

# Supply Chain Strategy for Implementing Fiscal Decentralization and its Effect on Regional Performance in North Sumatera Province, Indonesia

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**Abstract-** The purpose of this study is to investigate the supply chain strategy for implementing fiscal decentralization and its effect on regional performance which consists of financial equalization capabilities and regional development in North Sumatera province, Indonesia. A secondary data collected from the Central Bureau of statistic North Sumatera which consist of 33 regencies/cities in North Sumatera province for the period of 2011-2015 and analyzed using panel regression analysis by assisting EViews 10.0. This study applied the Williamson index to identify the effect of fiscal decentralization of financial capability via the General Allocation Fund (DAU) budget per capita and Gross Regional Domestic Product (GRDP). The variable of fiscal decentralization is the primary revenue received by local government measured by Original Local Government Revenue (PAD) and Balance Fund (DP) while the regional performance using per capita income. The result of the analysis shows that the random effect model is the best model for estimating the effect of fiscal decentralization on regional performance. By applying the Williamson Index for General Allocation Fund per capita, this study indicates it unstably distributed. Also, Williamson Index for per capita income distribution categorized as moderate. Lastly, the Original Local Government Revenue and Balance Fund have a positive effect on regional performance.

**Keywords-** Fiscal Decentralization, Supply Chain Strategy, Original Local Government Revenue, Regional Expenditure, General Allocation Fund and Fund Balance.

## 1. Introduction

Supply chain management (SCM) has been the dominant research paradigm of the last few decades. Considerable efforts have been put forth in developing decision models for solving supply chain related problems. Since the regional autonomy was implemented by Regional regarding the Fiscal Balance between Central-Regional Government, various policies concerning local finance in Indonesia are changing. Regional development previously

implemented by the central authority has been transformed into a regional authority and implemented by regions autonomously. Today, one of the most prominent issues in discussing the economy of a region is the issue of regional performance/ gross regional domestic product [1-4].

The enactment of this Law provides an opportunity for the region to explore the economic potential and improve its financial performance in order to realize regional self-reliance. Unequal distribution of natural resources and original local government revenue to autonomous regions, requires a source of local revenue that can reduce the fiscal imbalance. Areas with high local revenue will easily finance their expenses while regions with low local revenues will have difficulty financing their expenses. It will also result in differences in expenditure between regions to carry out government functions and services to a very diverse society. It will reflect the high level of financial need among the regions concerned.

A total of 33 regencies/cities in North Sumatera Province which consists of 25 districts and 8 municipalities. Every region has different economic activities, areas, and natural resources so that the Local Revenue received by each region is different. The following will present some data areas with the acceptance of it is the original local government revenue. The reception of original local government revenue from 2011-2014 shows that West Nias District has the lowest original local government revenue among other regions in North Sumatra of IDR 10,298 billion in 2014. The highest original local government revenue is in Medan for IDR 1,515,686 billion. High economic activity and substantial tax revenues make the city of Medan as the region in North Sumatra with the highest original local government revenue. Langkat Regency with the most significant area has PAD in 2014 of IDR. 107,812 billion. While the area with the smallest area of Sibolga has PAD in 2014 of IDR. 74,515 billion. From the above data can be seen how the regional income is still uneven. Thus, the objective of implementing fiscal decentralization as an inter-regional financial system must be achieved, so that every region in Indonesia has a relatively equal ability to build and empower the community. As a province

that has 33 regencies/cities were consisting of 25 districts and 8 municipalities and every district/city have different resources, and economic activities. It is necessary to investigate the effect of fiscal decentralization on regional performance in North Sumatra province, Indonesia.

## 2. Literature Review

The existential philosophy of supply chain management is to integrate the flow of materials, information and products from the initial suppliers to the end customer [5-21]. Fiscal decentralization aims to support the implementation of regional autonomy, so that the regulation of the substance of Law no. 32 of 2004 and Law no. 33 of 2004 is a unity that cannot be separated. In Law no. 33 of 2004, the financial balance between the central and regional governments includes the financial distribution between the Central and Regional Governments as well as equitable, democracy, fair and transparent interregional ratios concerning regional potentials, conditions and needs. A form of financial balance is the existence of regional funding derived from APBN revenues allocated to regions to fund regional needs in the context of decentralization implementation. The Balancing Funds consist of Revenue Sharing Funds sourced from taxes and natural resources, the Special Allocation Fund (DAK), and the General Allocation Fund (DAU). The three types of funds together with the Local Revenue and Other Revenue is a source of local funds used to run the wheels of local governments that expected to improve service in various sectors, especially the public sector.

In [22], the main features of a region capable of implementing fiscal decentralization are 1) regional financial capacity, which means the region has the ability and authority to extract financial resources, administer and use itself to finance the administration of the government. 2) the dependence on the center should be as minimal as possible. The less fund transfer from the center, the higher the degree of independence of a region indicating that the region is increasingly able to finance its expenditures without assistance from the central government [23-26]. Conversely, the lower degree of independence of a region indicates that the area is increasingly unable to finance its expenditure. Thus, with the sharing of the financial balance, it will support the region to implement fiscal decentralization. Unequal distribution of natural resources and local revenue (PAD) to autonomous regions, requires a source of local revenue that can reduce the fiscal imbalance. Areas with high local revenue will easily finance their expenses while regions with low local revenues will have difficulty financing their expenses. It will also result in differences in expenditure between regions to carry out government functions and services to a very diverse population. It will reflect the high level of financial need among the regions concerned [27-29].

Following its function, [19-21] to overcome fiscal imbalances that occur then the General Allocation Fund plays a vital role in the equitable distribution of financial capacity among regions to finance their expenditure needs in the context of decentralization. The General Allocation Fund is expected to overcome the vertical gap between the central government and local government as well as the horizontal gap between local governments to occur equity in fiscal capacity. The study conducted by [5-7,9], shows that DAU has a role in the distribution of the financial capacity of the district of West Sumatra. Most of the regions have excellent financial ability after receiving DAU. The research conducted by [8] shows that the equitable distribution of financial capability between regions has improved after the implementation of fiscal decentralization. It is evident from the declining value of the Williamson index from 0.45 to 0.23 - 0.33.

Besides as an instrument of financial capability, fiscal decentralization also aims to accelerate the equitable distribution of regional development. A comprehensive study conducted by [30], they studied the convergence of regional economic growth east coast north sumatera. They found that there is a process of convergence of economic growth among the districts/cities in North Sumatra, East Coast Region. Further, this study also found that Gross Regional Domestic Product (Regional Performance) per capita, working population, number of poor and length of study has a significant influence in increasing the speed of convergence of economic growth in the East Coast region of North Sumatra. Therefore, the local governments have the authority to make policy more directed to develop the region by using and managing its finances compared to the central government which has limitations in dealing with various problems and demands of community needs directly. Also, the allocation function should be used as much as possible by the local government in the development as the more knowing, the needs, conditions, and the situation of the local community [10] so that the community can feel the development.

## 3. Methodology

Agile Supply Chain expresses the need for organizations to develop and coordinate relationships with their business partners, including suppliers, manufacturers and distributors. The method of data analysis used in this study is the Williamson Index (WI) used to identify the level of equalization of local financial ability. The Williamson Index is one of the indicators used to calculate income disparities among regions within a region. WI value between 0 to 1, if the value of WI is equal to 0 then in the region there is no inequality of revenue between regions, or in other words equality between regions in the region is very good. Conversely, if the value of WI is equal to one then in the region there is very high inequality of inter-regional revenue, or even distribution between regions is very bad. There are three criteria in the calculation of Williamson that is: (i) the value from 0.00 to 0.25

shows that the distribution of regional revenue is excellent. (ii) the value from 0.26 to 0.50 indicates that the distribution of regional revenue is evenly moderate. (iii) the value from 0.51-0.75 then the distribution of the revenue area is paralyzed. (iv) the value from 0.76-1.0 describes that the distribution of regional revenue is unequal. The formulation of the Williamson Index is as follows:

$$WI = \frac{\sqrt{\sum_i (Y_i - Y)^2 \cdot fi/n}}{Y} \quad (1)$$

Whereas WI is Williamson Index,  $Y_i$  represents Regional Per Capita Revenue at Regency / City to Province North Sumatra (billion),  $Y$  is Per capita Regional Revenue on Cumulative Regency / City in Province North Sumatra (million),  $fi$  is the number of districts in the cumulative Kabupaten / Kota in Province North Sumatra (person) and  $n$  denotes Number of residents of districts/cities in North Sumatra Province

The effect of fiscal decentralization on development performance is by using regression analysis with the panel data model — this data regression processing using EViews 10. Panel data is a combination of time-series panel data and cross-section. The regression equation for panel data can be seen as follows:

$$Y_{it} = \alpha_0 + \beta_1 X_{it1} + \beta_2 X_{it2} + \dots + \beta_k X_{itk} + e_{it} \quad (2)$$

Where,  $Y_{it}$  is equal to 1, for  $i = 1, 2, 3, \dots, N$  and  $t = 1, 2, 3, \dots, T$ ,  $i$  is unit cross-section,  $t$  is time unit,  $Y_{it}$  = response variable in  $i$ -th cross-section unit and time  $t$ ,  $X_{it}(k)$  is  $k$ -free variable in the  $i$ -th cross-section unit and time  $t$ ,  $\beta_0$  is intercept and  $e_{it}$  is error term. The specified function in this study as below:

$$Y_{it} = f(\text{PAD}, \text{DP}) \quad (3)$$

The model of the effect of fiscal decentralization on development performance is as follows:

$$Y_{it} = \alpha_0 + \beta_1 \text{PAD}_{it} + \beta_2 \text{DP}_{it} + e_{it} \quad (4)$$

Where  $Y_{it}$  denoted as regional performance in per capita income, PAD is Original Local Government Revenue, DP is Balance Fund,  $\alpha$  is intercept/ constant,  $\beta$  is regression coefficient and  $e$  is the error term.

## 4. Results and Discussions

### 4.1 The Impact of Fiscal Decentralization on Equity in Financial Capacity by SCM

To achieve the goal of equitable distribution of financial capability between regions in the era of fiscal decentralization General Allocation Fund (DAU) has a crucial role. It is in line with the objectives of the DAU, namely as an equitable distribution of inter-regional financial capacity to fund regional needs. For

assessing the level of financial equalization between regions, this study uses the Williamson Index. The smaller number of Williamson Index (close to zero) more evenly distributed among regions and the higher the number of the Williamson Index (close to one) is more uneven. To see the financial equity by calculating the amount of DAU per capita received by each region.

From 2011 to 2015 the DAU transfers for the province of North Sumatra continue to be mainly progressing. In 2011 the DAU received amounted to IDR. 948,867 billion, in 2012 increased to IDR. 1.1 trillion, in 2013 increased to IDR. 1.2 trillion in 2014 increased to IDR. 1.3 trillion. Then in 2015 it decreased to IDR. 1.1 trillion. Successively, the development of DAU transfers for the regencies/cities in North Sumatera Province has grown. For the regions that receive the largest DAU is the city of Medan, while the region that receives the lowest DAU is the district of West Nias. In 2011 Medan City received DAU amounting to IDR. 1.06 trillion and in 2015 increased to IDR. 1.23 trillion. West Nias Regency in 2011 received a DAU of IDR. 193.068 billion and in 2015 increased to IDR. 301.537 billion.

In general, DAU has decreased from time to time i.e. 2011 to 2015. Among them are the Batu Bara Regency is -2.17%, Labuhan Batu Selatan Regency 5.14% and Medan -11.58%. As for the Province of North Sumatra, DAU has decreased from 2014 to 2015 as much as -15.56%. For identifying the fairness of financial capacity in fiscal decentralization not only analyzes DAU, but also need to analyze Regional Expenditure (APBD). Because DAU is not the only source of local revenue so that the equitable distribution of financial capabilities in fiscal decentralization should be seen from APBD revenue sources. APBD revenue consists of PAD, Balancing Fund and Other Receipts. So to see how the impact of decentralization implementation on the equity of financial capability by analyzing DAU per capita and APBD per capita income of each district/city in North Sumatra Province.

The region with the highest APBD per capita income from 2011-2015 is Kabupaten Pakpak Barat. In 2011 APBD income per capita of Pakpak Barat is IDR. 7905.619 per resident, then in 2015 increased to IDR. 10391.885 Per resident. While the region with the lowest APBD per capita income from 2011-2015 is Deli Serdang Regency. In 2011 per capita income of Deli Serdang Regency is IDR. 898,842 per resident, then in 2015 increased to IDR. 1,370,980 per resident.

The percentage of revenue growth of the average per capita APBD also experienced growth. In 2011-2012 West Pakpak District experienced a negative growth of 5.17%. In 2012-2013 all districts/cities in North Sumatera Province experience positive per capita APBD revenue growth. In 2013-2014 there are five districts/cities experiencing negative growth, such as Kabupaten Tapanuli Tengah of 8.6%, Tanjung Balai

City by 0.02%, South Nias Regency by 25.31%, Kabupaten Padang Lawas Utara of 8, 28%, and North Labuhanbatu Regency by 0.21%. While the growth of APBD per capita income in 2014-2015, there are three districts/cities that experienced negative growth such as the District of Asahan of 6.26%, Medan City by 2.38%, and West Pakpak district by 0.25%.

The region with the highest DAU per capita is West Pakpak District. THE SCM effect on the finance performance is investigated. In 2011 APBD income per capita of Pakpak Barat is IDR. 4,848,820 per resident, then in 2015 increased to IDR. 7,182,076 per resident. As for the region with the lowest DAU per capita is Deli Serdang District is IDR. 491.684 per resident, then in 2015 increased to IDR. 688,066 per resident.

Per capita growth rate of DAU per capita is on average experiencing growth but tends to decrease. In 2011-2012 all districts/cities in North Sumatra Province experienced growth. So also in the years 2012-2013 and 2013-2014. In 2014-2015 there are four districts/cities that experienced negative growth, namely District Karo of 0.27%, Medan City by 12.36%, Batu Bara by 3.23%, and South Labuhan Batu 7.17 %. Furthermore, from DAU per capita data, APBD per capita income and population in 2011-2015 can be obtained by calculation of the Williamson Index for DAU per capita and APBD per capita income.

**Table 1.** North Sumatera Province Williamson Index for Regional Budget Revenue (APBD) and General Allocation Fund (DAU) in 2011-2015 period

No	Year	Index Williamson
		APBD
1	2011	0.44
2	2012	0.42
3	2014	0.43
4	2014	0.42
5	2015	0.43

Source: Data Processing Williamson Index

The Williamson Index score for per capita income in APBD (PAD + Balancing Fund + Other legitimate income) shows moderate inter-regional acceptance this is seen from the value of the Williamson Index ranging from 0.42 to 0.44. It shows the moderate distribution of moderate distribution. The value of the Williamson Index for DAU per capita income over the 2011-2015 period ranged from 0.53-0.57, indicating that DAU massively distributed. DAU per capita allocated to regions in North Sumatra Province has not evenly distributed.

## 4.2 The Influence of Fiscal Decentralization on Development Performance

Descriptive statistics are the analytical methods used to provide detailed includes (minimum, maximum, mean,

standard deviation) of each research variable, both exogenous and endogenous variables. The results of descriptive statistical regression are presented in the table as follows:

**Table 2.** Descriptive Statistic (N=165)

	Mean	Maximu m	Minimu m	Std. Dev.
PAD	8798428 6	15156859 47	276147 0	2220900 15
DP	6051655 79	16819487 83	1377971 95	2963440 60
P. Perkap ita	2405637 0	56218281	9929110	1030072 0

By using the Chow test, it aims to choose between CEM or FEM model. When the probability of a chi-square cross-section is higher than 0.05 then the best model used is CEM, and vice versa if the probability of chi-square cross-section is less than 0.05 then the best model used in FEM.

**Table3.** Chow Test

Redundant Fixed Effects Tests

Pool: DF

Test cross-section fixed effects

Effects Test	Statistic	df.	Prob.
Cross-section F	445.319950	(32,130)	0.0000
Cross-section Chi-square	776.502500	32	0.0000

From the output Eviews 10.0 Chow test results show that the cross-section value of chi-square 0.000 is less than 0.05 means the null hypothesis is rejected. Thus between CEM and FEM, the best regression model is FEM. Since the model chosen based on the Chow Test is FEM, it is necessary to re-test with Hausman's Test to choose whether the best model is between FEM and REM. If the probability of the random cross-section is less than 0.05 then the FEM model is chosen.

**Table 4.** Hausman Test

Correlated Random Effects - Hausman Test

Pool: DF

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.775149	2	0.6787

The Hausman test results show a random cross-section value of 0.6787 > 0.05 meaning the null hypothesis is

accepted. Thus between FEM and REM, then the best model used is REM.

**Table 5.** Estimation Results of Panel Data Regression with Random Effect Model

Dependent Variable: PDRBKAP?  
 Method: Pooled EGLS (Cross-section random effects)  
 Date: 03/21/17 Time: 13:06  
 Sample: 2011 2015  
 Included observations: 5  
 Cross-sections included: 33  
 Total pool (balanced) observations: 165  
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16996269	1681698.10	10.1066	0.0000
PAD?	0.013046	0.0018866	9.18446	0.0000
DP?	0.009770	0.00086911	11.24813	0.0000

In this study the independent variables used are Original Local Government revenue (PAD) and Balancing Fund (DP), while the dependent variable is per capita income (PDRBKAP). Here is the output of EVIEWS 10 panel data regression using Random effect model. From the estimation result of Random Effect Model (REM) hence can be arranged multiple linear regression equation in north Sumatera region is as follows:

$$Y = 16996269 + 0.013046 \text{ PAD} + 0.009770 \text{ DP} + e \quad (5)$$

The above regression equation shows that: the value of constant is 16996269, which means that when the value of PAD and DP is constant, then GRDP per capita of IDR 16,996,269. Original Revenue (PAD) has a positive effect on per capita income. The coefficient value 0.013046 means any addition of IDR 1,000,000 PAD variable will improve the performance of development (income per capita) of IDR 13,046,3. Variable Balancing Fund (DP) has a positive effect on per capita income with coefficient value worth 0.009770, which means every addition of IDR 1.000.000 variable DP will increase income per capita equal to IDR 9,770. The results of substitution coefficients show that from 33 districts of the city in North Sumatra, only 15 districts/cities that get a positive impact on fiscal decentralization. Positive results on Random Effect (Cross) district/ municipality shows that fiscal decentralization affects the per capita income of the area, whereas negative results show the opposite effect. These districts are Asahan Regency, Tanah karo regency, Labuhanbatu regency, South Tapanuli regency, Toba Samosir regency, Batu Bara district, Padang lawas district, Padang lawas Utara, Labuhan Batu Selatan district, Labuhan Batu Utara regency, Binjai city, city Medan, Pematang Siantar City, Sibolga Town, and Tanjung Balai City.

Meanwhile, 18 districts/cities that have negative impacts on fiscal decentralization are Dairi Regency, Deli Serdang Regency, Langkat Regency, Mandailing Natal Regency, Nias Regency, Simalungun Regency, Tapanuli Tengah Regency, North Tapanuli Regency, West Pakpak District, South Nias Regency, Humbang Hasundutan, Serdang Bedagai District, Samosir Regency, North Nias Regency, West Nias Regency, Tebing Tinggi City, Padang Sidempuan City, and Gunung Sitoli City. The region that has the greatest impact on fiscal decentralization is Batu-Bara district with a constant value of IDR 24,462,935. As for the area with the least fiscal decentralization impact is South Nias Regency amounting to IDR -11.981.430.

The implementation of fiscal decentralization for the equitable distribution of financial capacity in the regencies/cities in North Sumatra Province is still not optimal. It is due to the ability of good financial equity according to [8] ranged from 0 to 0.25. However, results indicate that the Williamson Index is still high for per capita APBD and DAU per capita in 2011 to 2015 with a range of values ranging from 0.42 to 0.44 and 0.53 to 0.57. Even DAU variables show the distribution of revenue between regions lame. It is because the regions have not yet maximized the potential of local revenues (PAD), such as developing the superior regional sector in order to boost the regional economy further. It can be seen from the realization of PAD is still small compared to the transfer funds provided by the center. Local governments are more dependent on their financial needs by expecting transfer funds. It causes the inequality of DAU distribution as a counterweight instrument. Also, the uneven distribution of regional income sources causes regional income to be uneven. In line with [30] study, the Williamson Index for per capita APBD and DAU per capita income shows a relatively stable state. For per capita APBD revenues ranged from 0.23 to 0.33 and DAU ranged from 0.30 to 0.32. DAU per capita in Banten also shows that the DAU per capita has a Williamson Index that is larger than APBD revenue.

The effect of fiscal decentralization on the performance of development shows that the variable of revenues studied i.e. the Original Local Government Revenue (PAD) and the Balancing Fund on the development performance of the region seen from the per capita income shows the R-squared results of 0.408320. It means that the ability of PAD and DP variables simultaneously explains the variation of per capita income per capita of 66.84%. The remaining 33.16% is explained by other variables not included in the estimation model in this study. While for each variable of the PAD and Balancing Fund, both can increase income per capita society. It is in line with Keynes's theory that economic growth driven by government spending by the role of the APBD. This research is also in line with research Najiah (2013) [11], Ramayanti (2009) [15], and Novitri (2013) [12-14]. Najiah's (2013) [11] study shows that PAD and Balancing Fund

variables have a positive and significant influence on GRDP of Depok City. The balancing fund is the contribution of the most significant contributor in APBD revenue. So indicating the implementation of regional autonomy in Depok City in his government is still a very dependent fund from the center. Research conducted by Ramayanti (2009) [15-18] showed that the PAD variable had a positive and significant effect on the increase of income per capita while the central transfer variable had a negative and significant influence.

A study conducted by Novitri (2013) [12] PAD shows a positive influence on per capita income and balancing funds did not significantly influence the increase in per capita income. This PAD variable that has a positive influence also supports the BAPENAS (2003) statement which confirms that PAD growth should be sensitive to economic growth. This economic growth will directly increase the growth of income per capita. For districts/municipalities more than half of districts/cities still rely on the central government in carrying out its financing. It can be seen that there are still many districts/cities that get negative results on the Random Effect of each region. It can also be interpreted that the regional area still relies on the transfer from the central government in the form of the General Allocation Fund to carry out its government activities without accompanied by an increase in the original revenue of the region.

## 5. Conclusions

The purpose of this study is to investigate the effect of SCM and Original Local Government Revenue (PAD) and Balance Fund (DP) on regional performance by regencies/cities in North Sumatra from 2011 to 2015. In conclusion, the allocation of DAU has not sufficiently demonstrated the role of DAU as the equitable distribution of financial capabilities across regions. It can be seen from the very unequally distributed DAU per capita. The unequal distribution of DAU per capita shows that DAU allocations to regions in North Sumatra Province not evenly distributed. While for APBD revenue per capita. Every

regency/city in North Sumatra Province shows acceptance between regions evenly moderate. The Original Local Government revenue and Balance Fund both partially and simultaneously show that both variables significantly influence the performance of the development of regencies/cities in North Sumatra.

Further, the allocation of DAU can fully show the role of DAU as the equitable distribution of financial capability among regions. DAU calculations allocated to the regions on the basis of the fiscal gap have resulted in regions being too dependent on the transfer of General Allocation Funds granted by the central government. So that each region must be able to increase Original Local Government revenue (PAD) and DBH to increase its fiscal capacity. District/municipality governments in North Sumatera are expected to explore the economic potentials that can be seen from the leading sectors of each region and then develop them optimally to maximize the acquisition of Original Local Government revenue (PAD) to finance regional development and community services. Maximizing the acquisition of PAD will also encourage regions not to rely on transfer funds from the central government. Thus, the local government can manage and utilize local finance independently for the improvement of people's welfare and occur. Each region must also use the transfer funds provided by the central government for activities that encourage economic development not only to finance routine regional activities.

Local governments as holders of authority in regional autonomy expected to provide the infrastructure that will promote economic growth where economic growth will drive per capita income growth. In addition to the availability of proper infrastructure, local governments will be able to increase investment to the region to spur economic growth and move the wheels of the regional economy. The central government should also provide the infrastructure that has a vital role in encouraging the economy that cannot be implemented by local governments, such as the provision of electrical energy to attract investment in the region.

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