

Shift Share Analysis of Growth, Shifts and Links Between Economic Sectors in Medan City

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ABSTRACT

The process of sustainable economic growth is the main condition for the continuity of local economic development. Economic needs will continue to increase along with increasing population growth and so we need an increase in income every year. This can be achieved by increasing aggregate output (goods and services) or PD RB every year. This increase was due to the contribution of the economic sector having shifted although it was relatively insignificant. Sectors that were originally dominant sectors experienced a shift and had an impact on other sectors. The purpose of this study is to investigate and analyze sector to basic and non-sector basis, changes and shifts between sectors and between sectors in the economic causality area of Medan city. By using secondary data sourced from the field in figures for the years 2003 - 2012, the data analysis method used in this study is to use *Location Quotient* (LQ), *Shift-Share* analysis and *Granger Causality*. The estimation results using *Location Quotient* (LQ) show that the communication sector, financial institutions and banks, electricity, construction and trade, hotels and restaurants and the service sector are the economic base sectors in Medan. From the analysis of the *shift-share* increase that occurred at the aggregate level of economic output for 2003 - 2012 and amounted to 83.15 percent due to the effect of economic growth at the provincial level, the overall economic sector of Medan still has a lot of competitiveness or local independence in trade, communication, banking, industrial, building/construction and service sectors.

Keywords: *Shift-Share*, *Location Quotient*, *Granger Causality*, Growth, PDRB, economic sector.

Introduction:

Regional economic development is a process in which local governments and their communities manage existing resources and form a partnership pattern between local governments and the private sector to create new jobs, as well as stimulate the development of economic activities in the region.

Medan City is one of 33 regencies/ cities in North Sumatra province. As one of the autonomous regions that has the authority to organize government and development as well as provide services to the community, it has broad authority to manage, plan and utilize the economic potential optimally, which can be enjoyed by all people in the city of Medan.

Of all economic sectors in the city of Medan, it was recorded that in 2012 the trade, hotel and restaurant sector was the largest sector contributing to GRDP with a total of Rp. 11,108,805.88 million or 26.76 percent, followed by the transportation and communication sector and the processing industry at 20.51 percent and 13.38 percent, respectively.

Formulation of the problem

Based on the above background, the problems in this research are:

1. What are the basic and non-basic sectors in the economy of the Medan city area?
2. How are the changes and shifts in the economic sector in the Medan city area.
3. How is the contribution of *Provincial Share*, *Proportional Shift* and *Differential Shift* to the economy of the Medan city area.
4. How is causality between sectors in the economy in North Sumatra Province.

Theoretical Review:

1. Economic Development

According to Todaro in Sirojuzilam (2008: 16) defines economic development as a multidimensional process, which involves major changes, either to changes in economic structure, social change, reducing or eliminating poverty, reducing inequality and unemployment in the context of economic growth.

Adisimta (2008:13) states that regional (*regional*) development is a function of the potential of natural resources, labor and human resources, capital investment, development infrastructure and facilities,

transportation and communication, industry composition, technology, economic situation and inter-regional trade. , the ability to finance and finance regional development, entrepreneurship, regional institutions and the wider development environment.

2. Structural Change

According to Todaro in Kuncoro (2000; 110), the theory of structural change focuses on the mechanism of economic transformation experienced by developing countries, initially being subsistence and focusing on the agricultural sector towards the industrial and service sectors. Basically, this tori on structural change explains the phenomenon of structural changes in developing countries which are dominated by rural economic activities towards an urban-oriented economy in the form of industry and services. Changes in the structure of the economy, which initially relied on the agricultural sector and then switched to the industrial and service sectors, will be able to affect the level of people's income, or the level of income between economic sectors.

3. s analysis *Shift Share*

According to Arsyad (2001 ; 124), *shift share* analysis is a very useful technique in analyzing structural changes in the regional economy compared to the economic structure above it. The purpose of this analysis is to determine the performance or work productivity of the regional economy by comparing it to the wider region.

Methodology:

1. Research sites

This research was conducted in the city of Medan, which is one of the districts/cities in the province of North Sumatra. Consideration of the research conducted in the city of Medan, so that the results of this study in the form of leading sectors of the economy can be used as information and can be prioritized in the development planning of the city of Medan.

2.Data Analysis Method

In this study, 3 (three) methods were used in answering the existing problems, namely:

a. LQ method

Location Quotient is the ratio of the role of a particular local sector to the same sector at the broader reference economic level. The economic reference level used in this case is in the form of the provincial economy so that the algebraic form of the relationship is stated:

$$LQ_i = \frac{\left(\frac{E_{ij}}{E_i} \right)}{\left(\frac{E_{ir}}{E_r} \right)}$$

with :

- LQi = *Location Quotient* sector i of the local economy
- Eij = Product/employment in sector i in the local economy
- Ei = Total product or employment in the local economy
- Eir = Total product/employment in sector I in the prop insi perekonomian economy
- Er = Total product/employment in the provincial economy

b. *Shift Share* method

Shift Share the used to determine changes and shifts in the economic sector of the Medan city area. The results of the *shift share analysis* will describe the performance of sectors in the GRDP of the city of Medan compared to the province of North Sumatra. Then an analysis of the deviations that occur as a result of the comparison is carried out. If the deviation is positive, it is said that a sector in Medan's GRDP has a competitive advantage or vice versa.

The general form of the equation of the *Shift Share analysis* is:

$$G_{ij} = PS_{ij} + P_{ij} + D_{ij}$$

Through *shift share analysis*, economic growth and structural shifts in the economy of the city of Medan are determined by three components which mathematically, *provincial share* (PS), *proportional shift* (P) and *differential shift* (D) can be formulated as follows (Tarigan, 2007;88, Sjafrijzal, 2008;91)

1. *Provincial Share* (PS)

$$PS_{iMDN}^t = Y_{iMDN}^{t-1} X \left(\frac{Y_{iSUMUT}^t}{Y_{iSUMUT}^{t-1}} \right) - Y_{iMDN}^{t-1}$$

2. *Proportional Shift (P)*

$$P_{iMDN}^t = \left(\frac{Y_{iSUMUT}^t}{Y_{iSUMUT}^{t-1}} - \frac{Y_{iMDN}^t}{Y_{iMDN}^{t-1}} \right) X Y_{iMDN}^{t-1}$$

3. *Differential Shift (D)*

$$D_{iMDN}^t = Y_{iMDN}^t - \left(\frac{Y_{iSUMUT}^t}{Y_{iSUMUT}^{t-1}} \right) X Y_{iMDN}^{t-1}$$

Where :

SUMUT = North Sumatra Province as a higher reference area

MDN = Medan City as analysis area

Y = Gross added value

i = sector in GRDP

t = Year 2012

t-1 = Initial year

c. **Granger Causality Method**

Granger (1969) postulated that a variable X is said to cause another variable Y, if the current Y can be predicted better using the past values of X.

Research Results and Discussion:

1. **Research result**

a. **Result of Analysis of Leading Sector Determination**

From the results of the calculation of the *Location Quotient (LQ)* of Medan City from the period 2003 - 2012 it can be explained that there are 6 (six) economic sectors that have an LQ value > 1, namely the electricity, building, trade, communication, banking and service sectors. the sector that has the largest LQ value is the communication sector with an LQ value = 2.15, followed by the Banking sector with an LQ value = 2.07, the Electricity sector with an LQ value = 1.97, the Building sector with an LQ value = 1.68, and the trade sector with a value of LQ = 1.44 and the service sector with a value of LQ = 1.05. LQ value < 1 there are 3 sectors in the economy in Medan City over a period of 9 years.

The sector that has an LQ value > 1 in the economy of the city of Medan is the leading sector or the base sector. If we look at the development of the sector from 2003 to 2012 it shows that this sector remains the leading sector or the base sector during the 9 year period. The following presents the development of the trade sector for the period 2003 – 2012 in the economy of Medan City.

In aggregate, from 2003 to 2012 there was an increase in the level of GRDP (economic output) in Medan City as shown in table 2

So the aggregate increase, from 2003 to 2012 there was an increase in the level of GRDP (economic output) in Medan City by 23,452,509.50 million rupiah. Of this amount, most (83.15 percent) were caused by the effect of economic growth at the provincial level, this means that the economic growth of Medan City is faster than economic growth at the district/city level of North Sumatra province or its growth is faster than that of the district/city. others in the province of North Sumatra. Meanwhile, the influence of the competitiveness of Medan City on the economy of Medan City is -3.50 percent, which indicates that the economic independence of the city of Medan is still dependent on the economy of the province of North Sumatra. This is because even though there is a shift between economic sectors, especially in the agricultural sector, the shift is not significant so that the increase in the regional *share component* is also not significant.

Meanwhile, the effect of the industrial/sectoral mix (*proportional share*) on economic growth in Medan City is 20.35 percent .

So by using *shift share analysis* in aggregate, there was an increase in the level of economic output during the years 2003 - 2012 amounting to 23,452,509.50 million rupiah and overall the economic sectors of Medan City still have many regional competitiveness and advantages such as the trade, communication, banking, industry, building/construction and service sectors.

b. **Results of Inter-Sectoral Causality Analysis**

Unit Roots Test Results and Degree of Integration

The results of the unit root test on all variables showed that none of the variables studied were stationary even though the tolerance level was increased to 10 percent, the data for these variables did not meet the data stationarity criteria so that the unit root test was continued on the *first difference*.

Due to the non-stationary data, it must be tested at the *First Defference level* so that later all variables are at the same level . The degree of integration test is carried out as a consequence of the non-fulfillment of the assumption of stationarity at a certain degree. In this test, the data are differentiated to a certain degree, until all the data becomes stationary at the same degree .

The test results at the *First Defference level* also experience non-stationary data so that it must be continued on the *2nd difference* .

second difference level unit root test or from the results of the degree of integration test, it can be seen that all data used with the ADF model are good with intercepts, using intercepts and trends and those that do not use intercepts and trends in this study are stationary, because the probability values of all variables value below 1 percent or the ADF value on these variables is greater than the McKinnon critical value. Because the data is stationary in the first degree test (I), so it can be continued in the next test.

Hypothesis Testing Results (Hypothesis Testing)

The Lag Length test is very important in the VAR/VECM approach because the lag of the endogenous variables in the system of equations will be used as exogenous variables. The optimal length of variable lag is needed to capture the influence of every other variable in the VAR/VECM system (Widarjono, 2007: 137). The results of the optimum *lag length* test based on the AIC and SC criteria can be seen in Table 1 below.

Table 3. Lag Length Test Results for 9 Sector Variables

Method	Statistics	Prob.**
ADF - Fisher Chi-square	59.3902	0.0000
ADF - Choi Z-stat	-4.89860	0.0000

Test result Causality Granger (Granger Causality Test)

Because the data of all economic sectors is stationary at the *second difference level*, then all the data is first converted to the *Second difference form* .

The results of the Granger Causality test show that the correlation between economic variables in the economy of the Medan city area does not indicate any causality between these variables.

2. Discussion

Leading Sector and Economic Structure

The results of the calculation of the *Location Quotient* (LQ) in the city of Medan, there are 6 (six) economic sectors that have an LQ value > 1, namely the electricity, building, trade, communication, banking and service sectors. However, other sectors in the economy in the city of Medan can still be developed into the basic sector, including the industrial sector which has an LQ value of 0.63.

The six leading sectors that have the largest LQ value are the communication sector with an LQ value = 2.15, followed by the Banking sector with an LQ value = 2.07, the Electricity sector with an LQ value = 1.97, the Building sector with an LQ value = 1.68, and the trade sector with a value of LQ = 1.44 and the service sector with a value of LQ = 1.05.

Meanwhile, by calculating the *shift share analysis* in the aggregate, there was an increase in the level of economic output during the years 2003 – 2012 amounting to 23,452,509.50 million rupiah and overall the economic sectors of Medan City still have a lot of regional competitiveness or independence, such as the trade, communication, banking, industry, building/construction and service sectors.

Conclusion:

1. From the estimation results using *Location Quotient* (LQ) analysis, the leading sectors or base sectors are formed, namely: the communication sector, the banking sector, the electricity sector, the building sector and the trade sector as well as the service sector in the economy of the city of Medan.
2. From the results of *shift share analysis* in the aggregate, there was an increase in the level of economic output during the years 2003 – 2012 amounting to Rp. 23,452,509.50 million and 83.15 percent caused by the effect of economic growth at the provincial level, meanwhile the effect of the industrial /sectoral mix

effect (*proportional share*) on the economic growth of the province of North Sumatra is positive. And overall the economic sectors of Medan City still have a lot of regional competitiveness or independence, such as the trade, communication, banking, industry, building/construction and service sectors.

3. From the estimation results using the *Granger causality analysis*, it shows that there is no single economic sector in the city of Medan that influences each other between sectors (*causality*). Meanwhile, the agricultural, mining and industrial sectors are the supporting sectors for the basic sector in the economy of the city of Medan.

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