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Will Delayed Retirement Decrease Young Employment? Robust Results for Malaysia

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Abstract

Motivation and aim: The purpose of the present study is to investigate whether older workers would replace younger worker and in turn, will increase the unemployment among the younger workers. The novelty of the present paper is that this study will provide empirical evidences whether the older workers will substitute the younger workers in Malaysia, by using four different measures of employment – the number of employed persons, employment rate, unemployment rate and labour force participation rate.

Methods and material: Our final estimating model consists of old and young employment with control variables consist of real GDP, foreign direct investment and fertility. In this study, we provide robust results on the impact of older workers on young workers for the period 1982 to 2021. We measure young workers with aged 15-24 years; while older workers, aged 55-64 years old. Using data on the number of employments, employment rates, unemployment rates and labour force participation rates for both old and young workers, our estimators used in the study are namely – Ordinary Least Square (OLS), Robust regression, Fully Modified OLS and Quantile regression.

Key findings: First, the short-thinking believers of the lump of labour fallacy fail to apprehend that over the long-run, technological improvements create new products and services, raise national income, and increase demand for labour throughout the economy. These people also fail to acknowledge that job opportunities rise with growing young population as older people enter the market as consumers as well as workers. Second, our results show no evidence of crowd out of the young by older workers that would support the lump of labour theory. The positive results on the association between young and older workers are consistent for employments, employment rates and labour force participation rates, and robust to various estimators – OLS-robust, FMOLS, Robust regression and quantile regression.

Policy implications: The lack of evidence on the crowding out effect of older workers on the younger workers can have an important influence on the employment and retirement policy in Malaysia. As warned by the World Bank that Malaysia is facing rapid population aging, it is time for the government and public to reform the current retirement system. By not extending the retirement age, the government has to bear the cost of higher fiscal burden in the future, and the possibility of facing higher unemployment rates among the young people. This would hurt the younger population. Thus, we can conclude and strongly recommended that the retirement age need to be extended to 65 years, in which it will benefits economic growth, employment of the older people as well as reducing the unemployment rates among the young people.

JEL Classifications:
E24, H55, J26

Keywords:
Delayed retirement, lump-to-labour fallacy, old and young workers, complement, Malaysia

Will Delayed Retirement Decrease Young Employment? Robust Results for Malaysia

1. INTRODUCTION

In 2019, the Malaysian government rejected the proposal by the Malaysian Trade Unions Congress (MTUC) to raise the mandatory retirement age from 60 to 65 years (HRD Asia, 2019) on the basis that extending the retirement age might lead to an increase in youth unemployment rates. This viewpoint was supported by the Malaysian Employers Federation (MEF) at that time. Nonetheless, the World Bank has cautioned that since Malaysia is in transition into an aging society, the retirement age will need to be gradually raised from 60 to 65 years old (World Bank, 2020). As of April 2023, the question of extending the retirement age to 65 years old has resurfaced, but with diverse views (The Edge, 2023). On the contrary, Abdullah (2020) argued that Malaysia is not yet prepared to raise the retirement age to 65 due to existing economic conditions, recent trends in the labour market for graduates, and the current demographic and health patterns.

The opponents of delaying retirement are based on the notion that older workers would displace younger workers, resulting in higher youth unemployment rates. This notion is referred to as the "lump of labour" fallacy. Interestingly, even some academics embrace this belief about lump of labour, despite its debunking over a century ago. The lump of labour fallacy rests on two conditions: (1) a fixed number of jobs in the market as in the zero-sum view of the economy which implies that the gain of one older worker equals to the loss of one younger worker; and (2) older workers act as substitutes for younger workers.

Contrary to the claims that extending the retirement age would worsen the labour market prospects for younger workers, some politicians strategically frame the labour market idea as a zero-sum game to manipulate public opinion in line with their political agendas. If the public were to believe in the lump-of-labour idea, neither left nor right parties would dare to go against them (Kemmerling, 2016). For example, political parties in France continued to believe in the concept of age-related crowding-out where older workers crowd out younger workers in order to solidify the complex interaction of political, economic and cultural factors that shape attitudes towards different generations (Yerkes et al., 2022) throughout their political discourse for the last forty years (1977-2017). In fact, the French Ministry of Finance formulated policies on work-time reduction and other labour supply adjustments based on this irrational belief in a fixed quantity of work (Walker, 2007).

In reality, our economy is dynamic; it is continually expanding with job creation balancing out job losses. Since labour is a valuable input in output production, job losses within a specific industry due to structural changes such as technological advancements, are generally compensated by other expanding industries. Furthermore, the size of the economy is always growing rather than remaining fixed, and new workers are added to the economy. The additional income they earn is spent on purchasing goods and services which subsequently heightens the demand for those goods and services. This, in turn, generates a greater demand for the labour responsible for their production. As a result, labour is not a fixed lump; instead, labour is determined by the forces of demand and supply. Over the long term, the number of job opportunities will increase in tandem with the growth of the labour force and the economy (Wolla, 2020).

In fact, Figures 1 to 4 clearly indicate that employment, employment rates and labour force participation rates for both older workers and younger workers grow simultaneously over three decades from 1982 to 2021. This implies the dynamic nature of the Malaysian economy that provides job opportunities for the Malaysian people throughout those decades. A preliminary study conducted by the World Bank (Jasmin & Rahman, 2021) using national representative survey data from 145 districts across 13 states and 2 federal territories from 2014 to 2016 concluded that the employment of older individuals does not negatively affect younger individuals' employment.

The primary goal of the present study is to investigate whether older workers would replace younger workers thereby potentially increasing unemployment among the younger workforce. The novelty of the present paper lies in its empirical evidences of whether older workers substitute the younger workers in Malaysia by using four distinct employment measures: the number of employed individuals, employment rate, unemployment rate and labour force participation rate. To enhance the credibility of our findings on the relationship between older and younger workers, we employ several estimators in the analysis namely; the OLS with robust standard error, Robust regression, FMOLS and Quantile regression analyses.

To delve deeper into the topic, the paper is structured as follows. Section 2 offers a brief overview of related literature concerning the association between older and younger workers. Section 3 outlines the data and methodology employed in our analysis. Section 4 discusses the empirical findings, and Section 5 concludes our study.

2. LITERATURE REVIEW

Numerous international pieces of evidence show that the engagement of the older people in the labour market does not lead to a reduction in the employment opportunities available to the younger people. Within the literature, the positive impact of employing older workers on the employment prospects of their younger counterparts outweighs any negative impacts. The World Bank (2016) has reiterated that an economy would benefit from increased participation of older workers in the labour market, which in turn, generates higher aggregate demand for labour, including opportunities for younger workers. Since the types of job and skills between younger and older workers differ significantly, they cannot be considered substitutes.

Earlier research conducted by Kalwij et al. (2010), investigated the relationship between the employment of older workers aged 55-64 and the employment of younger workers aged 15-24 across 22 OECD countries from 1960 to 2008. It was found that changes in the employment of older workers had generally small yet positive effects on the employment of their younger counterparts. Conversely, Gruber and Milligan (2010) found no consistent evidence of older worker employment affecting younger workers in the United States. Baker et al. (2010) similarly found no strong evidence of older worker employment crowding out the young workers in Canada while Banks et al. (2010) found no evidence of any long- term crowding out of younger individuals by their older counterparts in the U.K. Ben et al. (2010) suggested that increased participation of older workers is indeed correlated with a higher employment rate and a decreased unemployment rate for younger workers in France.

Bingley et al. (2010) found no observable relationship between the employment trends of older and younger age groups. Furthermore, the statistical evidence did not indicate that older and younger workers act as substitutes. In Denmark, regression results suggested a complementary relationship between younger and older workers because youth employment tended to rise and fall in unison with the elderly employment. In Spain, Boldrin et al. (2010) found no correlation in the employment between the younger and older workers. They discovered weak evidence of a positive relationship between the employment level of the young and the exit from the labour force of older workers. Börsch-Supan and Schnabel (2010) found the belief that the employment of older individuals crowds out their younger counterparts has no empirical support in Germany. In Italy, Brugiavini and Peracchi (2010) identified a procyclical relationship between the unemployment rate of young workers and the labour force participation of older workers; that is, higher labour force participation of older workers is associated with a lower unemployment rate of the younger workers, thus refuting the "lump of labour" fallacy.

Similarly, Palme and Svensson (2010) discovered no empirical support for the notion that high labour force participation rates among older workers tend to "crowd out" employment possibilities for the younger demographic in Sweden. Rather, most empirical findings indicated a positive relation between the labour force participation of older workers and the employment prospects of young workers. Oshio et al. (2010) noted that the employment of the young tends to be positively, rather than negatively, associated with the labour force participation of the old. Kaptyen et al. (2010) found that the employment of the elderly had a marginally significant positive effect on the employment of the young and a negative effect on their unemployment in the Netherlands.

Most recent studies have also debunked the lump of labour fallacy. For instance, Kondo's study (2016) focused on Japan, using data from the cross-sectional Basic Survey on Wage Structure (BSWS) conducted by the Ministry of Health, Labour and Welfare spanning the years 1998 to 2011. Kondo's study indicated a lack of evidence supporting the substitution of young full-time workers with elderly workers. Furthermore, Kondo also highlighted those reductions in wages among the elderly did not lead to an increase in the employment of younger workers. Similarly, a study by Wijayanti (2018) investigated the ASEAN countries which include Indonesia, Malaysia, the Philippines, Singapore and Thailand. The study demonstrated that the presence of older workers does not impede the career progress of younger workers; instead, these two groups of workers are in fact complements rather than acting as substitutes.

Hu and Yang (2021) investigated the lump of labour fallacy within the context of China. Their study established a dynamic optimisation framework to simulate the implications of delayed retirement on the welfare of the working population in China over time. They revealed that delayed retirement does not crowd out workforce welfare; instead, it improves the welfare of the working population. Furthermore, delayed retirement is linked to an increase in per capita income, which subsequently increases expenditures on consumption, savings, child-rearing, and providing support for elderly individuals.

In another study focusing on the United States, Jin (2017) analysed panel data drawn from the Merged Outgoing Rotation Groups (MORG) of the Current Population Survey (CPS) administered by the Bureau of the Census of Labor statistics. This study found no substantiated evidence of older workers crowding out their younger counterparts from the labour market. On the other hand, by examining micro data sets from population surveys in China, Zhang's work (2012) discovered a positive, rather than negative association between the employment rates of younger and older individuals. Fan (2022) concluded that an increase in the employment of the older workforce not only does not reduce employment opportunities for the younger workforce, but also stimulates economic growth and creates more jobs for the youth.

The economic theory suggests that substitution within a labour market is mainly governed by the similarity of skills and abilities associated to workers. Freeman (1998) exerted those individuals with different skills are unlikely to be perfect substitutes for one another. As older and younger workers possess differing educational backgrounds and work experiences, studies have found them to be imperfect substitutes (Card & Lemieux, 2000; Fizenberger & Kohn, 2006). Hebbink (1994) even identified a negative elasticity of substitution between older and younger workers, suggesting that older and younger workers complement rather than substitute for one another.

On a smaller scale of evidences, older workers are found to serve as substitutes for their younger counterparts. For example, An et al., (2023) conducted a study that focused on the impact of delayed retirement on youth unemployment in China from 2003 to 2020. Their findings indicated that delayed retirement contributed to an increase in youth unemployment. They posited that the saturation of job opportunities and current economic conditions led to a decline in job availability for young individuals. In another study utilising U.S. data, Dai et al. (2022) discovered that through the cross-market matching channel, retirement policy implementation led to increased unemployment among young workers, although it was ambiguous for older workers and negatively affect the wages of cross-market matched workers.

Notably, the latter effect was adverse for younger workers and positive for older workers due to the capital-skill complementarity.

Another study that supports the notion of older workers crowding out is conducted by Boeri et al. (2021) who studied the data of private sector firms with over 15 employees in 2011, covering the span from 2008 to 2014. Their findings revealed an average crowding out effect of around -0.7 for middle-aged workers due to the mandatory delay in retirement. This implies that for every three older workers retained, these firms reduced the employment of middle-aged workers by two units. There was a similar crowding-out of young workers observed, but it was less marked compared to middle-aged workers. About one out of five locked-in older workers displaced a young worker. Additionally, Bertoni and Brunello (2017), drawing data from the Italian Labour Force Survey (LFS) spanning from 2004 to 2015, showed that raising the local workforce by one thousand additional senior individuals reduced youth and prime-age employment by 189 and 86 individuals respectively. However, it also correspondingly increased senior employment by 149 individuals.

3. METHODOLOGY

3.1 The Estimating Model

In this study, our primary objective is to address the main question: Would young workers become unemployed when the retirement age of older workers be extended in Malaysia? This question forms the central point of our empirical investigation.

In our empirical analysis, inspired by Munnell and Wu (2012a, 2012b), we estimate the following logarithmic reduced form equation (our long-run model) to examine the relationship between older workers and young workers:

$$\mathrm{young}_{jt} = \alpha_0 + \beta_0 \mathrm{old}_{jt} + \theta_k Z_{kt} + \epsilon_t \qquad (1)$$

where young_{jt} refers to workers aged 15-24 years; while old_{jt} denotes workers aged 55-64 years. In our empirical analysis, we employ j, representing the number of employed individuals, employment rates, unemployment rates and labour force participation rates for both young and old workers which serve as indicators to test whether older workers act as "crowd-out" agents or substitute for their younger counterparts.

In view of the four measurements, namely employments (_emp), employment rates (_emprate), unemployment rates (_urate) and labour force participation rates (_lfpr), we can outline the four specific equations as follows,

$$\text{young\_emp}_t = \alpha_1 + \beta_1 \text{old\_emp}_t + \theta_k Z_{kt} + \varepsilon_t \qquad (2)$$

$$\text{young\_emprate}_t = \alpha_2 + \beta_2 \text{old\_emprate}_t + \theta_k Z_{kt} + \mu_t \qquad (3)$$

$$\text{young\_urate}_t = \alpha_3 + \beta_3 \text{old\_urate}_t + \theta_k Z_{kt} + \eta_t \qquad (4)$$

$$\text{young\_lfpr}_t = \alpha_4 + \beta_4 \text{old\_lfpr}_t + \theta_k Z_{kt} + \omega_t \qquad (5)$$

Here, emp, emprate, urate and lfpr refer to employment, employment rate, unemployment rate and labour force participation rate, respectively. The vector Z_{kt} is a set of control variables included in the analysis. These variables encompass real GDP, foreign direct investment (FDI) and fertility rate. The parameters α's, β's and θ's are coefficients or elasticities to be estimated while the error terms ε_t, μ_t, η_t and ω_t are assumed to exhibit a zero mean and constant variance.

The "crowd-out" or the substitutability of older worker for young workers is examined by testing whether β_1, β_2, β_3 and β_4 are negative and significant. A negative and significant β_1 in Equation (2), would imply that increased employment of older workers will reduce employment opportunities for younger workers. Similarly, if β_2 is negative and significant in Equation (3), it indicates that increased employment rates among older workers will adversely impact the employment rates of young workers. In Equation (4), a negative and significant β_3 suggests that an increase in the unemployment rates among older workers would result in reduced unemployment rates for young workers. For β_4 in Equation (5), a negative and significant β_4 indicates that an increase in labour force participation rates among older workers leads to a decrease in labour force participation rates among younger workers. Thus, the negative (and significant) β's supports the notion that older and younger workers are substitutes, and that the job market is static. This condition aligns with the “lump of labour” theory.

3.2 Method of Estimations

To estimate Equations (2) to (5), we employ the Ordinary Least Square (OLS) with robust standard error due to Newey-West (Newey & West, 1987) procedure. Newey-West standard error method is a robust method/estimator which is highly accurate when there is a presence of heteroskedasticity and autocorrelation. Due to the fact that the time series variables are nonstationary, and most likely the regressions results will be spurious, we test the model for the presence of cointegration. To test for cointegration, we employ the conventional cointegration test proposed by Engle and Granger (1987). The two-step Engle-Granger cointegration test is done by estimating Equation (2) using OLS first. In the second step, the residuals are saved and then tested for the presence of unit root. The rejection of a unit root in the residuals will suggest cointegration. If the variables are found to be cointegrated in Equations (2) to (5), the estimated long-run models are said to be valid, the OLS estimation is efficient and the results are nonspurious.

In this study, we also employ the Fully Modified OLS (FMOLS) procedure and Robust regression such as the M-estimator to estimate the long-run models as per Equations (2) to (5). The FMOLS is more efficient and robust than the OLS, particularly for small samples, to work with models with heteroscedasticity, autocorrelation, and non-normality of errors. For the OLS approach, to circumvent the problem of autocorrelation and heteroscedasticity, we will estimate our models using OLS with robust standard error based on the Newey-West procedure.

On the other hand, we also employ the Robust regression approach which is robust to the presence of outliers. According to Rousseeuw (1984), robust regression is the best method to detect outliers and provides results that are resistant to outliers. The most common general method of robust regression is the M-estimation method introduced by Huber (1964). Barnett and Lewis (1994) stated that the presence of outliers can lead to inflated error rates and substantial distortions of parameter and statistical estimates when using either parametric or non-parametric tests. Statistically, the increase in error variance will reduce the power of statistical tests, decrease normality, and seriously bias or influence parameter estimates (Perez et al., 2013). For some of our sample of countries, several of the series exhibit outliers. This is evident in Figure 5. Boxplots in Figure 5 show some series such as Young_urate, Old_urate and FDI that contain outliers. These outliers are located at the top and/or bottom of the upper and/or lower whiskers. In view of this potential problems, we endeavour to employ the Robust regression estimator which is robust to the presence of outliers.

One strong simplification of the OLS estimates is that the explanatory variables determine the effects on the mean of the conditional distribution of the dependent variable. To allow the effects of the regressors on the entire conditional distribution of the dependent variable, we employ the quantile regression proposed by Koenker and Basset (1978). Quantile regression allows the estimated parameters (slopes) to differ at different points of the conditional distribution of the dependent variable. Since quantile regression is nonparametric procedure, it does not impose any functional form on the economic growth relationship. Furthermore, quantile regression is not sensitive to the presence of outliers. Therefore, a number of different quantile regressions give more complete descriptions of the underlying conditional distribution.

The quantile regression is defined as follows:

$$\mathrm{young}_t = x_t'\beta_\tau + \mu_{\tau t} \quad 0<\tau<1 \tag{6}$$

$$\mathrm{Quantile}_\tau(\mathrm{young}_t|x_t) = x_t'\beta_\tau \tag{7}$$

where x_t' equals a vector of explanatory variables as defined above, β_τ equals the vector of parameters associated with the τ-th percentile, and $\mu_{\tau i}$ equals an unknown error term. The $\mathrm{Quantile}_\tau(\mathrm{young}_t|x_t) = x_t'\beta_\tau$ equals the τ-th conditional quantile of growth given x with $\tau \in (0,1)$. By estimating β_τ, using different values of τ, quantile regression permits different parameters across different quantiles of young_t. In other words, repeating the estimation for different values of τ between 0 and 1, we trace the distribution of young_t conditional on x and generate a much more complete picture of how explanatory variables affect the dependent variable. The τ-th quantile regression estimates β_τ, by solving the following minimisation problem, and the median regression occurs when $\tau = 0.5$ and the coefficients of the absolute values both equal one.

$$\hat{\beta}(\tau) = \arg\min_{\beta} \left[\tau \sum_{\{young_t \geq x_i'\beta\}} |young_t - x_t'\beta| + (1-\tau) \sum_{\{young_t < x_t'\beta\}} |young_t - x_t'\beta|\right].$$

Figure 6 shows the quantile-quantile (Q-Q) plots for all the variables in our study. The Q-Q plots show that none of the variables present a good fit to normal distributions. Despite the Q-Q plot visualization on all the series, the Jacque-Bera goodness of fit test as presented in Table 1 reject the null hypothesis of normality for only Young_urate, Old_emp and Old_emprate. Thus, most variables in our model do not follow the normal distribution. It seems that the majority of the data distribution is normal; nonetheless, the quantile regression can provide more efficient estimates for detecting the relationship between $young_t$ and its determinants, and particularly, the old_t variables.

3.3 Data Sources

The data used in our study includes the dataset from 1982 to 2021. Data on employment, unemployment rates and labour force participation rates were taken from the Labour Force Survey (LFS) Time Series Statistics by States, spanning from1982 to 2021, which is available on the Department of Statistics Malaysia's website at https://www.dosm.gov.my/portal-main/time-series. The employment rate was calculated as employment per 100,000 persons.

Data on real Gross Domestic Product (GDP), total population, foreign direct investment, and total fertility rate were collected from the World Development Indicator, a World Bank database which is available at https://data.worldbank.org/indicator?tab=all. Foreign direct investment is measured using the percentage ratio of foreign direct investment net inflows to GDP. All variables were transformed into logarithm and used in all estimations.

4. THE EMPIRICAL RESULTS

4.1 Descriptive Statistics and Correlation Matrix

Before we proceed estimating Equations (2) to (5), the descriptive statistics of all the variables involved in the study are presented in Table 1. In general, the mean for all series is positive, meaning that all series are trending upwards. The employment of younger workers has been higher than the employment of older workers. The mean employment for younger workers is 1974.4, and for old workers, the mean is 685.7. Similarly, for the employment rates, younger workers record higher than older workers with means of 8612.7 and 2755.9, respectively. With respect to the unemployment rates, older people record lower than the unemployment rate of the younger people. The mean unemployment rate for younger people is 10.9%, and for the older people, the mean is 1.6%. As for the labour force participation rate, the mean is 49.0% for younger workers and 48.4% for older workers.

More importantly, most variables demonstrate substantial standard deviations, skewness and kurtosis. All eleven variables are skewed showing asymmetry. As for kurtosis, the variables that show the size of greater than 3 include Young_urate and FDI. This indicates that the series shows longer or fatter tail on the right side of the distribution. In other words, the kurtosis shows a leptokurtic type of distribution for the series. Nevertheless, the Jarque-Bera test for normality of the series is rejected for all series except for Young_urate, Old_emp and Old_emprate. In view of that, many of the variables involved in our analysis demonstrate extreme skewness and kurtosis and have non-normal distribution, the common method to circumvent these problems is to transform all variables into logarithm (McKinney et al., 2009; Naidoo & Adamowicz, 2001; Ehrhardt-Martinez et al., 2002).

In Table 2, we present the correlation matrix for dependent variables (Young_emp, Young_emprate, Young_urate) and all independent variables, namely, Old_emp, Old_emprate, Old_urate, real GDP, FDI and fertility. Generally, the correlation between Young_emp and Old_emp, Young_urate and Old_urate, Young_lfpr and Old_lfpr is positive. This implies that younger and older workers are complements in terms of employment, unemployment rates and labour force participation rates. On the other hand, in terms of employment rates, younger and older workers act as substitutes as shown by the negative correlation between the two variables.

On the one hand, the correlation matrix also indicates that Young_emp has positive correlation with Real GDP and negative with fertility. Young_emprate suggests negative correlation with Real GDP but positive correlation with FDI and fertility. Young_urate shows only significant negative correlation with FDI. On the other hand, Young_lfpr indicates negative correlation with Real GDP but positive correlation with FDI and fertility.

For older workers: (1) Old_emp shows positive correlation with Real GDP, but negative correlation with fertility; (2) Old_emprate demonstrates negative correlation with Real GDP but positive correlation with FDI and fertility; (3) Old_urate and Old_lfpr illustrate negative correlation with Real GDP but positive correlation with fertility.

Figures 1 to 4 show the trend of the employment, employment rates, unemployment rates and labour force participation rates for both young and older workers, respectively. The trend in employment for both young and older workers seem to move together over more than three decades. On the other hand, Figure 2 suggests that between 1982 and 2008, the employment rates of the older workers have increased steadily during the period, but the employment rates of the younger workers have been on a decreasing trend. However, starting from 2009, both employment rates of younger and older workers have moved together for the rest of the years until 2021. For the trend in unemployment rates, except for the period during mid-1980s, on average, both younger and older individuals seem to show increasing trends for the next twenty years. Nevertheless, whether younger and older workers are substitutes or complements over the three decades is an empirical question.

4.2 Results of Unit Root Tests

Before conducting the cointegration test on Equations (2) to (5), the order of integration of each of the variable is to be determined. To test for integration, we employ the standard Augmented Dickey-Fuller (Dickey & Fuller, 1981) unit root test. The test is conducted for both variables in level as well as their first-differences. For each unit root test, we include the intercept and/or trend as the deterministic components when conducting a unit root test. The results of the unit root test are presented in Table 3. The unit root test results suggest that all variables in their levels are integrated of order one, that is, I(1). After first-differencing, no unit root is detected which means that they are stationary in their log changes. In other word, all series are I(0), that is, stationary in first-differences.

4.3 Results of Cointegration Tests

The results of our regression analyses for estimating Equation (2) to (5) are presented in Table 4. All estimated regressions were estimated using OLS with robust standard error due to Newey-West procedure (OLS-robust). For each of the estimated regression, we saved the residuals, and these residuals were tested for unit root. The significance of the DF t-statistics on the residuals will suggest that there is no unit root in the residuals, and thus, implies that the residuals are stationary. This will imply that there is cointegration among the variables in the model. The existence of cointegration validate the regressions estimated using OLS, and the results are nonspurious. As shown in Table 4, the DF t-statistics clearly suggest that the null hypothesis of a unit root can be rejected at the 1% level of significance. Our cointegrated estimated regressions are our long-run models.

Interesting results emerge from Table 4. First, in column 1, the impact of Old_emp on Young_emp is positive and significant at 1% level. A 1% increase in the employment of older workers will increase the employment of the younger workers by 0.41%. Second, in column 2, our results suggest that the impact of younger workers employment rates (Young_emprate) on the employment rates of older workers (Old_emprate) is also positive and significant at 1% level. A 1% increase in the employment rates of older workers raises the employment rates of younger workers by 0.45%. These positive relationships imply that older workers and younger workers are complements. And third, in column 3, our results suggest that the unemployment rates of older people have no impact on the unemployment rates of younger people since variable Old_urate is not statistically significant at any level. In column 5, the older labour force participation rate positively affects the young labour force participation rate.

To support further our OLS-robust results, we estimate our long-run models using two additional estimators, namely; FMOLS as shown in Table 5, and Robust regression as shown in Table 6. As shown by FMOLS's results, all three indicators – Old_emp, Old_emprate and Old_lfpr are positive and significant. The estimated elasticities are indeed larger than the elasticities of OLS-robust. A 1% increase in older worker's employment, employment rate and labour force participation rate will increase employment, employment rate and labour force participation rate of younger worker by 0.42%, 1.81% and 0.65% respectively. Despite a larger size in elasticities, these positive results clearly suggest that older workers and younger workers are complements. However, as shown in Table 5, the unemployment rate of older workers has no impact on younger workers.

On the other hand, the results of the Robust regression estimator which is robust to the present of outliers (suspected outliers during the commodity price crash in 1985. See Figure 3) is presented in Table 6. The estimated elasticities of younger workers with respect to the changes in older worker's employment, employment rate and labour force participation rate is 0.39%, 0.41% and 0.47% respectively. A 1% increase in the employment, employment rate and labour force participation rate of older workers will increase young workers employment, employment rate and labour force participation rate by 0.39%, 0.41% and 0.47% respectively. Thus, the complementarity between older and younger workers are substantiated by our empirical evidence as presented above. Again, we found that the unemployment rate of older workers has no connection with the unemployment rate of younger workers.

Results of the quantile regressions are presented in Table 7. As shown in Panel A, the employment of older workers affects positively on the employment of younger workers for the 20th, 40th, 50th and 60th quantile. A 1% increase in the number of employments for older workers will result in an increase of between 0.30% to 0.44% in the employment of younger workers. At higher quantile of 80th percentile, older workers' employment has no effect on the younger workers. On the other hand, the impact of old workers employment rate on the younger workers employment rate is shown in Panel B. We observe that the impact of the employment rate of older workers on the employment rate of younger workers is positive. A 1% increase in the employment rate of older workers will increase the employment rate of younger workers by 0.47% at the 20th quantile; 0.45% at the 40th quantile; 0.44% at the 50th quantile; 0.41% at the 60th quantile, and 0.30% at the 80th quantile. This results clearly indicate that older workers do not substitute younger workers; instead, they are complements.

In Panel C, results in Table 7 suggest that older worker's unemployment rate has no impact on the unemployment rate of younger workers at all quantiles. On the other hand, the impact of older worker's labour force participation rate on the labour force of younger worker is presented in Panel D. The impact of older workers on younger workers labour force participation rate is only statistically significant at the 20th and 40th quantiles at 1% level; while at the 50th and 60th quantile, it is statistically significant at 10% level. The results suggest that an increase in the labour force participation rate of older workers would increase the labour force participation rate of younger workers.

5. CONCLUSION

The purpose of the present study is to provide empirical evidence that the lump of labour idea is untrue in Malaysia. To do that, we have collected data on the number of employments, employment rates, unemployment rates and labour force participation rates for both younger workers aged 15-24 and older workers aged 55-64, using annual data from 1982 to 2021. We then estimate our stochastic models using four different estimators, namely; the OLS with robust standard error, fully modified OLS, Robust regression with M-estimator and quantile regression which is robust to the presence of outliers.

Generally, we can conclude that: First, the short-thinking believers of the lump of labour fallacy fail to apprehend that over the long-run, technological improvements create new products and services, raise national income, and increase demand for labour throughout the economy. These people also fail to acknowledge that job opportunities rise with growing young population as older people enter the market as consumers as well as workers. Second, our results show no evidence of crowd out of the younger by older workers that would support the lump of labour theory. The positive results on the association between younger and older workers are consistent for employments, employment rates and labour force participation rates, and robust to various estimators – OLS-robust, FMOLS, Robust regression and quantile regression. Thus, people should not fear of losing their jobs or not getting new jobs when older people extend their employment in the labour market. Thirdly, the data illustrated that the employment of younger and older workers tends to move in the same direction over more than three decades, and our empirical analysis supports the notion that older and younger workers are complementary in Malaysia.

The lack of evidence on the crowding out effect of older workers on younger workers can have an important influence on the employment and retirement policy in Malaysia. As suggested by the World Bank that Malaysia is facing rapid population aging, it is time for the government and public to reform the current retirement system. By not extending the retirement age, the government has to bear the cost of higher fiscal burden in the future, and the possibility of facing higher unemployment rates among the young people. This would potentially hurt the younger population. Thus, we can conclude and strongly recommend that the retirement age should be extended to 65 years which will benefit the economic growth, employment of the older people as well as reduce the unemployment rates among the youth.

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Table 1: Descriptive statistics

Series	Unit	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obs
Young_emp	'000	1974.4	2594.6	1582.7	279.7	0.44	2.22	2.29	40
Young_emprate	person	8612.7	11369.1	6454.5	1411.9	0.34	1.79	3.20	40
Young_urate	%	10.85	17.38	6.64	2.30	1.23	5.09	17.42***	40
Young_lfpr	%	48.96	58.07	40.16	0.06	0.19	1.39	4.55	40
Old_emp	'000	685.7	1323.4	335.3	315.0	0.71	2.06	4.84*	40
Old_emprate	person	2755.9	3986.1	2243.2	569.6	0.99	2.31	7.38**	40
Old_urate	%	1.55	3.54	0.28	0.85	0.58	2.64	2.46	40
Old_lfpr	%	48.38	53.93	43.24	0.03	-0.02	2.27	0.89	40
RealGDP	RM mil	686542.6	1423952.0	184832.0	392006.1	0.43	1.96	3.04	40
FDI	%	3.80	8.76	0.06	1.86	0.53	3.54	2.38	40
Fertility	rate	2.77	3.96	1.80	0.70	0.15	1.54	3.70	40

Notes: Asterisks ***, **, * denote statistically significant at 1%, 5% and 10% level, respectively. Jarque-Bera is a test of non-normality of the series.

Table 2: Correlation matrix

Series	Old-emp	Old_emprate	Old_urate	Old_lfpr	Real GDP	FDI	Fertility
Young_emp	0.9131***				0.9106***	0.0753	-0.8529***
	(13.807)				(13.579)	(0.4655)	(-10.072)
Young_emprate		-0.6290***			-0.8978***	0.3209**	0.9194***
		(-4.9880)			(-12.564)	(2.0884)	(14.409)
Young_urate			0.3577**		-0.2236	-0.3733**	0.0437
			(2.3611)		(-1.4139)	(-2.4806)	(0.2697)
Young_lfpr				0.5160***	-0.8799***	0.2834*	0.8977***
				(3.7134)	(-11.418)	(1.8217)	(12.563)
Real GDP	0.9657***	-0.8978***	-0.6536***	-0.4446***	1	-0.1173	-0.9699***
	(22.943)	(-12.564)	(-5.3239)	(-3.0596)		(-0.7280)	(-24.554)
FDI	-0.1577	0.3209**	-0.0965	0.0405		1	0.1835
	(-0.9847)	(2.0884)	(-0.5976)	(0.2500)			(1.1506)
Fertility	-0.9760***	0.9194***	0.6089***	0.3832**			1
	(-27.603)	(14.409)	(4.7313)	(2.5578)			

Notes: Asterisk *** denotes statistically significant at 1% level. Figures in round bracket, (…) are t-statistics. All variables are in logarithm.

Table 3: Results of unit root tests

Variables	Level: Intercept	Intercept+trend	First-difference Intercept	Intercept+trend
Young_emp	-0.66 (0)	-2.59 (0)	-7.41***(0)	-7.30***(0)
Young_emprate	-1.75 (0)	-1.67 (0)	-7.06***(0)	-7.22***(0)
Young_urate	-2.26 (0)	-2.35 (0)	-5.04***(0)	-4.98***(0)
Young_lfpr	-2.14 (4)	0.38 (1)	-6.68***(0)	-6.83***(0)
Old_emp	0.38 (0)	-1.92 (0)	-5.69***(0)	-5.76***(0)
Old_emprate	0.54 (0)	-1.66 (0)	-5.30***(0)	-5.81***(0)
Old_urate	-0.81 (6)	-2.51 (7)	-4.26***(5)	-4.05***(5)
Old_lfpr	-2.12 (0)	-2.12 (0)	-6.70***(0)	-6.75***(0)
Real GDP	-1.88 (0)	-0.60 (0)	-4.89***(0)	-5.20***(0)
FDI	-2.59 (4)	-2.82 (4)	-6.98***(1)	-6.88***(1)
Fertility	-0.64 (1)	-3.11 (3)	-2.91* (0)	-2.84 (0)

Notes: Asterisk ***, **, * denotes statistically significant at 1%, 5% and 10% level, respectively. Figures in round bracket, (…) are optimal lagged length. All variables are in logarithm. Using DF-GLS unit root test proposed by Elliott, Rothenberg & Stock (1992), the DF-GLS test statistic for Fertility in first-difference is -2.82**(0) with intercept, and -2.91*(0) with intercept and trend.

Table 4: Results using OLS-robust for young workers

Independent variables	Depandent variables: Young_emp	Young_emprate	Young_urate	Young_lfpr
Constant	1.9194**	4.6263***	15.327***	1.8170
	(2.0839)	(4.4444)	(4.3857)	(1.2331)
Old_emp	0.4092***			
	(4.2203)			
Old_emprate		0.4532***		
		(6.6473)		
Old_urate			0.0614	
			(1.0714)	
Old_lfpr				0.4592**
				(2.3291)
Real GDP	0.1784***	0.0001	-0.8241***	-0.0082
	(4.2685)	(0.0040)	(-3.5635)	(-0.1278)
FDI	0.0266***	0.0273***	-0.0443*	0.0202**
	(3.7160)	(4.4945)	(-1.7528)	(2.0484)
Fertility	0.6382***	0.8010***	-2.0278***	0.3756**
	(3.5253)	(6.0936)	(-4.9022)	(2.2588)
$\hat{R}^2$	0.930	0.939	0.575	0.840
DF	-3.83***	-4.21***	-4.08***	-1.63*

Notes: Asterisks ***, **, * denote statistically significant at 1%, 5% and 10% level, respectively. $\hat{R}^2$ is adjusted R-square. DF denotes Dickey-Fuller unit root test on the residuals. Figures in round bracket, (…) are t-statistics.

Table 5: Results using FMOLS for young workers

Independent variables	Depandent variables: Young_emp	Young_emprate	Young_urate	Young_lfpr
Constant	2.1172***	4.5024***	14.206***	0.6738
	(2.7477)	(5.6898)	(5.7140)	(0.3179)
Old_emp	0.4197***			
	(5.6319)			
Old_emprate		0.5049***		
		(9.0905)		
Old_urate			0.0790	
			(1.6124)	
Old_lfpr				0.6515**
				(2.3292)
Real GDP	0.1594***	-0.0205	-0.7523***	0.0161
	(3.3059)	(-0.5508)	(-4.6844)	(0.1641)
FDI	0.0332***	0.0318***	-0.0669**	0.0526***
	(3.9571)	(4.5527)	(-2.3227)	(3.0073)
Fertility	0.6199***	0.7904***	-1.8675***	0.4289*
	(4.4723)	(7.4344)	(-4.9194)	(1.8021)
$\hat{R}^2$	0.924	0.929	0.581	0.770

Notes: Asterisks ***, **, * denote statistically significant at 1%, 5% and 10% level, respectively. $\hat{R}^2$ is adjusted R-square. Figures in round bracket, (…) are t-statistics. We used lag one period for pre-whitening.

Table 6: Results using Robust regression for young workers

Independent variables	Dependant variables: Young_emp	Young_emprate	Young_urate	Young_lfpr
Constant	1.5946**	4.4572***	18.801***	1.3380
	(2.1332)	(5.5850)	(11.128)	(1.2486)
Old_emp	0.3851***			
	(5.3328)			
Old_emprate		0.4423***		
		(8.0446)		
Old_urate			0.0028	
			(0.0857)	
Old_lfpr				0.4658***
				(3.2740)
Real GDP	0.2107***	0.0160	-1.0580***	0.0178
	(4.6191)	(0.4362)	(-9.7288)	(0.3635)
FDI	0.0242***	0.0268***	-0.0349*	0.0130
	(2.9652)	(3.8217)	(-1.7151)	(1.4703)
Fertility	0.6902***	0.8432***	-2.3802***	0.4857***
	(5.0922)	(7.8693)	(-9.0142)	(4.0533)
$\hat{R}w^2$	0.960	0.968	0.819	0.923

Notes: Asterisks ***, **, * denote statistically significant at 1%, 5% and 10% level, respectively. $\hat{R}w^2$ adjusted measure of goodness of fit in Robust regression. Figures in the slash bracket, /…/ are z-statistics.

Table 7: Results on Quantile regressions for young workers

Dependent variable:	constant	Old_emp	Real GDP	FDI	Fertility
Panel A: $Young\_emp_t$					
Q(0.20)	2.0190	0.4355***	0.1557**	0.0191**	0.6494***
	(1.7389)	(6.1346)	(2.1692)	(2.2811)	(3.2176)
Q(0.40)	1.4074	0.4130***	0.2085***	0.0245**	0.7195***
	(1.3183)	(4.4413)	(3.7271)	(2.5552)	(3.6064)
Q(0.50)	1.4552	0.4010***	0.2114***	0.0259***	0.7163***
	(1.4181)	(4.2627)	(4.2689)	(2.9644)	(3.6400)
Q(0.60)	2.0687	0.3011**	0.2246***	0.0310***	0.5727**
	(1.5241)	(2.1019)	(4.7255)	(3.3988)	(2.0546)
Q(0.80)	2.9270***	0.1992	0.2241***	0.0327***	0.3890
	(2.6216)	(1.4973)	(5.7590)	(4.2124)	(1.6393)

Dependent variable:	constant	Old_emprate	Real GDP	FDI	Fertility
Panel B: $Young\_emprate_t$					
Q(0.20)	4.9261***	0.4681***	-0.0292	0.0222***	0.7538***
	(4.0913)	(7.4747)	(-0.4801)	(2.9322)	(4.3521)
Q(0.40)	4.7596***	0.4473***	-0.0052	0.0276***	0.7781***
	(3.3189)	(5.5796)	(-0.0810)	(3.0331)	(3.8991)
Q(0.50)	4.4924***	0.4424***	0.0138	0.0278***	0.8363***
	(3.4866)	(5.8493)	(0.2462)	(3.4323)	(4.7343)
Q(0.60)	4.3471***	0.4097***	0.0412	0.0299***	0.8814***
	(3.2654)	(4.8894)	(0.7532)	(3.5956)	(4.8946)
Q(0.80)	6.1532***	0.2989**	-0.0090	0.0271	0.6405***
	(3.8315)	(2.5374)	(-0.1687)	(1.5029)	(3.1458)

Dependent variable:	constant	Old_urate	Real GDP	FDI	Fertility
Panel C: $Young\_urate_t$					
Q(0.20)	16.262***	0.0507	-0.8898***	-0.0236	-2.1752***
	(5.2660)	(1.0552)	(-4.4303)	(-1.3358)	(-5.0901)
Q(0.40)	17.538***	0.0235	-0.9687***	-0.0489	-2.3356***
	(5.1396)	(0.5434)	(-4.3820)	(-0.9853)	(-4.8546)
Q(0.50)	18.342***	0.0140	-1.0207***	-0.0408	-2.4372***
	(5.2787)	(0.3306)	(-4.5340)	(-1.0445)	(-4.9375)
Q(0.60)	17.212***	0.0120	-0.9484***	-0.0409	-2.2532***
	(4.8394)	(0.2887)	(-4.1144)	(-1.0165)	(-4.4733)
Q(0.80)	18.564***	-0.0096	-1.0436***	-0.0350	-2.2303***
	(3.5236)	(-0.2648)	(-3.0257)	(-0.3180)	(-2.7817)

Dependent variable:	constant	Old_lfpr	Real GDP	FDI	Fertility
Panel D: $Young\_lfpr_t$					
Q(0.20)	-1.5214	0.7976***	0.4116***	0.0062	0.5173***
	(-1.5898)	(6.2467)	(9.9631)	(0.9030)	(5.0917)
Q(0.40)	-1.8366	0.8681***	0.4174***	0.0112	0.4973***
	(-1.4833)	(5.4233)	(8.2548)	(1.3115)	(3.9229)
Q(0.50)	-0.0342	0.6498*	0.3571***	0.0212	0.3400
	(-0.0121)	(1.8296)	(3.5959)	(1.5257)	(1.3410)
Q(0.60)	1.4241	0.4422*	0.3158***	0.0299***	0.2333
	(0.6982)	(1.7149)	(4.2118)	(2.9367)	(1.2193)
Q(0.80)	2.6793*	0.2538	0.2835***	0.0242	0.1566
	(1.8882)	(1.1625)	(5.8601)	(1.3891)	(1.2645)

Notes: Asterisks ***, **, * denote statistically significant at 1%, 5% and 10% level, respectively. Figures in round bracket, (…) are t-statistics.

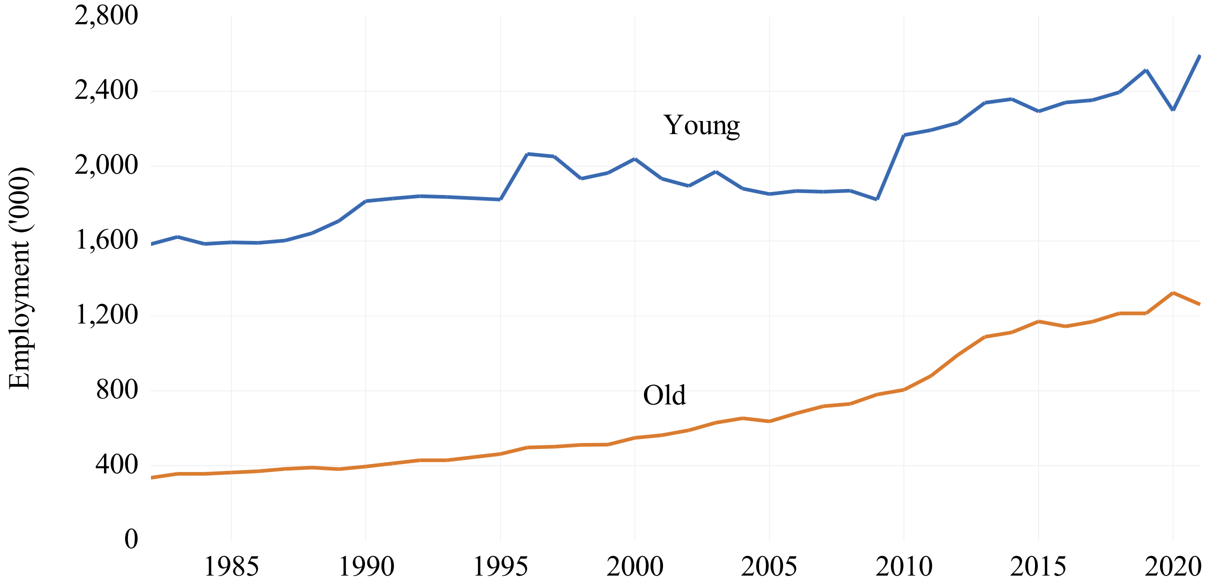

Figure 1: Trend in employment for young and older workers, 1982-2021

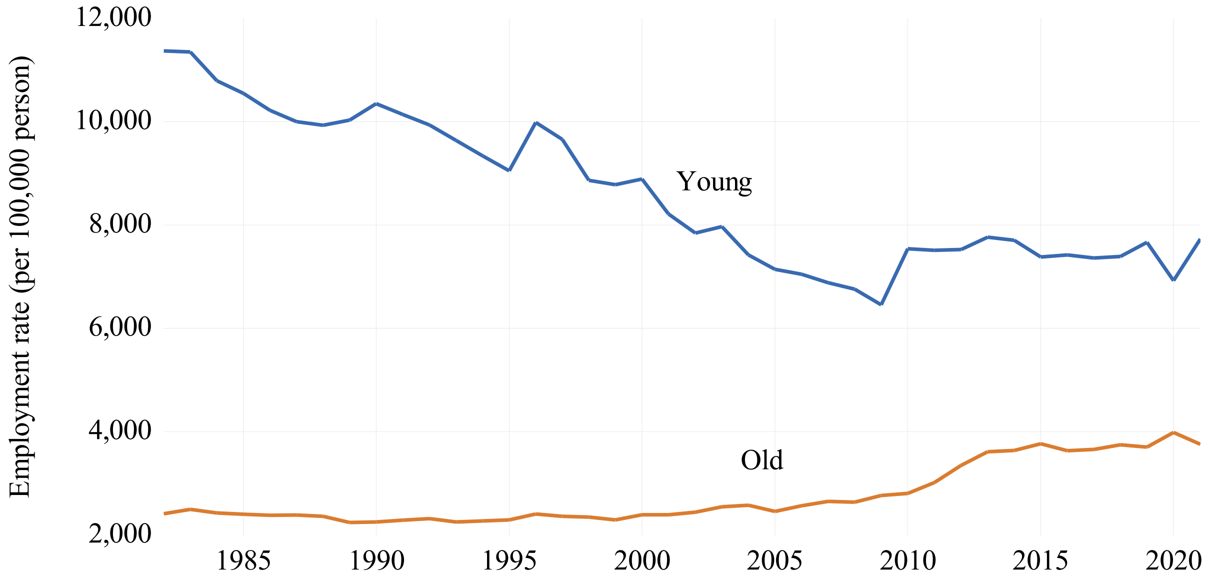

Figure 2: Trend in employment rates for young and older worker, 1982-2021

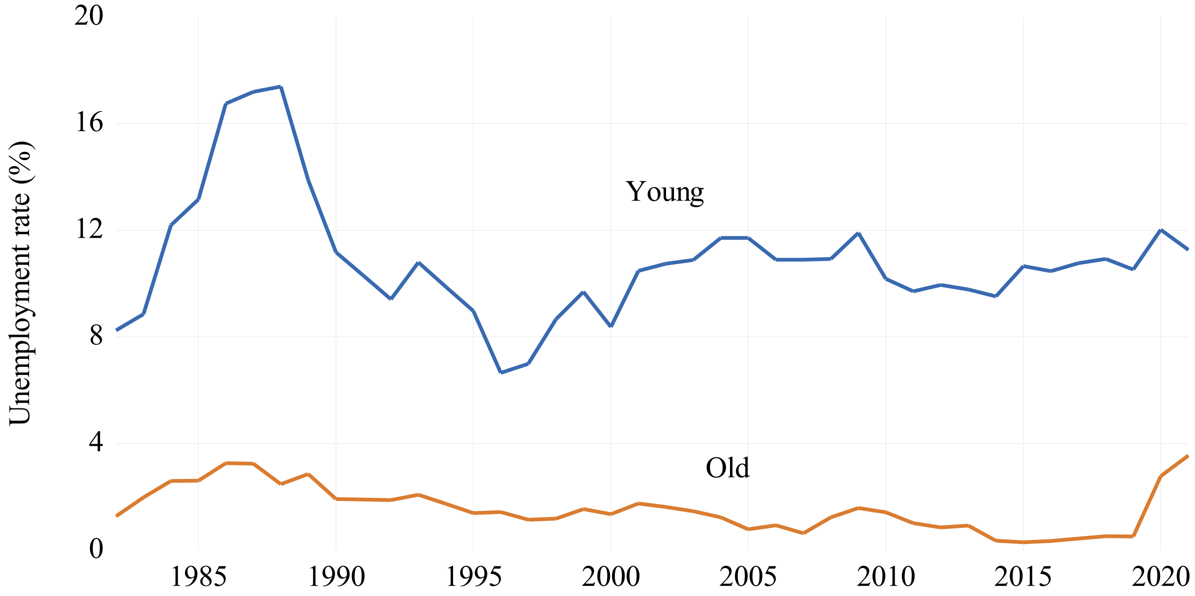

Figure 3: Trend in unemployment rates for young and older workers, 1982-2021

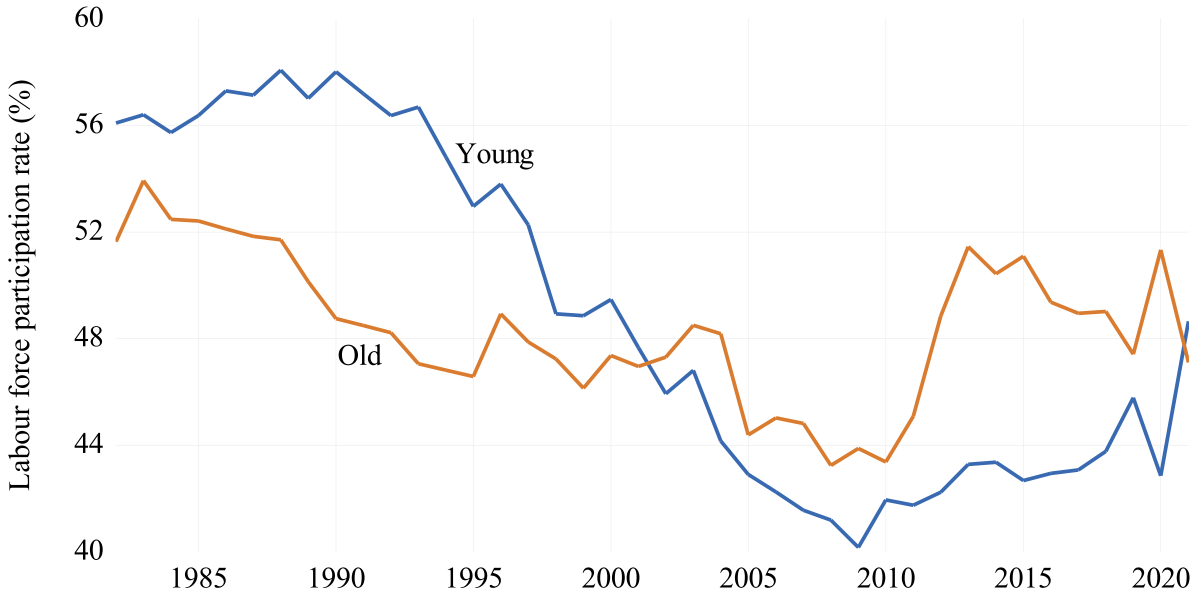

Figure 4: Trend in labour force participation rates for young and older workers, 1982-2021

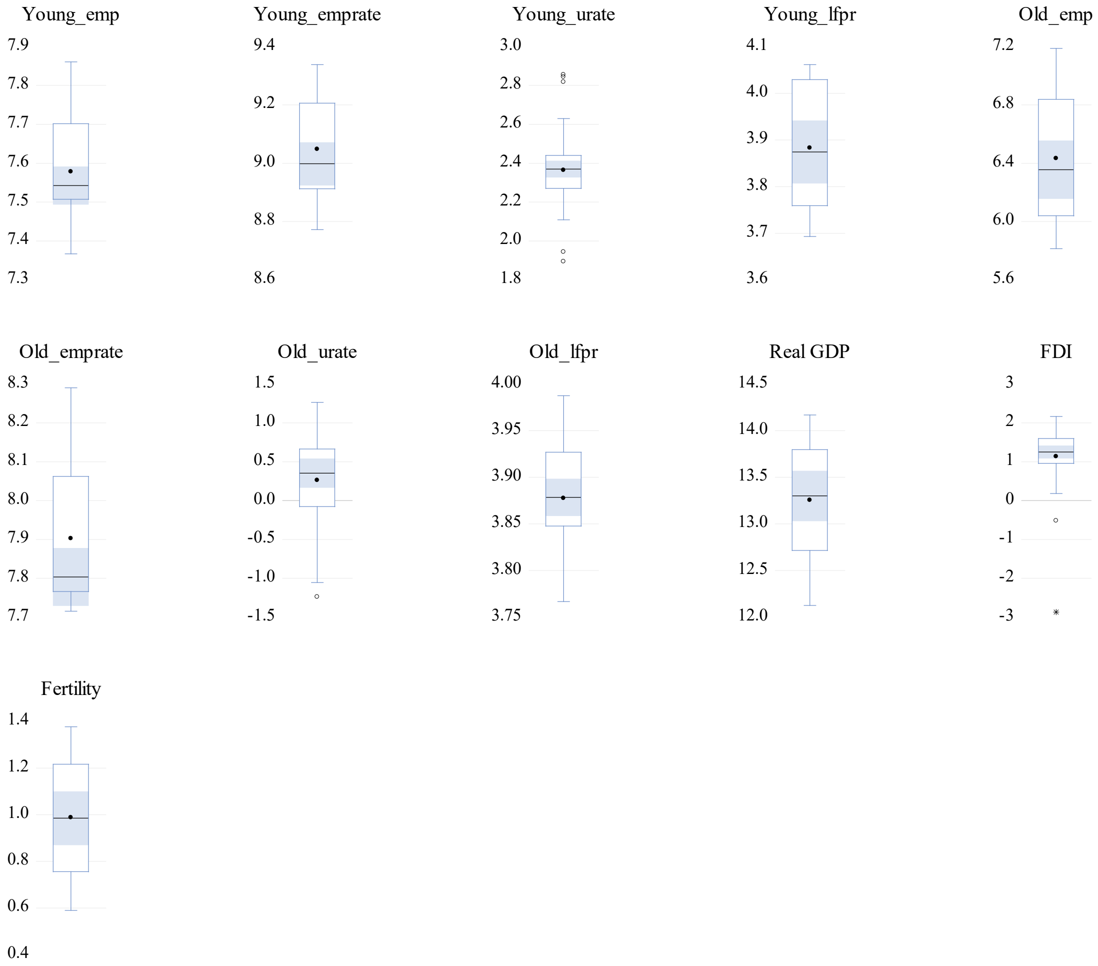

Figure 5: Boxplot for all series

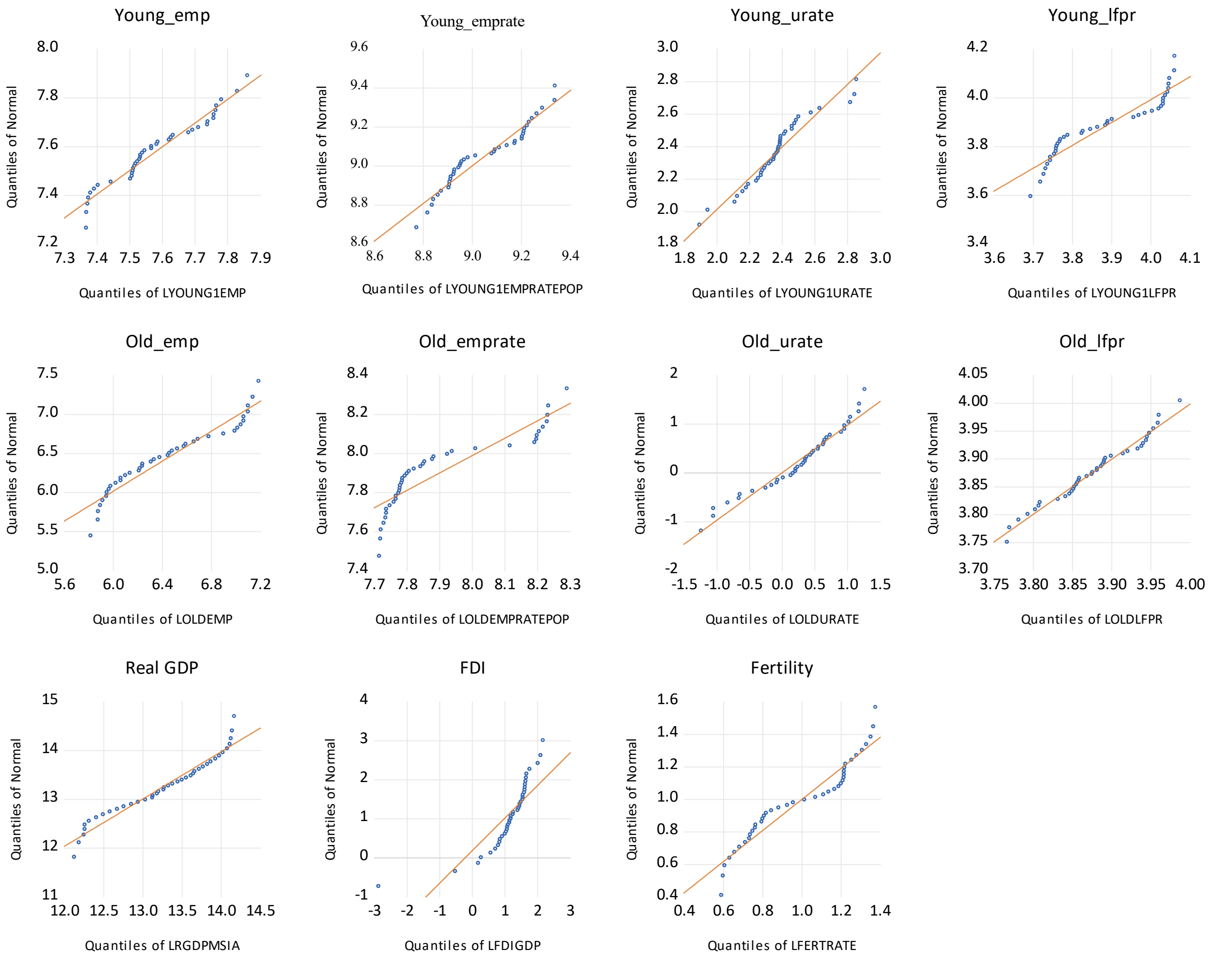

Figure 6: Q-Q plots for all series

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