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LONG-DISTANCE COMMUTING: LABOR DECISIONS IN NORTH SUMATERA

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ABSTRACT

Cross-border labor mobility is currently a sight we are used to seeing on a daily basis. The increase in labor mobility is seen with the increase in the number of commuter workers, especially for longer trips that occurred in North Sumatra from 2015 to 2018. This increase in travel activity also has an influence on economic growth between regions. But unfortunately until now, there are almost no studies or analyses related to labor mobility, especially commuter activities for long-distances in North Sumatra. The purpose of this study was to identify how much the labor in North Sumatra tends to travel long-distances and compare the impact of public transportation and income on the decision to do long-distance commuting in North Sumatra. This research uses an economic approach, especially on the use of occupational models in analyzing labor decisions to commute. Sakernas 2018 data were used in this study with logistic regression analysis techniques with logit models. The findings in this study show that the decision to commute for a distance of more than 30 km one way by utilizing public transportation has a tendency to be 2.9 times greater than the variable income in North Sumatra compared to workers who travel to work on other distances. This research shows that publicl transportation is an important bridge for workers to carry out mobility between regions and as an effort to increase economic growth,

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1. INTRODUCTION

The trend of increasing the number of commuter workers for longer trips occurred in North Sumatra since 2015 by 14.45%, and in 2018 it increased to 18.09% (Statistics Indonesia, 2017, 2019). The tendency of an increase in the number of commuter workers for long-distances (more than 30 km each way) seems to be getting less attention for analysis. For some people commuting long distances will have a negative impact on health and on work productivity [1], but some mention that there are positive behaviors that are not observed towards work, where workers who do remote work are less likely to be absent [2]. Apart from various opinions regarding long-distance commuter is inseparable from individuals in making decisions that are certainly aware of their positive and negative impacts on their lives. However, one that is often the main consideration in determining these decisions is the availability of transportation and expectations when commuting over longer distances, namely increased income or high incomes elsewhere.

Currently, there are almost no studies or analyses related to the mobility of commuter work trips for these longer distances, especially in North Sumatra. In fact, this increase in travel activities will have an influence onthe macroeconomic level (environmental planning and policy) and at the micro level (individuals and households)[3]. Therefore, it is necessary to have a study or analysis at the micro level, namely related to individual decisions as a labor to commute. This is done to find out the biggest motivation for the increase in the number of workers who commute over long distances, so that information can be

obtained in assisting the government in making plans and policies that lead to the sustainability of the transportation system which will also have an impact on increasing economic growth between regions.

Commuting decisions are a rational way of thinking of each individual that considers accessibility to work, including the availability of transportation. The public transport will reduce workers' commuting costs so that it will allow them to find more jobs.[4]) Public transport has also proven to be more satisfying than travel by private transport such as cars. Public transport and mobility are related to the ability of public transport services to be considered a 'safety net' in improving the mobility of disadvantaged communities[5] . Using public transport will allow commuters to engage in a variety of activities during the trip, such as reading and socializing with other passengers [6]. However, other opinions state that commuting using public transportation tends to be less satisfied than users of other modes [7], [8]. The results of research in Indonesia conducted by[9] confirm that ten regions in Indonesia, public transportation is an option that tends to be used by commuter and circular workers who usually have a long-distance commute. Therefore, the existence of public transportation is important and be a main consideration in making decisions for workers in carrying out longer work journeys

In addition to the availability of public transportation, the income is also related to the decision to commuting to work. Income in other areas is more attractive than income in the area of residence. The income would increase the cost of travel at a certain distance because the value of time lost would increase [10]. This increase in travel costs will hamper commuter travel, assuming that travel distances will increase along with increased revenue if and only if, space has greater revenue elasticity. Mantra [32] mobility to urban areas has expectations for the improvement of the family economy, namely obtaining jobs and higher incomes from rural areas. Öhman and Lindgren [11] in the results of their analysis showed that long-distance commuters are more likely in men, with a younger age, and have a higher education, experienced in previous long-distance travel and very low or very high incomes. Sandow and Westin [3] state that higher incomes, positively correlate to continuing long-distance travel. Clark et al [12] in the case of commuter workers in the UK, job satisfaction in younger and low-income adult workers was not found to be negatively associated with longer travel times. Therefore, income relates to working travel over long distances.

Research on commuters has been the topic of many fields of science, although there is no standard concept or understanding yet. In general, the implications of research on commuters on economics are usually seen in the labor market [3], [13]–[15]. Most say that commuting is a process of migration. Ahmad [16] said commuters are part of migration activities. Another view states that commuting is a form of non-permanent mobility [32]. Base on Mantra [32], non-permanent mobility consists of two forms. First, circular mobility is the movement of individuals or groups that stay for a while, for example one Week to six Months. Second, commuting/commuting mobility is the movement of individuals or groups in one day outside the administrative area of residence and returning home on the same day and is carried out every day with various purposes, namely work. Lyons and Chaterjee [17] stated that the emphasis of the term commuter is more on routine and repetitive nature on work trips related to public transportation. Daily and weekly long trips from home to work show commuter activity [3], [17], [18]. Pakpahan and Manulu [19] stated that commuter activities themselves will have a positive and negative impact on increasing commuter activities both in the destination area and in the area of origin. The positive impact can be seen from the improvement of the socioeconomic status of the family in the long term. In addition, commuters can also reduce the economic gap between urban and rural residents. Meanwhile, the negative impact of increasing individual or group commuter activities is that it causes an increase in the number of residents at a certain time which can have an impact on congestion in the destination area [13], [20], [21]. According to Hugo and Ahmad [16], [22], commuting that occurs in Indonesia is part of the internal process of migration, which is a natural process in the flow of labor movement from rural areas to urban areas. The continuous increase in the internal process of migration can lead to exceeding the absorption of the industrial sector, especially in urban areas. Todaro [23] stated that this situation would result in changes in sectoral and geographical economic activity patterns, income distribution, and population growth, so that it would affect the magnitude of migration flows. This will further bring other consequences in the job market.

Actually, research on commuter and labor decisions in Indonesia has been conducted [9], [16], [19], [24]–[26]. Meanwhile, special research in North Sumatra, paid more attention to the activities of commuter workers in Medan, Binjai and Deliserdang (Mebidang) [9], [19], [27], [28] the choice of modes of transportation for commuting. However, research in North Sumatra that observes the focus on workers who make long journeys is very limited and has not even been seen until this article is made, even the observations of commuter workers are still widely limited to the Mebidang Area. Whereas in other areas commuter workers are scattered almost throughout other cities / districts. The purpose of this study is to complement previous research. This is done to enrich studies related to labor and work travel in North Sumatra.

For some workers doing remote commuting is an alternative to achieving their life goals and is a strategy of working for a long time. The study focused on the impact of public transport and revenue on the decision to travel long-distance commuters (more than 30 km each way). The purpose of this study is to identify how much public transportation tends and income towards the decision to do long-distance commuting in North Sumatra. The article is divided into four parts. The first part of the introduction that contains the reasons why it is important to conduct this research and some relevant theories and research. The second part, the research describes the research methods, the third part is the results and discussion. Finally, this article closes with a conclusion

2. METHOD

2.1 Data Source

Furthermore, to answer the questions in this study, researchers used secondary data obtained from Sakernas August 2018 from the Indonesian Central Statistic (BPS). In this data, researchers obtained employment data such as information about where to live, place of work, distance to work, monthly income, gender, education, region (village / city). This research focused on workers who make a round trip every day and cover a distance of more than 30 km between home and work [3]

The variables in this study consist of two main variables, namely the dependent variable which is workers aged 15-60 years who travel to work with a distance of more than 30 km each way. Based on Sakernas 2018 data, as many as 17896 respondents of workers who commute from home to work every day who travel more than 30 km commuting. The binary dependent variable is one, a commuter worker who travels more than 30 km each way and zero, others. Independent variables in the study consisted of the availability of public transportation and income Furthermore, this study also took into account the socio-economic variables of workers such as region of residence, gender, higher education, age, and employment sector (formal and informal)

2.2 Analysis Method

Based on the explanation of the previous section, it can be stated that the decision to conduct commuters is influenced by general transportation which is a means by which labor can be used to move from the area of residence to another place [4], [6], [9], another major reason is high income/earnings [3], [12], [26]. It will focus on public transport and income levels as key variables to labor decisions to commute.

The basic model for analyzing commuter decisions in this study refers to the *Occupational Choice Model*. This model analyzes the opportunities for households to migrate. In this model, it is stated that individuals will choose to work in the area of residence because they have the greatest potential benefits as non-migrants. On the contrary, individuals will choose to work in other areas if they have great profit potential in other areas, they will choose to migrate. The same applies to individual decisions to commute, because commuters are part of the migration process [16], [22]. Based on Emerson [29] the form of the equation in this model is as follows:

$$\frac{Yi^{c}-Yi^{nc}}{Yi^{nc}} > \rho_i \quad (1)$$

Where ρi is a function of commuter costs (Cmi) and individual preferences (A1i) representing individual characteristics and substituting between commuter costs, individual characteristics functions and location dummy variables (Li), the following equation is obtained:

$$\rho_i = \theta_i \varepsilon + \lambda_1 A_{1i} + (\lambda_2 + \varepsilon\theta_2) A_{2i} + \varepsilon\theta_3 L_i + (\omega_{1i} + \varepsilon\omega_{2i}) \quad (2)$$

From equations (1) and (2), the function of the migration probability equation is as follows:

$$\Pr[Commuter] = Pr\frac{Yi^{c}-Yi^{nc}}{Yi^{nc}} - \theta_i\varepsilon + \lambda_1 A_{1i} + (\lambda_2 + \varepsilon\theta_2)A_{2i} + \varepsilon\theta_3 L_i + (\omega_{1i} + \varepsilon\omega_{2i}) \quad (3)$$

From equation (3) by changing the shape $\frac{Yi^{c}-Yi^{nc}}{Yi^{nc}}$ in log form it will obtain a function of the Probit equation expressed as Pr (Ii* > 0). This indicates that the choice or decision to commuter is a dependent variable that can then be resolved using the Logit function.

From equation (3) it is known that the decision to migrate in this case is commuter or not to do commuting can be analyzed using Logit function analysis techniques. This analysis technique can be used in analyzing categorical data or binary-scale response (Y) changes with their explanatory changes (X) that are continuous and/or categorical scale [30], [31] . The analytical technique in this study was carried out to determine the tendency of the explanatory change (X), namely public transportation and income to the ability to commuter to workers in North Sumatra. The models in the study are as follows:

$$Li = Ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 X_1 + \beta_2 X_2 + \cdots . \beta_n X_n + \varepsilon_p \quad (4)$$

Then formed the empirical equation in this study as follows:

$$PK = L_n\left(\frac{k}{nk}\right) = \beta_0 + \beta_1 TU + \beta_2\ PDPT + \beta_3 PDDKN + \beta_4 JK + \beta_5 WIL + \beta_6\ STK + \beta_7 UM + \beta_8 SEKT + e \quad (5)$$

3. RESULT AND DISCUSSION

3.1 Labor Commuting in North Sumatera

North Sumatra is one of the largest provinces in Sumatra Island, which has the largest proportion of commuter workers at 3.12% and has the 7th proportion in all provinces in Indonesia. Figure 1 shows that almost all regions in North Sumatra have commuter workers both in long-distances and in short-distances. The regency which has the largest proportion of commuter workers is known to be in the Deli Serdang Regency (11.6%), Binjai City (8.31%), Sibolga Regency (4.85%), Simalungun Regency (4.02%)). This shows that the job market in North Sumatra is also enlivened by commuter workers. This condition can be caused by a response to changes in the economic structure that occur, where mobility is an effort to get the expected wages and careers without changing the environment and place of residence. In addition, the improvement of transportation facilities and infrastructure makes it easy for people to move from their place of residence to other regions to work

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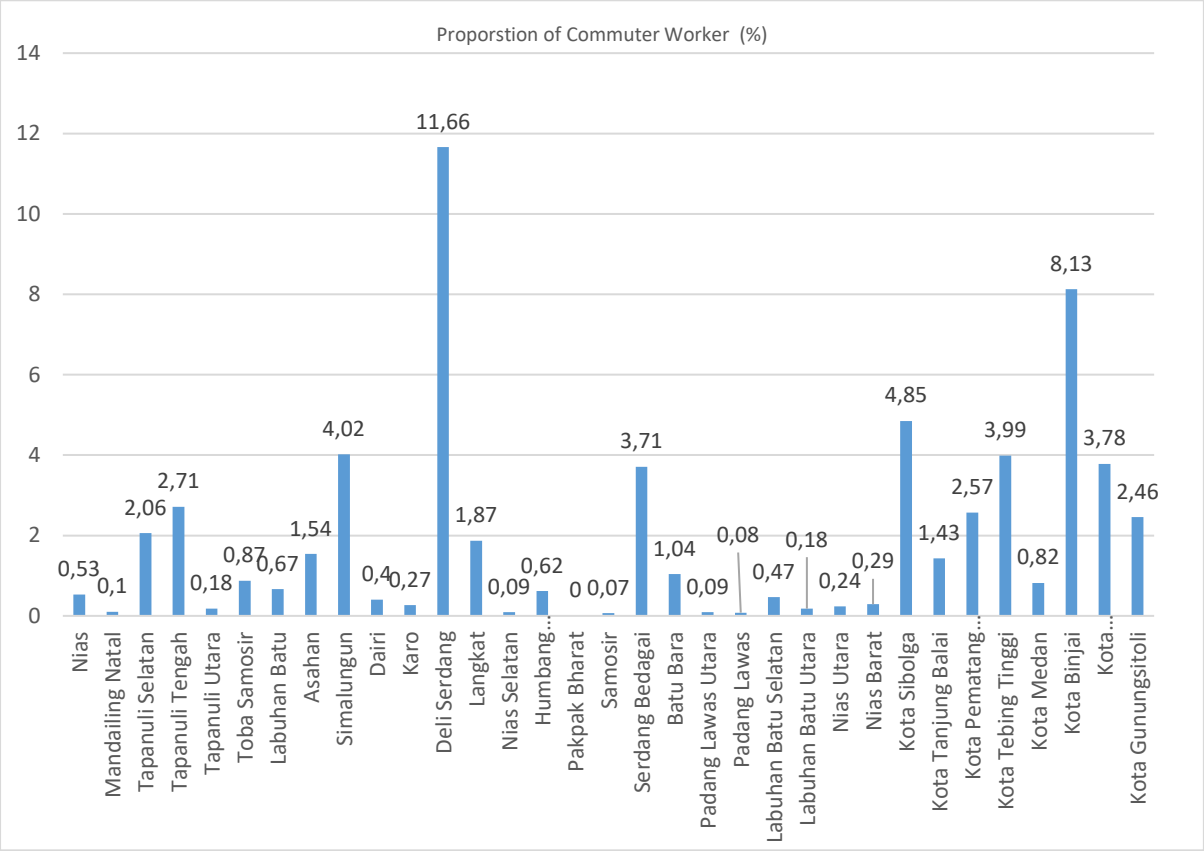

Source : BPS – Sakernas 2018 (www.bps.go.id)

Figure 1. Proportion of Commuter Workers (%) North Sumatra

Based on the 2018 Sakernas data, information was obtained that 17,896 worker respondents carried out commuter activities in North Sumatra. The profile of commuter workers in North Sumatra is dominated by male workers about 58%. The income, more than 2.5 million have an average of 13.3% and highly educated (high school and above) 12%. Commuter workers in North Sumatra on average come from rural areas by 62% to work in the formal sector by 35%. As many as 69% of commuter workers in North Sumatra are married and 36% are of the productive age of 32-45 years. The profile of commuter workers can be seen from Table 1 below:

Table 1. Summary of Research Data

Variable	Observasi	Mean	Min	Max
Commuter Worker > 30 km	17896	0,0341	0	1
Publik Transportation	17896	0,0438	0	1
Income	17896	0,1333	0	1
Education	17896	0,1219	0	1
Region	17896	0,6227	0	1
Sex	17896	0,5809	0	1
Mar. Status				
Married	17896	0,6943	0	1
Divorced	17896	0,0184	0	1
Death divorce	17896	0,0674	0	1

Age				
31-45 yrs	17896	0,3696	0	1
46-60 yrs	17896	0,3212	0	1
61+ yrs	17896	0,0355	0	1
Sectoral Formal	17896	0,3589	0	1

Source: processed data

Based on the number of observations in this study, namely as many as 17896 workers who commute for more than 30 kilometers in North Sumatra, the LR Chi^2 is 387.91. There are 12 predictors in this model, or there are 12 degrees of freedom. In this study, it was stated that overall, this model is statistically significant because the p value is less than 0.05. The results of data processing in this study obtained a pseudo-R^2 value of 7.29%. The results of this study were explained using the control variables of higher education, area of residence in the village, male gender, age, and field of work. The results of the data can be seen in Table 2 below:

Table 2. Logistic Regression Results on Long-distance Commuting Decisions in North Sumatra

Variabel	**OR**	**P>Z**	**Conf. Interval] (95%)**	
Publik Transportation	2,9870	0.000	2,2577	3,9519
Income	1,7305	0.000	1,3476	2,2222
Education	1,5137	0.000	1,2007	1,9083
Region	0,4502	0.000	0,3765	0,5382
Sex	2,6664	0.000	2,1734	3,2713
Mar. Status				
Married	1,3890	0.020	1,0539	1,8305
Divorce	0,9926	0.985	0,4673	2,1084
Death Divorce	0,5239	0.082	0,2530	1,0850
Age				
31-45 yrs	0,9619	0.767	0,7441	1,2435
46-60 yrs	0,7395	0.036	0,5575	0,9810
61+ yrs	0,3434	0.014	0,1468	0,8036
Sectoral Formal	0,9206	0.461	0,7389	1,1471
_cons	0,0198	0.000	0,0147	0,0266

Number of obs = 17896; LR chi2(12)= 387.91; Prob > chi2 = 0.0000; Pseudo R2=0.0729
Source: Data Processing,

The observations from the data processing in Table 2, we can get an overview of the labor condition in North Sumatra who commute more than 30 km one way to work. Next, we analyze the main variables, public transportation and income. Based on table 2, the odds ratio (OR) is 2.9 with p <0.000. Its shows that labors who use public transportation are 2.9 times more likely to commute more than 30 km one way compared to workers who commute less than 30 km one way. This statement was obtained after controlling for the variables of higher education, area of residence, gender, marital status, age, and employment sector.

The results from Table 2 also show that the high income variable has an OR value of 1.7. This means that workers with high incomes are more likely to commute more than 30 km one way compared to workers who commute less than 30 km one way. This statement is obtained after controlling for variables of higher education, area of residence, gender, marital status, age, and employment sector.

This shows that labor commuting in North Sumatra tend to use public transportation. The results of this study are in line with those conducted by[9], where workers who make long-distance to work are more likely to use public transportation than workers with a distance of less than 30 km one way. In addition, the existence of public transportation can provide opportunities for workers to earn a living in other areas, especially those carried out by male workers. According to Sandow [3], male workers have a longer working journey than women. Another consequence of long-distance commuting is workers will be faced with other challenges, such as adaptation to work schedules Another result of this study is to show that commuting workers in North Sumatra are more dependent on public transportation than high income. This research is slightly different from that conducted by Hasyasya [24] on workers in Central Java and [26], who found that the biggest effect of commuting decisions is more due to income.

4. CONLUSION

Research related to commuter work trips to workers in North Sumatra has not been carried out much. Several studies that examine academically related to labor and commuting decisions in North Sumatra are more on the choice of modes of transportation in the Medinding area. Chotib [9] stated that public transportation is not an option for male workers, including in the Medinding area. Chotib also stated that overall workers who commute long distances have twice the chance of using public transportation compared to workers who commute shorter distances. The results of this research conducted are in the same direction as what was conveyed by Chotib [9]

This research proves that for the entire North Sumatra region, the availability of public transportation has a greater tendency compared to high incomes in making commuter decisions on the labor in North Sumatra. This observation of labor mobility in North Sumatra shows that there are efforts to balance the economy between regions, especially in fulfilling interregional labor through the availability of public transportation. Publik transportation is a bridge and opens up opportunities to increase family income. But of course, the results of this study will have other consequences such as the need for government efforts to improve and improve public transportation services. Therefore, improving supporting facilities and infrastructure to improve services for the existence of public transportation needs to be a concern between local governments such as the provision of buses that are comfortable, safe and of course affordable prices. In addition, it needs to be supported by continuous efforts in improving highways for a good experience journey to work.

This research has contributed both operationally and theoretically. However, this research still has limitations in using secondary data, where secondary data is often unable to meet the specific needs of the research. In addition, this study only looked at data for 2018. Therefore, it is necessary to carry out further observations in view of economic growth in the origin region of workers who commute in North Sumatra.

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