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**DETERMINANTS OF LABOR MARKET IN JAKARTA METROPOLITAN AREA:
A SURVIVAL ANALYSIS OF COMMUTERS**

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Abstract: This study aims to assess the determinants of the labor market in the Greater Jakarta Area (Jabodetabek) with a population of 27.9 million (2010 census) and growth rate of 3.6 percent per annum over the period 2000-2010. With a total area of 4,384 square kilometers (1,693 sq mi), the city has a very high population density of 14,464 people per square kilometer (37,460/ sq mi), while the metro area has a density of 4,383 people/sq km (11,353/sq mi). The paper employs the survival regression analysis by incorporating attributes of commuter, namely gender, age, distance, travel time, wages, stress, education level, double income households, and home ownership. The area consists of Jakarta as the receiving labor market and eight municipalities and regencies as labor suppliers. The study utilizes a cross-section data from a commuter survey with more than 4,000 respondents participated using different modes of land transport. The results reveal that some determinants have influenced commuters' resiliency and their willingness to participate in the receiving labor market. We found that gender, distance, wages, and home ownership do not affect to respondent's decision whether to stay or quit as commuters. On the other hand, the fittest model exhibits that age, education level, stress, travel time, and double income households have

significant effects on individual's decision to stay or quit as a commuter. We found that gender, distance, wages, and home ownership do not matter to respondent's decision on whether to stay or to quit as commuters. The model exhibits that age, education level, stress, travel time, and double-income household have significant effects on an individual's decision to stay or quit as a commuter. Education level has a positive effect; on the other hand, age, stress, double-income household, and travel time have a negative effect. The policy implications for improving the labor supply provision and some contested policy options are suggested such as the provision of affordable housing in Jakarta, the improvement of commuting enjoyment, the establishment of child care facilities in the office buildings, and the creation of more sophisticated jobs within the Jakarta's surrounding municipalities and regencies.

Keywords: commuter, labor supply, survival analysis, transportation

INTRODUCTION

Jakarta, as Indonesia's capital city, has been a magnet to every immigrant to work. Aside from being the center of every governance activity, Jakarta economic activities also attract more labors, especially from the outside of Jakarta. Although Jakarta's economic growth tend to fluctuate, from 5.97% to 5.93% in the first quarter of 2018, Jakarta has contributed 17% to Indonesia's economy (Tempo, 2018). Higher pay and more abundant opportunities are some factors influencing individual decision to move to Jakarta. Some of them are willing to travel for 10 or more hours in order to relocate to Jakarta.

Not only attracting those who lived 10 hours away from Jakarta, labor from districts and cities that circled Jakarta also attracted to gamble in this city to have a better life through higher pay and a more suitable job that match their qualifications. Those who live in the outskirts of Jakarta are willing to travel back and forth from their home to their workplace in Jakarta. These people are known as commuter labors. There are 2.43 million commuters who are traveling within, into and out of the city in a day. Of these people, 1.38 million are those who lived in the outskirts of Jakarta, such as Depok, Tangerang, Bogor, Bekasi, and Banten (Jakarta Post, 2019).

This study would like to assess the determinants of commuter labor on their decision making to be a commuter and fulfill Jakarta's market labor. By employing a survival regression analysis, this study will shed light on how commuter labors decide to stay or quit as a commuter in the future.

Influence of Commuters on Labor Market Supply

An individual decision on doing commuter can be caused by wages creating the process in the labor market that differs between areas. Reservation wage assumption that identical between commuters underlies every person on how they choose their most compatible and wanted a job (Rouwendal, 2014). In this study, Jakarta's commuters that fill the labor market in 2014 have been attracted to the minimum wage policy that fixated on IDR2,44 million. It was the highest minimum wage to be set compared to the other eight cities/regencies outside Jakarta. Other than Jakarta's minimum wages, transportation cost and housing price have accounted on household's decision making on whether they should be a commuter or not. Social demographic characteristics such as education level, age, gender, and race also influenced an individual decision on commuting (Russo, Tedeschi, Reggiani & Nijkamp, 2013).

Labor supply limitation due to migration will keep minimum wage high in the receiving labor market (Samuelson, 1964). Meanwhile, commuters are eager to increase their utilization to get the most satisfying pay, and the job will travel back and forth in one day. This event will imply to unlimited labor availability in the city, additionally with a regional minimum wage policy set above other areas than Jakarta. Commuters flow will improve labor supply for the job in the commuters' receiving labor market. Hence, it will lower the cost of opening new job opportunities. Okun's Law has stated that decrease in labor demand on receiving labor market will affect in the rise of product and services demand, assuming commuter utilize and spend their money in the district where they work, not where they are originated (Russo, Tedeschi, Reggiani & Nijkamp, 2013).

Staying Duration on Current Living Area

Sociodemographic characteristics affect an individual decision on doing commuter. How long they have stayed in their current living area is one of the satisfaction indicators on migration process

they perform, because it can describe the adaptation process of the immigrant to their environment (Neto & Fonseca, 2016). Recent migration has limited staying duration up to five years compared to their current living area. For this reason, this study will see how personal satisfaction to keep or stop being a commuter regarding their duration of stay in their current living area. Staying duration will describe individual resilience on shortening their traveling distance to the workplace. The longer the staying duration, it will describe different individual decision on comfortability factors that cannot be offered by other areas.

Commuting Duration, Distance, and Double-Income Household Migration Strategy

Every individual has their resilience stability to perform commuting in a day for one hour (Joly, 2006). If the commuting takes place more than an hour, it will affect individual decision making to stay as a commuter or to stop the act of commuting. Male commuter and female commuter have different resilience in commuting. Where male described as more resilient on long-distance commuting, this is not what happens with female commuters. Female commuters' resilience can be affected by the household condition. Household where husband and wife are both working outside their origin labor market, will discuss whether they will stay as a commuter or quit the job. A tendency to quit a job more likely happen to wives due to household condition, the school-age child they have that will make a female more likely to stop commuting and choose a job much closer to her home (Green, 1996; Sandow, 2010).

Additionally, the experience of having long-distance commuting with a longer duration will affect an individual decision on staying or quitting as a commuter (Sandow, 2010). A study by Joly (2006) on measuring commuting resilience duration with survival analysis, while Sandow (2010) divide subsamples of the research based on how long they have been commuting with multinomial analysis. In this study, the research team will use survival analysis on the duration of staying in their current living area with individual decision to stay or stop being a commuter.

METHODOLOGY

This research uses Jabodetabek commuters in 2014 survey data that has been conducted by Statistics Indonesia. This survey has been conducted in five districts in Jakarta namely South

Jakarta, East Jakarta, Central Jakarta, West Jakarta, North Jakarta; and eight surrounding cities and regencies namely Bogor Regency, Bogor City, Bekasi Regency, Bekasi City, Depok, Tangerang Regency, Tangerang City, and South Tangerang City. This research use 1,712 households whose household member perform commuting to Jakarta in one day back and forth to fulfill Jakarta's labor market. 3,522 samples were the total commuter individuals who headed to Jakarta. To analyze the commuting resilience of the individual, 2,485 units sample who has been living in their current living area up to 10 years were gathered. Ten years of living decided as the limitation because many cases of quitting as a commuter happened in this period, although it is still an indifferent duration for commuters to stay or quit.

Survival analysis, in particular, the survivor function and hazard ratio will measure the commuters' resiliency. This research uses parametric survival regression with log logistic distribution. Survivor function $S(t)$ is a function that stated individual chances to stay longer in their current living area and become a commuter to Jakarta up until the certain point of time, which can be defined as:

$$S(t) = P(T \geq t), \dots \dots \dots (1)$$

Random variable T defined staying duration in the current living area and keep being a commuter. The probability density function $f(t)$ is:

$$f(t) = -\frac{dS(t)}{dt}, \dots \dots \dots (2)$$

Proof :

$$S(t) = \int_t^{\infty} f(x) dx$$

$$\int_{-\infty}^t f(x) dx + \int_t^{\infty} f(x) dx = 1$$

$$\int_{-\infty}^t f(x) dx = 1 - S(t)$$

$$\frac{d \left[\int_{-\infty}^t f(x) dx \right]}{dt} = \frac{d[1 - S(t)]}{dt}$$

$$f(t) = -\frac{dS(t)}{dt}, \dots \dots \dots (3)$$

On the other hand, Hazard function is used to define the probability of someone keep staying in their current living area and stop being a commuter in time t subject to the provision of someone quitting as a commuter up until the time they are willing to quit. This study used 5,9 years as the limitation based on survival time mean. Given is the function:

$$h(t) = \lim_{\delta t \rightarrow 0} \frac{P(t \leq T < t + \delta t | T \geq t)}{\delta t}, \dots \dots \dots (4)$$

Relation between Survivor function and Hazard function

$$P(t \leq T < t + \delta t | T \geq t) = \frac{P(t \leq T < t + \delta t)}{P(T \geq t)}$$

$$= \frac{F(t + \delta t) - F(t)}{S(t)}$$

$$h(t) = \lim_{\delta t \rightarrow 0} \left\{ \frac{P(t \leq T < t + \delta t | T \geq t)}{\delta t} \right\} \cdot \frac{1}{S(t)}$$

$$h(t) = \frac{f(t)}{S(t)}$$

because $f(t) = -\frac{dS(t)}{dt}$

therefore $h(t) = -\frac{d}{dt} \{\log S(t)\}$

$\log \log S(t) = \int h(t) dt = H(t)$

$\log S(t) = \exp(-H(t))$

Parametric method applied in this study is using analysis method with log logistic distribution assumption after distribution test conducted with Matlab software. Thus, Survivor function and log-logistic distribution used in this study will be defined as:

$$S(t) = 1 - F(t) = 1 - \frac{e^{\theta t^k}}{1+e^{\theta t^k}} = \frac{1+e^{\theta t^k} - e^{\theta t^k}}{1+e^{\theta t^k}} = \frac{1}{1+e^{\theta t^k}}, \dots \dots \dots (5)$$

Meanwhile, Hazard function with log-logistic distribution will be :

$$h(t) = \frac{f(t)}{S(t)} = \frac{ke^{\theta t^{k-1}}}{(1+e^{\theta t^k})^2} \cdot \frac{1+e^{\theta t^k}}{1} = \frac{e^{\theta t^{k-1}}k}{(1+e^{\theta t^k})}, \dots \dots \dots (6)$$

To analyze survival probability, we will use Accelerated Failure Time (AFT) log-logistic model

Accelerated Failure Time (AFT) log-logistic model

This model will describe when commuter stops happening faster than the survival time (accelerated failure time).

Hazard function with AFT model

$$h_i(t) = e^{\eta_i} h_0(e^{-\eta_i} t)$$

$$h_0(t) = \text{Initial Hazard Function}$$

$$h_i(t) = \text{Initial Hazard Function on } -i$$

$$\eta_i = \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi}$$

Where $i=1,2,\dots,n$

Survivor function with AFT model

$$S_i(t) = \frac{f_i(t)}{h_i(t)}$$

$$S_i(t) = \text{Initial Survivor function on } -i$$

$$h_i(t) = \text{Hazard function on } -i$$

How long commuter will stay in their current living area and keep being a commuter is estimated by $(\theta + k\eta_i, k)$ parameter

The log-linear format from Accelerated Failure Time log-logistic model

Log linear is a group of a variable in surviving time T_i :

$$\log T_i = \mu + \alpha_1 x_{1i} + \dots + \alpha_p x_{pi} + \sigma \varepsilon_i$$

Using Survivor function definition, thus

$$S(t) = P(T \geq t) = P(\log T_i \geq \log t) = P\left(\varepsilon_i \geq \frac{\log t - \mu - \dots - \sigma_\rho x_{\rho i}}{\sigma}\right)$$

Assumed that ε distribute logistic, the density of opportunity function probability and Survivor function from ε are

$$f(\varepsilon) = \frac{e^\varepsilon}{(1 + e^\varepsilon)^2}$$

$$S(\varepsilon) = \frac{1}{1 + e^\varepsilon}$$

Therefore, Survivor function from T_i is

$$S_i(t) = \left[1 + \exp\left\{\frac{\log t - \mu - \dots - \sigma_\rho x_{\rho i}}{\sigma}\right\}\right]^{-1}$$

Survivor function with i-individual distribute log-logistic with $(\theta + k\eta_i, k)$ parameter estimation where η_i is

$$\eta_i = \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi}$$

Given is Survivor function from T

$$S_i(t) = \frac{1}{1 + e^{\theta + k\eta_i t^k}}$$

Compared to T Survivor function that

$$\theta = -\frac{\mu}{\sigma}$$

$$k = \frac{1}{\sigma}$$

Hazard ratio from the Proportional Odds Log-logistic model is

$$\frac{h_i(t)}{h_0(t)} = [1 + (e^{\eta_i} - 1)S_0(t)]^{-1}$$

RESULTS AND DISCUSSION

When forming its labor market, Jakarta as Indonesia's capital city cannot be separated by local labor (stayer labor) and labor who mobilize (mover labor) with daily duration (commuting labor) or more than one-day duration (circular labor) in six months period. The increasing percentage of Jakarta, Banten, and West Java's commuter labors indicated a spatial interaction to fulfill labor market for each area. Spatial interaction happened in the form of labor mobilization that moves across their city or district border. This interaction implies the increase of income per capita on receiving labor market and an increase in welfare on the labor's origin area, especially for a household with commuter labor. This phenomenon can describe two sides of commuter labor as an input on production factor in the receiving labor market to produce output and as a resident of the area of origin with better income level compared to when they do not mobilize. Rouwendal (2014) explained that commuter labor most likely to work outside their current living area than in their origin area, assuming reservation wage for every labor is treated as equal.

This study will analyze how commuter labor's characteristics from the surrounding area of Jakarta, such as Banten district and West Java, fulfilling Jakarta's labor market based on Jabodetabek commuter survey in 2014 by Statistics Indonesia. Jakarta, as a megapolitan, has grown through the suburbanization process that happens in the surrounding area of Jakarta. This phenomenon described by Handerson (1997) happened where suburbanization takes place with spatial distribution pattern that spread more widely, along with the growth of metropolitan cities.

Tabel 1. Data Descriptions

Variable	Log Logistic Survival 1 = Quit 0 = Stay
Total Sample	n=2485
Gender	
Male	1
Female	2
Age	
Education	
Up to Elementary/Islamic Elementary or equivalent	1
Junior High School/Islamic Junior High School or equivalent	2
Senior High School/Islamic Senior High School or equivalent	2
Diploma I/II/III	4
Diploma IV/Bachelor/Master/Doctoral	5
Homeownership status	
Self-owned	1
Rent/Contract	2

Other	3
Feeling stress when headed to/from receiving labor market	
Yes	1
No	2
Commuting Duration Mileage	
Average income from the primary job	
Double-income household	
Yes	1
No	2

Labor mobilization that happens with a daily duration from the surrounding of Jakarta is an implication caused by suburbanization around Jakarta. 12.44% of labors from Depok fulfilled Jakarta's labor market and became the most significant percentage compared to the other 13 districts/cities/regencies that directly bordered with Jakarta. 32.45% of the commuter labor from 13 districts/cities/regencies around Jakarta, headed to South Jakarta and Central Jakarta every day. It describes how Jakarta's biggest economy happen in Central and South Jakarta, supported by commuter labors from 13 districts/cities/regencies. Central and South Jakarta are the biggest Jakarta's most significant GDP contributor, with 24.34% contribution come from Central Jakarta and 22.35% from South Jakarta. Moreover, commuter labors that headed to Jakarta fulfill governance and public service sector (21.78%), trade sector (19.85%), insurance and finance (12.21%) and manufacturing industry (11.73%). These four sectors are the most significant contributor to Jakarta's gross domestic, local product and become the main characteristic of a big city such as Jakarta. In 2014, the trading sector contributed 16.64% to Jakarta's GDP, followed by governance and public service sector (15.18%), manufacturing (12.94%) and financial services (10.21%).

Technology development marked by better transportation system which connects Jakarta and its surroundings has affected commuter labors to mobilize and head toward to Jakarta without any significant time constraint. According to Joly (2006), a stable individual will travel to their receiving labor market in 60 minutes duration. Additionally, 40.60% commuter labor who headed to Jakarta more likely to travel in 31-60 minutes duration and 16.7% travel for 11-20 km from their home to their workplace. Travel duration can be an indicator to describe commuter labor supply from the surrounding area that fills Jakarta's labor market.

Jakarta, where most of the economic activities happened, has attracted labors from outside of Jakarta to take a role in the labor market. Most of Jakarta's commuters come from the surrounding

area of Jakarta and become a recent immigrant, not a resident. Experience on becoming an immigrant where they have long experience to live in their current area that differs from where they lived five years ago is an indicator of immigration satisfaction (Neto & Fonseca, 2016). 8.92% of commuters have lived in their current area for five years or different home compared to five years ago. While 57.04% have experienced living in the area other than their current districts/cities/regencies, 19.39% of the commuters live in their current place following where their husband/wife/parents/kids live. 11.19% of them said it is because of housing and followed by working reason 8.21%. Therefore, it contributed to individual decision to stay in their current home or choose to seek a home near their workplace and decide to quit as a commuter.

Commuting duration and previous experience as an immigrant are the reason why individual decided to maximize their utilization to stay in their current area. 30.72% commuters explained that they decided to commute because of the security and convenience in their current living area. While 13.49% commuters willing to sacrifice their two hours to go to work for their current living area. On the other hand, Jakarta's labor market has become the reason for 34.64% commuters to get the job that matches their skills and competence.

Table 2. Data Analysis

Variable	Total Samples (n = 2485)		Full Model	Fitted Model
	Willing to Quit		Coefficient	Coefficient
	Yes	No		
Samples	173	2312		
Gender				
Male	126	1619		
Female	47	693	0.0185968 (0.1262742)	
Age	173	2312	0.0139384 ** (0.0065005)	0.0161032 ** (0.0063751)
Education Level				
Elementary/Islamic Elementary or equivalent	14	100		
Junior High School/Islamic Junior High School or equivalent	11	169	0.6434834 ** (0.2849675)	0.6277425 ** (0.2879138)
Senior High School/Islamic Senior High School or equivalent	94	1122	0.5567855 *** (0.2094445)	0.5765493 *** (0.2113748)
Diploma I/II/III	11	214	0.8876308 *** (0.2759957)	0.9076511 *** (0.2778538)
Diploma IV/Bachelor/Master/Doctoral	43	707	0.7377673 ** (0.2291076)	0.7590284 *** (0.2267885)
Home ownership status				
Self-owned	123	1723		
Rent/Contract	32	380	-0.1110324 (0.1402029)	

Other	18	208	-0.1814356 (0.1768024)	
Feeling stress when heading toward/from the activity area.				
Yes	111	1058		
No	62	1254	0.3410174 *** (0.1089175)	0.3290216 *** (0.1091749)
Commuting Duration	173	2312	-0.003817 ** (0.0016782)	-0.0023322 * (0.0013896)
Mileage (Distance)	173	2312	0.0067719 (0.004922)	
The average income per month from the primary job			-1.58e-08 (7.72e-09)	
Double-Income Household				
Yes	65	833	-0.1936276 * (0.1121168)	-0.1963347 * (0.1101553)
No	108	1479		
Constants			1.953655*** (0.3370987)	1.886609 *** (0.3215616)
1/ln_gamma			-0.8366013 *** (0.0916982)	-0.826973 *** (0.0918275)
gamma			0.4331803 (0.0397219)	0.4373712 (0.0401627)

* p<0.10, ** p<0.05, *** p<0.01

6.39% stated that they want to make a better living through higher income, compared to their current living area. It can be one indicator that happens in labor mobility where the opportunity of getting higher income in receiving labor market is more significant than in their current living area (Bourjas, 2013).

Rational individual choice is more likely to lean on the decision to avoid long commuting time (Zelinsky, 1971; Sandow & Westin, 2010). Thus, every individual will maximize their utilization when facing two choices between stay or quit as a commuter. This research use willingness to quit as a commuter for the next one year approach to limit the event on analyzing commuter resilience on fulfilling Jakarta's labor market. According to Jabodetabek commuter survey in 2014, 70.56% commuter decided to stay in their current living area for less than or up to 10 years. Therefore, this study takes that sub-population to see their commuting resilience to their decision on quitting as commuter labor.

Table 3. Surviving Probability and Hazard Ratio on Quitting as a Commuters

Variable	Survivor Function		Hazard Function		Hazard Ratio
	Stay as a Commuter		Quit as a Commuter		
	0	i	0	i	
Global	0.466		-0.109		
Age		0.471		-0.108	0.992
Education Level					

Elementary/Islamic Elementary or equivalent			
Junior High School/Islamic Junior High School or equivalent	0.799	-0.041	0.376
Senior High School/Islamic Senior High School or equivalent	0.876	-0.025	0.232
Diploma I/II/III	0.986	-0.003	0.026
Diploma IV/Bachelor/Master/Doctoral	0.989	-0.002	0.022
Feeling stress when heading toward/from the activity area.			
Yes			
No	0.659	-0.070	0.639
Commuting Duration	0.466	-0.110	1.002
Double-Income Household			
Yes	0.488	-0.105	0.960
No			

Nearly one-third of the commuter labors fulfilled Jakarta's labor market and contributed to Jakarta's economy. Commuter labors resilience can be drawn by examining their commuting duration. According to Joly (2006), 60 minutes that every labor take every day to commute is a description of labor's duration stability. It describes how individual resilience on commuting in one day. Therefore, if commuting is done repeatedly more than one hour a day, it will deflate the individual's utilization. Thus, according to Zelensky's migration theory (1971), the individual will tend to find a home closer to their workplace.

Staying duration in the current living area can describe the adaptation process every recent migrant going through where they have a different living area with what they have today. Staying duration is also closely related to immigrant's psychological wellness (Ward, Bochner & Furhman, 2001). When adaptation process not going well and the burden of commuting duration is more significant than before, commuters may be affected by a psychological disorder where in this study can be described with stress and plan to quit on being a commuter in the next one year. Meanwhile, a household with double income where husband or wife work, and both are commuters will be more likely to face a tendency to decide which one will quit as a commuter. For most case, women tend to quit as a commuter (Sandow & Westin, 2010).

A study by Sandow (2010) described that the duration of being a commuter could be affected by education level and gender. While age does not describe someone's willingness to quit as a commuter or have a shorter duration on commuting, it is still an aspect that needs to be considered regarding the ability to perform commuting. Related to a commuting distance where housing

location is formed in the surrounding area of Jakarta, home ownership status become an essential consideration for someone on deciding to have a home closer to their workplace and quit being a commuter.

This research used survival analysis in seeing commuter resilience on commuting with current living area approach as a stimulus to migrate, shortening their commuting duration from home to workplace based on their commuting adaptability with their environment.

Based on Table 2, it describes that gender, distance, income, and home ownership do not affect to respondent's decision whether to stay or quit as commuters. The fittest model exhibits that age, education level, the psychological condition, commuting duration, and availability of spouse who is also a commuter can affect individual's decision to stay or quit as a commuter.

This research used parametric survival regression where gamma value defined as a shape from data distribution that describes hazard value. Survival model on the duration of staying in Jakarta's commuter shown a declining hazard value. Thus, it can describe how individual choose to stay as a commuter.

In the end, Jakarta's government can apply a policy that will comfort commuters and help them to stay as a commuter.

Table 3 shown that commuter probability of staying commute is more significant than the hazard of quitting as a commuter. Based on education level, Jakarta has offered much more job opportunity for those who earn education higher than senior high school level compared to the local area. Therefore, the higher the education level, the more commuter will stay as a commuter rather than quit. In order to keep their labor working in their origin area, commuter's area of origin must develop economic activities that will expand jobs opportunity for labor with higher education level qualification. Additionally, a regional minimum wage that Jakarta has established already match the commuter's utility. It can be seen through commuter's probability to stay rather than to quit as a commuter.

Based on age, the hazard ratio found to be higher than the opportunity to stay as a commuter. The older is the commuter, the more likely they want to work in their origin area and fulfill their local area labor market, rather than being a commuter in the future. This is also the case of a double-income household where the probability of one of the household members more likely to quit as a

commuter is more significant due to the internal decision in the household, regarding the family condition and where the school-aged kid is in the household or not. Thus, the female commuter is more likely to fill the local's labor market rather than being a commuter (Sandow & Westin, 2010). For the commuting duration, the longer the commuting takes time, the higher the chance of someone to quit as a commuter. However, this is not the case where commuter does not feel any stress on commuting. The more commuter resistance to stress, the probability of quitting or staying is almost the same.

Jakarta offers significant job opportunities with tight competition. It has attracted commuter labor to participate in Jakarta's labor market. Productive age with higher level education commuter is more likely to contribute to Jakarta's labor market. On the other hand, to maintain the large numbers of commuters to Jakarta's economy, the public transportation system must be able to make commuters feel at ease on their commuting time so that long commuting time will not be a constraint for a commuter to keep on commuting.

CONCLUSIONS

With the growing economy activities in Jakarta, the surrounding area of Jakarta will eventually get spillover from this event. One of the aspects that most likely to be affected is the labor market. With the development towards a better transportation system, housing price, and opportunities available in the megapolitan city, it surely will attract more labors from outside of Jakarta to participate in Jakarta's labor market. However, several factors are playing a role in commuter labor decision making, whether they want to stay or quit as a commuter.

The policy implications for improving the labor supply provision and some contested policy options are suggested such as the provision of affordable housing in Jakarta, the creation of jobs within the Jakarta's surrounding cities and the improvement of commuting enjoyment.

Labors with a higher educational level are those who are willing to stay as a commuter in order to pursue their most wanted and most suitable job for their qualification. Jakarta has offered much more opportunities compared to its surrounding areas such as Depok, Bogor, Tangerang, and Banten. However, as labor grow older, they are more likely to stay in their area of origin and plan

to quit as a commuter. Especially if the commuting time is longer than one hour and trigger stress on the labor. This is also the case of women commuter, especially if they already have a spouse and a school-aged kid, where they are more likely to quit as a commuter due to household decision making.

Jakarta surroundings already have its advantage on lower house pricing compared to Jakarta. Thus, the provision of affordable housing in Jakarta will help retaining labor supply. However, lower housing prices and rents would be a trigger to labors to be commuters. Furthermore, most people are still reluctant to work in the surrounding area of Jakarta due to the small number of job opportunities given by the local labor market. If Jakarta's surrounding area wants to retain their resident to work in their area, jobs opening especially for labor with a higher level of education must be attractive enough to the employee candidates. It can be started by giving better incentives and more job opportunities that match their qualifications and interests.

If Jakarta wants to retain their numerous commuter labors, it must improve the transportation system. Not only the inner-city transportation that must be developed but also intercity transportation. Therefore, it will make commuters more likely to head to Jakarta because there will be no more significant constraint to head to work, especially time constraint. Tariff reduction on public transportation can also play a role to retain and attract more labor from the surrounding area. Also, the enjoyment during the traveling time must be put into consideration. A seamless experience for commuters when changing their transportation modes would be very much welcomed. Additionally, entertainment during commuting is also useful to reduce boredom such as access to free internet.

REFERENCES

- A.Morris, E., & Zhou, Y. (2018). Are long commutes short on benefits? Commute duration and various manifestations of well-being. *11*.
- Axisa, J. J., Scott, D. M., & Newbold, K. B. (2012). Factors influencing commute distance: a case study of Toronto's commuter shed. *Elsevier: Transportation Research*, 123-129.
- Borjas, G. J., (2013). *Labor Economics*. New York: McGraw-Hill Education.

- Cameron, G., & Muellbauer, J., (1998). *The housing market and regional commuting and migration choices* (Vol. 45). Oxford: Scottish journal of political economy.
- Cassel, S. H., Macuchova, Z., Rudholm, N., & Rydell, A. (2013). Willingness to commute long distance among job seekers in Dalarna, Sweden. *Journal of Transport Geography*, 49-55.
- DeSalvo, J., & Huq, M., (1996). Income, residential location, and mode choice. *Journal of Urban Economics*, 40(1), 84-99.
- Fujita, M., & Okigawa, H. (1982). Multiple equilibria and structural transition of non monocentric urban configuration. *Regional Science and Urban Economics*, 161-196.
- Green, A. E. (1996). A question of compromise? Case study evidence on the location and mobility strategies of dual career households. *Regional Studies*, 641- 657.
- Henderson, V. (1997). Medium size cities . *Regional Science and Urban Economics* 27 (1997), 583-612 .
- Jakarta Post, T. (2019). *1.38 million commute into Jakarta daily*. [online] The Jakarta Post. Available at: <https://www.thejakartapost.com/news/2015/02/17/138-million-commute-jakarta-daily.html> [Accessed 11 May 2019].
- Joly, I. (2006). Stability or regularity of the daily travel time in Lyon? Application Of A Duration Model. *International Journal of Transport Economics*, 33(3), 369-400.
- Neto, F., & Fonseca, A. M. (2016). The satisfaction with migration life scale. *International Journal of Intercultural Relations* 54, 47–54.
- Odland, J., (1978). The conditions for multi-center cities. *Vol. 54 No. 3*(234-244).
- Pazy, A., Salomon, I., & Pintzov, T. (1996). The impacts of women’s careers on their commuting behavior: A case study of Israeli computer professionals. *Elsevier: Transportation Research*, 269-286.
- Rouwendal, J., (2014). Search theory and commuting behavior. *Growth and Change*, Vol. 35 No. 3 (Summer 2004), pp. 391-418.
- Russo, G., Tedeschi, F., Reggiani, A., & Nijkamp, P. (2013). Commuter effects on local labor markets: A German Modelling Study. *Urban Studies Journal Limited*, 493–508.

- Samuelson, P. A., (1964). *Economics*. New York: McGraw-Hill.
- Sandow, E., (2010). Commuting behavior in sparsely populated areas: evidence from northern Sweden. *Journal of Transport Geography*, 14-27.
- Sandow, E., & Westin, K., (2010). The persevering commuter – Duration of long-distance commuting. *Transportation Research*, 433-445.
- Tempo. (2018). *BI: Jakarta Contributes to 17 Percent of Indonesia`s Economy*. [online] Available at: <https://en.tempo.co/read/922840/bi-jakarta-contributes-to-17-percent-of-indonesias-economy> [Accessed 11 May 2019].
- Ward, C., Bochner, S., & Furnham, A. (2001). The psychology of culture shock. *International Journal of Intercultural Relations*, 602-607.
- Zelinsky, W., (1971). The hypothesis of the mobility transition. *American Geographical Society*, 219-249.