DETERMINANTS OF POVERTY LEVELS IN MEDAN CITY IN 1998-2021: ERROR CORRECTION MODEL APPROACH

Ramadhan Devan Pratama[1], Adithiya Rahman Atmaja[2], Sirojuzilam[3], Irsad[4], Muhammad Syafii[5], Wahyu Ario Pratomo[6], Tetty Yuliaty[7]

Master of Economics, Faculty of Economics and Business , University of North Sumatra

ARTICLEINFO	ABSTRACT
Keywords: Level Poverty Economic Growth Education Level Goverment Expenditure Open Unemployment.	This research examines the connection between economic growth, education level, government expenditure, and open unemployment in Medan City. This research utilized annual time series data for Medan from 1998 to 2021. This research analysis method employs ECM (Error Correction Model) to comprehend the impact of long-term and short-term predictions processed by Eviews 9 software. According to the research findings, long-term and short-term projections of economic growth, education level, and accessible unemployment have a significant negative impact on poverty levels in the city of Medan. On the other hand, long-term and short-term government spending positively impact the poverty level in Medan City, although the effect is not significant. Based on the result of this research, the Medan City Government should enhance its oversight of the government's budget allocation in the context of reducing poverty in the city of Medan. In addition, the Medan City Government should concentrate its efforts on providing employment opportunities and utilizing competency-based certification and training to decrease unemployment, thereby contributing to reducing poverty in Medan City.
E-mail: ramadhandevanpratama@gmail.com atmaja.adithiya@gmail.com	

1. INTRODUCTION

In general, no developing nation can ever be separated from the issue of poverty because it remains a social phenomenon that is difficult to manage year after year. This includes Indonesia. The poverty level can be determined by the condition of a community with low economic status and the failure of government policies to act effectively and efficiently to combat poverty. Therefore, poverty is a condition of those who have not participated in this research of transfiguration because they lack adequate skills and expertise in mastering production factors and production factors of sound quality and thus cannot contribute positively to economic development (Subandi, 2019). The province of North Sumatra is one of the regions on the island of Sumatra, with the fourth highest population of Indonesia's thirty-seven provinces. The largest city in North Sumatra Province is Medan City, one of the province's eight urban areas. The poverty rate in Medan is relatively volatile between 2010 and 2021, as the table below demonstrates.

Table 1
Development of the state of Poverty Rate, Economic Growth, Education Level, Government Expenditure, and Open Unemployment in Medan City in 2010-2021

Year	Poverty level (percentage)	Economic growth (percentage)	Average Length of School (Year)	Expenditure Realization Budget (Million Rupiah)	Government percentage	Open unemployment (percentage)
2010	10.05	6.94	10.54	3.021.172.391	86.57	13.11
2011	9.63	7.79	10.63	3.224.449.048	89.55	9.97

2012	9.33	7.66	10.72	3.723.643.299	74.03	9.03
2013	9.64	5.36	10.76	4.496.573.831	76.09	10.01
2014	9.12	6.05	10.88	4.525.231.332	80.50	9.48
2015	9.41	5.74	11	4.395.825.169	82.23	11
2016	9.3	6.27	11.18	4.213.480.509	84.11	10.24
2017	9.11	5.81	11.25	5.059.288.701	79.14	9.46
2018	8.25	5.92	11.37	3.854.742.411	77.32	8.25
2019	8.08	5.93	11.38	4.499.148.542	80.25	8.53
2020	8.01	-1.98	11.39	3.224.449.048	73.36	10.74
2021	8.34	2.62	11.48	3.723.643.299	78.50	10.81

Sourced: (Badan Pusat Statistik, 2021)

Based on the first table above, it is evident that the poverty rate in Medan City has fluctuated over the past twelve years. The causes encompass sluggish economic growth, suboptimal education quality, improper government spending budget allocation policies, and a rise in the number of open unemployment rates. Therefore, efforts are required to alleviate the issue of poverty, specifically by increasing or fostering economic growth.

Based on table 1, it can be observed that the percentage of economic growth has been volatile or fluctuating over the past twelve years. The percentage of economic growth experienced a decline or its lowest point at 1.98 percent but increased by 2.62% in 2021. The COVID-19 pandemic caused all economic activities to stagnate; the COVID-19 pandemic was the primary cause of 2020's economic decline and low growth.

According to the theory of Simon Kuznets as presented in Jhingan (2014), to decrease the amount of poverty, it is necessary to achieve a growth rate that increases or develops from year to year. This is because there is an inverse relationship between economic growth and poverty levels. According to the theory of Simon Kuznets, if economic growth fluctuates between positive and negative values, it implies that people's incomes are rising; as a result, it can reduce poverty levels. This theory is backed up by the research of Pasaribu et al. (2023), who hypothesize that economic growth significantly negatively affects poverty levels in Padang Lawas Regency.

According to research by Rahman et al. (2021b), there was a significant negative relationship between education and poverty in North Sumatra Province. According to Rahman et al. (2021a), the high level of poverty in a region is a result of the low quality of education, which affects the ability of individuals to become unskilled and find it challenging to enter the workforce. This is supported by their research, which found that the level of education was inversely proportional to the level of poverty. This indicates that the individual's education level increases with the region's quality of education. By the optimal performance of the Medan City Government, the average length of schooling indicates the level of education in the city of Medan over the past twelve years. The average length of schooling indicates that the level of education in the city of Medan is becoming more advanced.

It goes without saying that to raise the education standard; there must be enough money set aside for government spending on it. This money should also reflect the government's efforts to provide services to the public to ensure fair access, high standards, relevance, and regional competitiveness. Information about upcoming government policies is included in government spending (Permana, 2022).

According to table 1, the growth of government expenditures over the past twelve years has also fluctuated. This suggests that strict oversight is required, especially in terms of budget distribution, as the growth of government spending in Medan City tends to be dynamic every year as a result of changes in policies outlined in the APBD so that the programs being implemented, especially those aimed at reducing poverty, are carefully targeted and focused on the development of public infrastructure in order to generate new sources of revenue for the regions and have a positive impact on the number of the poor. According to research carried by Marisa (2019), there is positive influence of the goverment expenditure on poverty levels in Indonesia, although it is not statiscally significant.

Government spending is an instrument of government intervention in the economy. It is highly effective due to its role in the economy's development, which is not limited to economic growth but also includes unemployment and poverty rates. Suppose the budget allocation for government expenditures

does not have a significant effect on the level of poverty. In that case, it will affect the rising number of unemployed individuals in a region.

According to table 1, the state of the open unemployment rate in Medan City fluctuates annually, with the lowest percentage in the last twelve years occurring in 2018 at 8.25% and the highest percentage in the last twelve years occurring in 2010 at 13.11 %. This indicates that few employment opportunities are available due to the rapid growth of the labor force. When economic growth is only assisted by production sector activities and necessitates a highly educated workforce, while the majority of the poor have only completed elementary school or high school, the poverty rate will rise, making it difficult for unemployed individuals to meet their daily needs, thereby resulting in widespread poverty—the crime rate in an area.

2.   METHOD

This research employs a quantitative data method. The Central Statistics Agency (BPS) of Medan City provided the secondary data for the research, using data from 1998 to 2021, the period that was chosen for the study. Additionally, time series econometric techniques, especially ECM (*Error Correction Model*) analysis, were used to analyze the data using Eviews 9 software. According to Basuki & Prawoto (2017), the Error Correction Model analysis aims to identify the long-term and short-term correlations that exist as a result of cointegration between research variables. This research examines the impact of open unemployment, education levels, government spending, and economic growth on poverty. An example of the ECM analysis model used in this study is as follows: The long-term equation is first set up as follows to determine how the independent variable affects the dependent variable.:

$$Y_t = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$$

Information:

Y_t is the Poverty Rate (percent), and X_1 is Economic Growth (percent). X_2 is the Education Level (years), X_3 is Government Expenditure (million rupiahs), X_4 is Open Unemployment (percent), α indicates the regression constant, $\beta_1\beta_2\beta_3\beta_4$ is the regression coefficient, ε is residual, and t is the time trend.

Second, the equation is set up to determine how the independent variable in the short-term equation affects the dependent variable. :

$$D(Y_t) = \alpha_0 + \beta_1 D(X_1) + \beta_2 D(X_2) + \beta_3 D(X_3) + \beta_4 D(X_4) + ECT(-1) + \varepsilon_t$$

Information:

Y_t is Change in Poverty Rate (percent), X_1 is Change in Economic Growth (percent). X_2 is Change in Education Level (years), X_3 is Change in Government Expenditure (million rupiahs), X_4 is Change in Open Unemployment (percent), α shows regression constant, $\beta_1\beta_2\beta_3\beta_4$ is regression coefficient, The terms ECT, ε, and t refer to the Error Correction Model, Residual, and First Stage Differentiator, respectively.

According to Ekananda (2019), the application of ECM analysis techniques must pass a series of tests, including stationarity testing, cointegration, and *Error Correction Model*. In addition, there are several benefits to utilizing ECM analysis to solve research problems, including:

1) The transformation of each variable concerning the long-term trend.
2) Researchers can determine whether economic data has achieved long-term stability or has been transformed and enhanced in the direction of long-term stability.
3) There is a theory that describes background behavior
4) Examines whether an error persists compared to the long-term trend throughout the observation period.

3.   RESULT AND DISCUSSION
3.1   Results of Model Specification Tests
3.1.1 Stationarity Test

With the aid of the unit root test, it is possible to determine whether or not the researched time series data is stationary.

Table 1
Results of the Unit Root Test for *Augmented Dickey-Fuller* (ADF) at Level

Variable	ADF t-statistic	Critical Value 5%	Prob.	Ket.
Growth_Economic	-10.52138	-2.998064	0.0000	Stationer
Education	-1.423204	-2.998064	0.5532	Tidak Stationer
LnExpenditure_Government	-3.774911	-2.998064	0.0095	Stationer
Unemployement_Open	-2.350888	-2.638752	0.1658	Tidak Stationer

Source: Eviews 9 (data processing)

In table 1, the results of the *Unit Root Test* indicate that the variables of economic growth and government expenditure data have remained stationary since the probability number is less than the significance level of 0.05. Nonetheless, the variables of education and open unemployment data are not stationary at the level because the probability value surpasses the significance level of 0.05, necessitating a distinction in the first stage.

Table 2
Results of the ADF's First Stage Unit Root Test on the *Augmented Dickey-Fuller*

Variable	ADF t-statistic	Critical Value 5%	Prob.	Ket.
Education	-4.644249	-3.004861	0.0014	Stationer
Unemployement_Open	-3.269485	-3.012363	0.0298	Stationer

Source: Eviews 9 (data processing)

Based on the results in table 2, it can be concluded that the data education variable is stationary because the probability value is 0.0014, which is lower than the significance level of 0.05. The data open unemployment variable is stationary because the probability value is 0.0298, which is lower than the significance level of 0.05. The data is determined to satisfy the unit root test's requirements, allowing cointegration testing to proceed.

3.1.2 Cointegration Test
This test determines whether the variables are associated with the *Engle-Granger* description of the long-term equilibrium state.

Table 3
Cointegration Test Results

Variable	ADF t-statistics	Nilai Kritis Mackinnnon 1%	5%	10%	Prob.	Ket.
ECT	-4.327837	-3.752946	-2.998064	-2.638752	0.0027	Stationer

Eviews 9 is the originating source (data processing)

Table 3 reveals that the ADF t-statistics obtained a value of -4.327837, which exceeded the MacKinnon critical value for all significance levels (α = 1%, 5%, or 10%). Therefore, it can be concluded that all variables are interrelated over the long term or that cointegration has occurred.

3.1.3 ECM Test (*Error Correction Model*)
This test examines the stability of the short- to long-term future. Test the effect of the dependent variable on the independent variable using the long-term prediction results.
Table 4 Long-Term Prediction Results

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Dependent Variable: TINGKAT_KEMISKINAN
Method: Least Squares
Date: 10/10/22   Time: 21:58
Sample: 1 24
Included observations: 24
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
PERTUMBUHAN_EKONOMI	-0.269466	0.078364	-3.438659	0.0028
PENDIDIKAN	-4.250881	1.714648	-2.479157	0.0227
LNPENGELUARAN_PEMERINTA...	0.901945	0.812738	1.109761	0.2810
PENGANGGURAN_TERBUKA	-0.317042	0.117038	-2.708878	0.0139
C	40.74489	7.879738	5.170844	0.0001

R-squared	0.763047	Mean dependent var	9.367917
Adjusted R-squared	0.713163	S.D. dependent var	2.722473
S.E. of regression	1.458080	Akaike info criterion	3.775170
Sum squared resid	40.39396	Schwarz criterion	4.020598
Log likelihood	-40.30204	Hannan-Quinn criter.	3.840282
F-statistic	15.29621	Durbin-Watson stat	1.857328
Prob(F-statistic)	0.000009		

Source: Eviews 9 (data processing)

Based on table 4, the following equation can be used to make long-term predictions:

$$\text{Level\_Poverty}_t = 40{,}74489 - 0{,}269466(\text{Growth\_Economic}_t) - 4{,}250881\text{Education}_t + 0{,}901945(\text{LnExpenditure\_Government}_t) - 0{,}317042(\text{Unemployement\_Open}_t) + \varepsilon_t$$

Except for the government expenditure variable, the long-term test revealed that all probability values for the component variables were less than 0.05. This indicates that economic growth, education, and open unemployment significantly and negatively affect poverty. In the meantime, government spending has a marginally positive impact on poverty.

Table 5
Results of Short-Term Predictions

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Dependent Variable: D(TINGKAT_KEMISKINAN)
Method: Least Squares
Date: 10/10/22   Time: 22:56
Sample (adjusted): 2 24
Included observations: 23 after adjustments
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Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PERTUMBUHAN_EKONOMI)	-0.250994	0.072565	-3.458903	0.0030
D(PENDIDIKAN)	-8.176052	3.014344	-2.712382	0.0148
D(LNPENGELUARAN_PEMERINTA...	0.479180	1.461423	0.327886	0.7470
D(PENGANGGURAN_TERBUKA)	-0.346147	0.140957	-2.455686	0.0251
ECT(-1)	-0.930123	0.246398	-3.774877	0.0015
C	0.309829	0.418888	0.739647	0.4696

R-squared	0.724433	Mean dependent var	-0.475217
Adjusted R-squared	0.643384	S.D. dependent var	2.420980
S.E. of regression	1.445744	Akaike info criterion	3.794584
Sum squared resid	35.53300	Schwarz criterion	4.090800
Log likelihood	-37.63771	Hannan-Quinn criter.	3.869081
F-statistic	8.938209	Durbin-Watson stat	1.994683
Prob(F-statistic)	0.000261		

Source: Eviews 9 (data processing)

Based on table 5, the following equation can be used to make short-term forecasts:

$$D(\text{Level\_Poverty}_t) = 0{,}309829 - 0{,}250994D(\text{Growth\_Economic}_t) - 8{,}176052D(\text{Education}_t) + 0{,}479180D(\text{LnExpenditure\_Government}_t) - 0{,}346147D(\text{Unemployment\_open}_t) - 0{,}930123(-1) + \varepsilon_t$$

According to the short-term test results, ECT produces a negative and statistically significant sign with a probability level below 0.05 of 0.0015. Consequently, it is possible to predict the ECM model applied in this research.

3.2 Results of a Classic Assumption Test

According to Pandoyo & Sofyan (2018), it is necessary to verify the stages of testing classical assumptions so that they do not appear in the equation model used in a study. If all requirements pass the evaluation, the analysis model is deemed feasible for implementation.

3.2.1 Normality Test

According to Pratomo & Hidayat (2010), Using *Jarque-Bera* to determine if the data follows a normal distribution.

Source: Eviews 9 (data processing)
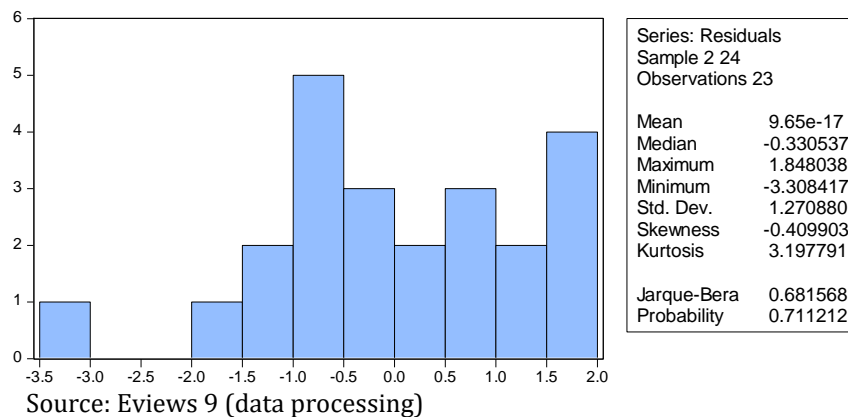
Figure 1
Normality Test Results

According to the normality test results, the obtained value for *Jarque-Bera* is assumed to have passed the probability threshold of 0.05 at 0.681568. The normality test can therefore be asserted to have passed (normally distributed).

3.2.2 Multicollinearity Test

According to Wahyudi (2020), The multicollinearity test can be derived from the number of *Variance Inflation Factors.*

Table 6
Multicollinearity Test Results

Variance Inflation Factors
Date: 10/10/22   Time: 23:34
Sample: 1 24
Included observations: 23

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
D(PERTUMBUHAN_E…	0.005266	1.428335	1.381266
D(PENDIDIKAN)	9.086271	1.573661	1.040212
D(LNPENGELUARAN…	2.135758	1.966945	1.390044
D(PENGANGGURAN_…	0.019869	1.174623	1.168872
ECT(-1)	0.060712	1.166585	1.166293
C	0.175467	1.930816	NA

Source: Eviews 9 (data processing)

The *Variance Inflation Factor* (VIF) of all of the components of the independent variable in this research is less than ten, so there is no multicollinearity issue, as shown by the data in Table 9.

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3.2.3 Heteroscedasticity Test

According to Winarno (2015), The *White* test reveals that heteroscedasticity symptoms are guaranteed to occur.

Table 7
Results of a heteroscedasticity test using the *white* test

Heteroskedasticity Test: White

F-statistic	17.92695	Prob. F(20,2)	0.0541
Obs*R-squared	22.87241	Prob. Chi-Square(20)	0.2951
Scaled explained SS	13.73126	Prob. Chi-Square(20)	0.8439

Source: Eviews 9 (data processing)

The *white* test results show that the significance level exceeded the chi-square probability value of 0.2951. (0.05). This suggests that heteroscedasticity has not been indicated.

3.2.3 Autocorrelation Test

The *Lagrange Multiplier* test can be used to determine whether autocorrelation is present.

Table 8
Autocorrelation Test Results with Lagrange Multiplier

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.637182	Prob. F(2,15)	0.2274
Obs*R-squared	4.121093	Prob. Chi-Square(2)	0.1274

Source: Eviews 9 (data processing)

It can be concluded from the data in table 8 that there is no autocorrelation symptom because the chi-square probability value of 0.1274 from the *Lagrange Multiplier* (LM) test exceeded the significance level of 0.05.

Discussion

1.   The Influence of Economic Growth on Poverty

Based on the results of the long-term equation in this research, it appears that the variable economic growth has a significant adverse effect on the poverty rate in Medan City. The probability number reaches 0.0028, which is less than the significance level, indicating this finding (0.05). In addition, the acquisition of the economic growth regression coefficient reached -0.269466, which indicates that when economic growth has increased by 1 %, it will reduce the poverty rate to 0.269466 % per year.

In addition to the regression analysis in the short-term equation, it demonstrates that the variable economic growth has a substantial negative impact on the poverty rate in Medan City. The economic growth regression coefficient is -0.250994, which indicates that a 1% increase in economic growth will reduce the poverty rate by 0.250994% per year. This result is indicated by the probability value reaching 0.0030, below the significance threshold of 0.05.

This research confirms Simon Kuznet's theory that economic growth and poverty levels have an inverse relationship. Increasing economic growth, according to Kuznet, indicates that people's incomes are rising, thereby reducing poverty levels. This finding is consistent with the research findings of Pasaribu et al. (2023), who hypothesize that economic growth significantly affects poverty levels.

2.   The Influence of Educational Level on Poverty

According to the regression results of the long-term equation in this study, the education variable significantly negatively affects the level of poverty in Medan. It was discovered with a probability of 0.0227, less than the significance threshold of 0.05. The education regression coefficient reaches -4.250881, indicating that when the education level advances to 1%, the poverty rate will decrease to 4.250881% per year.

Similarly, the short-term equation's regression analysis reveals that education significantly negatively impacts the poverty rate in Medan City. This is discovered with a probability of 0.0148, which is lower than the significance level of 0.05. The education regression coefficient is -8.176052, which indicates that when the education level reaches 1%, the poverty rate will decrease by 8.176052% per year.

The findings of this research show a strong correlation between education and poverty levels because education can increase individual skills through scientific competence, despite not having a direct effect on individual utility, which increases income. A rise in income will lift individuals above the poverty line. This result is consistent with the research conducted by Rahman et al. (2021b), who hypothesize that education significantly negatively affects poverty levels.

3.   The Influence of Goverment Expenditure on Poverty

According to this study's long-term regression equation, the government expenditure variable has a positive but insignificant effect on the poverty rate in Medan City. Government spending has a regression coefficient of 0.901945, indicating that a 1% increase in the poverty rate will result in an annual increase of 0.901945%. This result's probability value of 0.2810 exceeds the significance threshold of 0.05.

Similarly, the regression results for the short-term equation indicate that the variable representing government expenditures has a positive effect on the poverty rate. However, this effect is not statistically significant in Medan City. This conclusion is supported by the probability value of 0.7470, exceeding the significance level of 0.05. Government spending has a regression coefficient of 0.479180, which means that if government spending rises by 1%, the poverty rate will also rise by 1% annually to 0.479180%.

The results of this research show that government spending is insignificant because the Medan City Government has not provided adequate oversight of the budget allocation policies that the government has implemented to combat poverty. As a result, an evaluation must be carried out to design efficient and focused government policies. The finding of this research is consistent with those of Marisa (2019), who hypothesized that government spending might have a small but positive impact on poverty levels.

4.   The Influence of Open Unemployment affects Poverty

It was discovered that the open unemployment variable significantly impacted the poverty level in Medan City based on the regression findings in the long-term equation. The probability number reaches 0.0139, which is less than the significance level, indicating this finding (0.05). In addition, the open unemployment regression coefficient was acquired, reaching -0.317042, which meant that the poverty rate would decrease to 0.317042% annually if open unemployment rose to 1%.

Similar to the long-term equation, the regression analysis of the short-term equation reveals that the open unemployment variable has a significant adverse effect on the poverty rate in Medan. When open unemployment reaches 1%, it will cause the poverty rate to drop to 0.346147% annually, according to the regression coefficient for open unemployment, which is -0.346147. The probability value for this finding was 0.0251 times smaller than the significance level (0.05).

This research shows that the increase in open unemployment reduces the poverty rate in the city of Medan. One of the most important factors is the strength of the family bond, which allows an established family to take care of unemployed relatives. In addition, the population classified as unemployed is dominated by individuals with a high school degree or higher. In other words, unemployment in people who do not have earnings but do not reside in poverty because their families still support them suggests that family culture factors continue to play a significant role in moderating the correlation between unemployment and poverty. This finding is consistent with the results of research conducted by Sinaga (2020), who hypothesized that open unemployment significantly negatively affects poverty levels.

4.   CONLUSION

Based on ECM model analysis experiments involving regression analysis of long-term and short-term equations, overall research findings demonstrate that economic growth is variable; the education level and open unemployment significantly negatively impact the poverty rate in Medan. On the other hand, the variable representing government expenditure positively affects the poverty rate, although this effect is not statistically significant in Medan City. Based on ECM model analysis experiments involving regression analysis of long-term and short-term equations, the research results show that economic growth, education

level, and open unemployment significantly negatively impact the poverty rate in Medan City. On the contrary hand, the variable representing government expenditure has a positive effect on the poverty rate, although this effect is not statistically significant in Medan City.

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