The Monetary Policy Transmission Mechanism based Macroeconomic Model of North Sumatera: A Projection using Stochastic Simulation

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Abstract

This paper analyses monetary transmission mechanism by using macroeconomic model north Sumatera, focusing especially on how the aggregate economy North Sumatera responds changes of interest rate. In this paper, we establish identification conditions macroeconomics model to uncover the effects of monetary policy to aggregate economy North Sumatera Utara. By using semiannual data over the period 2000S1-2015S2 macroeconomics model is developed to analyze various channels of monetary policy mechanism in North Sumatera. The empirical results show the strength and working of the monetary transmission mechanism is highly dependent on the balance-sheet compositions of the central bank, banks, firms and households. In the 3SLS model, changes of interest rate significantly affect the aggregate economic activity in North Sumatra through the mechanism of the magnitude of the elasticity of that occurs.

Keywords: monetary policy, transmission mechanism, aggregate economic activity.

Introduction

The prime objective of economic policies (monetary and fiscal policy) is to increase the welfare of the general public. The issue of monetary policy transmission mechanism is still an interesting topic, based on two questions. First, whether monetary policy can affect the real economy in addition to its influence on prices. Secondly, if the answer is yes, then through the transmission mechanism what the influence of monetary policy on the real economy occurs. The research mechanism of monetary policy transmission should provide an explanation of how changes in monetary policy instruments can affect other macroeconomic variables to the realization of the ultimate goal of monetary policy. How much influence on prices and activities in the real sector, everything is very dependent on the behavior of banking and business to shock monetary policy instruments namely interest rate certificates bank Indonesia (rSBI).

Process through which monetary policy and fiscal policy decisions affect real gross domestic product (RGDP) and price level (P). Economic development of North Sumatra Province aims to increase the Gross Domestic Product or the GDP per capita in the long-term period. Surprise monetary policies tend to increase the

pressure of general prices. Achievement of the objectives of economic development in the long-term period is also affected by changes in the regional and international economy. Therefore, the economic model to be built must include a model of aggregate supply and aggregate demand in a holistic manner, thus stimulating monetary, supply side and the demand side as well as regional and international economic changes can be responded to by all regional economic indicators.

There are at least six channel through which monetary policy appears to impacting economics activities in development countries. There are : (1) interest rate channel, (2) money supply channel, (3) credit channel, (4) Balance sheet channel, (5) assets price channel, and (6) exchange rate channel and (7) expectations channel (Mishkin 2006; Bernanke and Kuttner 2005; Borio and Zhu 2012; Adrian and Shin 2009; and Gambacorta 2009). According to Greenspan (2005) and Bernanke (2005), these interest rate levels have significantly altered the level of output and prices. The behavior of interest rates in relation to changes in macroeconomic aggregates raises some fundamental research questions.

The primary purpose of this paper is to shed light into the interest rate transmission mechanism process based macroeconomics model North Sumatra. We seek to explore the interest rate channel of monetary transmission because of the implicit assumption that the Central Bank Indonesia can influence long term interest rates through the manipulation of short-term real interest rate. We also wish to identify the effects of interest rate changes on activities economy in North Sumatera. Is the interest rate pass - through complete in this macroeconomics model?

Literature Review

The monetary policy transmission mechanic is defined in several ways. Monetary transmission mechanism refers to the general conceptual framework, while the channel of monetary policy influences refers to "the path through which the monetary disturbances influence the goal variables".

The process through which monetary policy affects aggregate demand, gross domestic product in real terms, and price level is described as monetary transmission. The impact of monetary policy on gross domestic product is through its influences on consumption and investment decisions of household, business and financial intermediaries. According to Taylor, the monetary policy transmission mechanism is defined as the process through which monetary policy decision are transmitted with effects on the real gross domestic product and inflation (Taylor, 1995).

Most studies examined all the channels through which changes in money supply and interest rates affect output and prices with very few studies focusing on particular channels of monetary transmission mechanism. Studies by Hasibuan, S and Pratomo, W A (2015) suggest that the monetary policy variables SBI, Foreign Exchange and Money Supply interact with macroeconomic variables, namely GDP, Import Price Index and the Consumer Price Index.

The results of Goltom, M S (2008) study concluded that the monetary transmission mechanism through the interest rate channel starts from a change in the short-term interest rate, which will then be transmitted to all medium-and long-term interest rates through the balancing mechanism of supply and demand in financial markets. The change in the short-term nominal interest rate set by the central bank can induce changes in real short-and long-term interest rates. If prices are sticky, an expansionary monetary policy will drive down the short-term real interest rate.

For example, Central Bank interest rate decisions affect short and long term interest, liquidity in the financial system, the quantity of money and bank credit, exchange rate and all variables that influences consumption and investment decisions of individuals and firms and thereby aggregate demand, inflation as shown in figure 1.

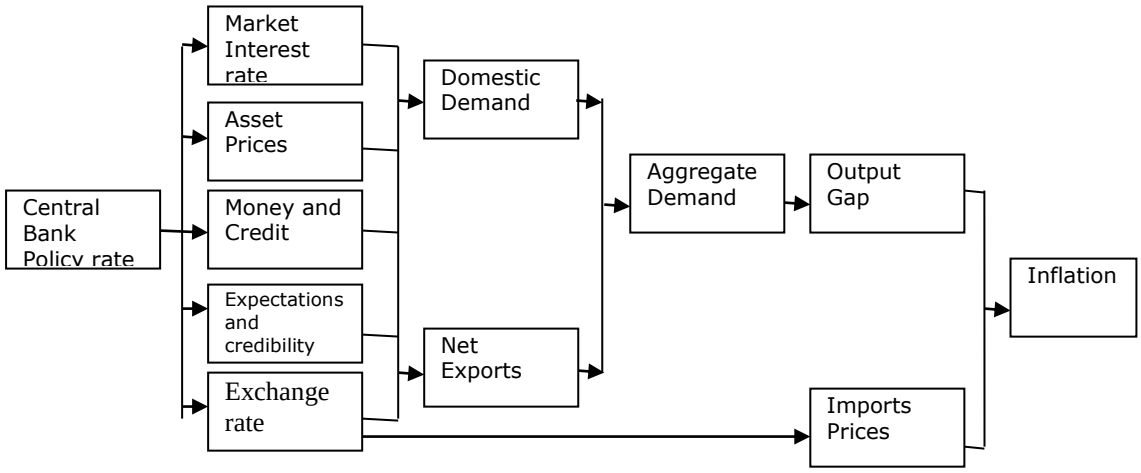

Figure 1. The Transmission mechanism of monetary Policy (Petursson, 2001).

The previous majority studies into monetary transmission mechanism has focused in developed countries. The early literature concentrates money-output relationship in Mexico. The results seem to indicate a causation from money (nominal interest rate) to output, implying the interest rate channel effectiveness (Ansari and Ahmed, 2007).

Ireland, P N (2005) considered the monetary transmission mechanism describes how policy-induced changes in the nominal money stock or the short-term nominal interest rate impact on real variables such as aggregate output and employment. Specific channels of monetary transmission operate through the effects that monetary policy has on interest rates, exchange rates, equity and real estate prices, bank lending, and firm balance sheets. Recent research on the transmission mechanism seeks to understand how these channels work in the context of dynamic, stochastic, general equilibrium models

In this study, basic theories were developed to produce macroeconomic models of north Sumatra as a tool to analyze how the mechanism of monetary policy transmission through changes in interest rates work are Dutt (2006), Blanchard (1987), Kaminchia (2014) Romer (2012), and Barro (1997) states that the equilibrium model deals with regional aggregate demand will result in several indicators of aggregate economic activity of regions, among others, economic growth, unemployment and inflation. Aggregate production functions using endogenous growth models (Romer, 1990); Rao and Cooray, (2008), Aggregate production function is formulated in the form of Cobb-Douglas. Based on Euler's theorem (Chiang and Wainwrigth, 2005).

Research Method

Based on the above theoretical framework built this research model as follows:

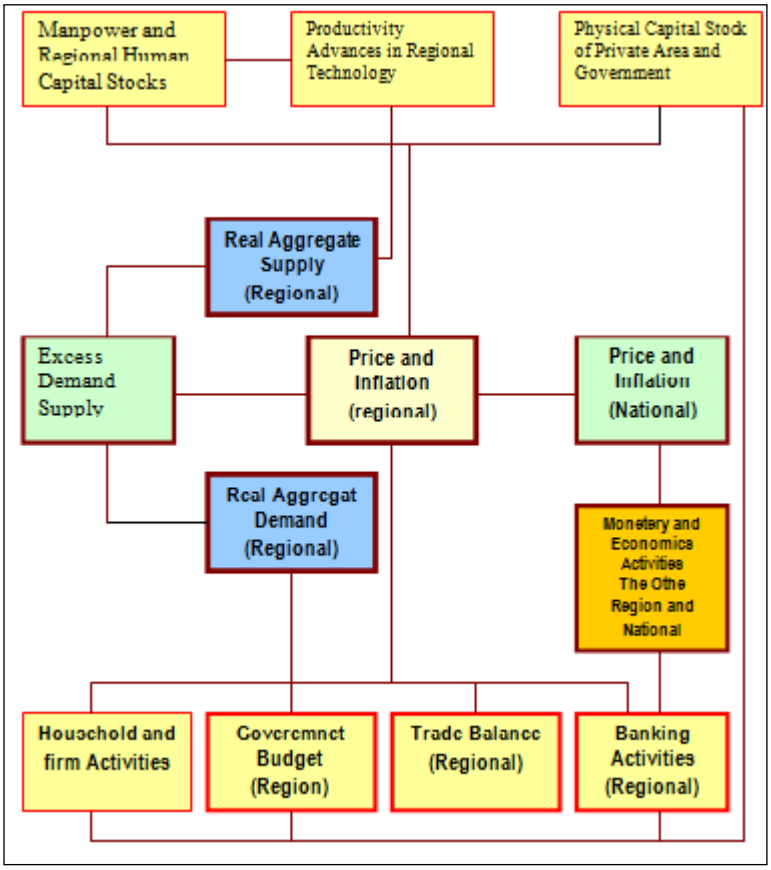

Figure 2. Diagram of Transmission Mechanism of Regional Macroeconomics Model.

Aggregate Supply Model

$$HKSU = RAS1*NSSU + HRSU \quad \text{.....} \quad (1)$$

Where HKSU (the amount of the stock of human capital region), RAS1 (the ratio of the stock of human capital region, HRSU (workforce for research and development region). The new knowledge generated by the research and development sector is both non-rival with the basic model.

$$\sum DURGi = 0 = DURG0 + DURG1 + DURG2 + \text{.....} \quad (2)$$

where Durg = accumulated production of durable or intermediate inputs. If successful research and development is shown by the coefficient of successful research and development of the technological progress and the growth of technological progress respectively

$$DTECH/dt = SUCS \times HKSU \times TECH \text{ .....} \quad (3)$$

$$[DTECH/dt]/TECH = SUCS \times HKSU > \text{.....} \quad (4)$$

Where, TECH (technological progress or labor productivity region) and SUCS (coefficient of successful research and development region), so that the technological advances is,

$$TECH\ [HKSU] \text{ .....} \quad (5)$$

$$PDRB = HOSU^{C2}\ NDSU^{C3}\ [TECH \times DURG^{\,1-C2-C3}] \text{.....} \quad (6)$$

Total stock of physical capital is a unit of consumption that is not done [C1] multiplied by a durable commodity, namely:

$$DURG = RKSU / [C1 \times TECH] \quad (7)$$

where RKSU is the physical capital stock of the region. Substitution of equation (7) to equation (6) will result in the production function aggregates, namely the,

$$PDRB = HKSU^{C2}\ NDSU^{C3}\ TECH\ [RKSU/(C_1 \times TECH)]^{1-C2-C3} \text{ or}$$

$$PDRB = C_1^{1-C2-C3}\ [HKSU \times TECH]^{C2}\ [TECH \times NDSU]^{C3}\ RKSU^{1-C2-C3}$$

The model of aggregate output growth region and formulated as follows:

$$PDRB[(HKSU*TECH), (NDSU*TECH), RKSU] \quad (8)$$

$$EGSU = 100*[PDRB - PDRB_{t-1}] / PDRB_{t-1} \quad (9)$$

$$RKSU = RKSP + RKSG \quad (10)$$

where: EGSU = level of regional economic growth, the PDRB = Gross Domestic

Product real region, NDSU = labor usage region, RKSU = capital stock physical region, RKSP = capital stock physical company region domestic and abroad in the region, and RKSG = stock real physical capital of local government. Model of labor demand region is

$$NDSU[(100*WGSU/PISU), PDRB] \quad (11)$$

Where PISU = the general price level or the local consumer price index, and WGSU = the average nominal wage region. Interrelationship of unemployment to wages is the new Keynesian Phillips curve or forward-looking Phillips curve. Otherwise Clarida, Gali and Gertler (1999). The existence of price rigidity [θ], so that the general price level is

$$PISU_t = [1-\theta]\ PISU_{jt} + \theta\ PISU_{jt-1} \quad (12)$$

where [j] = index of manufacturers. Optimization of pricing by manufacturers in the period [t] is:

$$PISU_{jt} = [1 - \beta\ \theta]\ PISU^*_t + \beta\ \theta\ E[PISU^*_{jt+1}] \quad (13)$$

where: PISU * = target price level common regions, PISU = actual region of the general price level, E[Pisu] = expectations of general price level regions, and β = discount rate.

$$PISU^*_t = k \times PISU_t \times MC_t = PISU_{jt} \times MC_t \quad (14)$$

Thus the wage rises when output is above the trend or wages rose against unemployment or employment gap, namely:

$$WGSU = [1/\lambda] \times [NDSU_t - NSSU_t] \quad (15)$$

where [$1/\lambda$] = elasticity to unemployment or employment gap. From the information contained employment gap, the so-called New Keynesian Phillips curve or forward-looking Phillips curve, namely:

$$[NDSU_t - NSSU_t] = \lambda [(1-\beta\theta) PISU^*_t + \beta\theta E(PISU^{\bullet}_{jt+1}) - (1-\theta) PISU_{jt} - \theta PISU_{jt-1}] \quad \ldots\ldots\ldots\ldots\ldots\ldots (16)$$

$$[NDSU_t - NSSU_t] = \lambda [(1-\beta) PISU^*_t + \beta E(PISU^{\bullet}_{jt+1}) - PISU_{jt-1}] = \lambda [IFSU_t + \beta E(IFSU_t)] \ldots\ldots\ldots\ldots\ldots\ldots (17)$$

$$NSSU_t = NDSU_t + \lambda\theta /[(1-\theta)(1-\beta\theta)] \times [\beta E(IFSU_t) - IFSU_t] \ldots\ldots (18)$$

so the model of labor supply and the unemployment rate is defined as follows:

NSSU[NDSU, (EPSU - IFSU)] .....(19)
UNSU = 100*[NSSU - NDSU] / NDSU..... (20)

where: UNSU manpower = unemployment regions, EPSU = the region inflation expectations, and IFSU = inflation rate region.

The basic framework of the establishment of regions aggregate demand model is a balance of commodity markets and the balance of the money market. Establishment of regions aggregate demand model is also based on the monetary system of open trade relations with other regions and regions internationally. The entry of regions or regional trade and international commodity market equilibrium model explains that excess aggregate supply on aggregate demand regions is

RESU = PDRB - HCSU - GCSU - IVSU - NCSU - NXSU ..... (21)

where: NCSU = real consumption private institutions, non-profit regions, HCSU = real consumption of household region, GCSU = real consumption of local government, IVDP = real consumption domestic private sector in the region, IVFP = real consumption of private overseas in the regions, resu = stock change real regions, and NXSU = real net exports region.

Data

The research adopted semiannual data covering the period 2000:S1-2015:S2 from the National Bureau of Statistics and the Central Bank of Indonesia.

Data Analysis

Projections comprehensively against indicators macroeconomic North Sumatra can only be done through econometric model. Methods estimator used to the system of simultaneous equations is the Three-Stage Least Squares [3SLS] because the empirical correlation of stochastic term error with endogenous variables as exogenous and correlation of stochastic term error of each equation is quite serious, so the method estimator 3SLS more efficient than the 2SLS method.

Based on the above framework, the empirical model developed is as follows:

LOG(TECH) = C(10)+C(11)*LOG(HKSU)

LOG(PDRB) = C(20)+C(21)*LOG(TECH*HKSU)+C(21)*LOG(TECH*NDSU) +C(23)*LOG(RKSU)

LOG(NDSU) = C(30)-C(31)*LOG(100*WGSU/PISU)+C(32)*LOG(PDRB)

LOG(NSSU/NDSU) = C(40)+C(41)*(EPSU-IFSU)

LOG(HCSU) = C(50)-C(51)*IFSU-C(52)*(100*RAS2)+C(53)*LOG(PDRB)

LOG(IVDP) = C(60)-C(61)*LOG(LRSU)+C(62)*LOG((1-RAS2)*PDRB)

LOG(IVFP) = C(70)-C(71)*LOG(LRSU)+C(72)*LOG((1-RAS2)*PDRB)$_7$

$$LOG(XFSU) = C(80)-C(81)*LOG(100*RAS2)+C(82)*LOG(100*DMPI/DXPI) +C(83)*LOG(EXCR*DMPI/DXPI) +C(84)*LOG(100*(PDRO+MDSU-XDSU)/PDRB)$$

$$LOG(XDSU) = C(90)-C(91)*LOG(100*DMPI/(1-RAS2)*DXPI) -C(92)*LOG(100*MPSU/XPSU) +C(93)*LOG(100*(PDRO+MDSU-XDSU)/PDRB)$$

$$LOG(MFSU) = -C(101)*LOG(100*RAS2)+C(102)*LOG(100*DMPI/DXPI) -C(103)*LOG(EXCR*MPSU/XPSU)+C(104)*LOG(PDRB)$$

$$LOG(MDSU) = C(110)-C(111)*LOG(100*DMPI*(1-RAS2)/DXPI) +C(112)*LOG(EXCR*MPSU/XPSU)+C(113)*LOG(PDRB)$$

$$LOG(RNES) = C(120)-C(121)*LOG(NRSU)+C(122)*LOG(PDRB) +(1-C(122))*LOG(RKSG)$$

$$LOG(RRSU) = C(130)-C(131)*LOG(NRSU)+C(132)*LOG(PDRB) +(1-C(132))*LOG(RKSG)$$

$$LOG(RTSU) = C(140)+C(141)*LOG(100*RAS2)+C(142)*LOG(PDRB)$$

$$LOG(DESU) = C(150)+C(151)*LOG(DRSU)+C(152)*LOG(LRSU) +(1-C(151)-C(152))*LOG(SBIR)+C(153)*LOG(0.01*PISU*PDRB)$$

$$LOG(CRSU) = C(160)-C(161)*LOG(DRSU)+C(162)*LOG(LRSU) +(1-C(161)-C(162))*LOG(SBIR)+C(163)*LOG(0.01*PISU*PDRB)$$

$$LOG(DRSU) = C(170)+C(171)*LOG(SBPU)+(1-C(171))*LOG(NBSU) -C(172)*LOG(LDSU*BRES)$$

$$LOG(LRSU) = C(180)+C(181)*LOG(SBPU)+(1-C(181))*LOG(NBSU) -C(182)*LOG(LDSU*BRES)$$

$$LOG(SBPU) = C(190)+C(191)*LOG(SBIR)+C(192)*LOG(MOBS)$$

$$LOG(MON0) = C(200)-C(201)*LOG(SBPU)+C(202)*LOG(PINA) +(1-C(201)-C(202))*LOG(0.01*PINA*PDBR)$$

$$LOG(EXCR) = C(210)+C(211)*LOG(SBIR-LIBR) -C(212)*LOG(100*MPIN/XPIN)+C(213)*LOG(MON0)$$

$$LOG(PINA) = C(220)+C(221)*LOG(EXCR*MPIN/XPIN)+C(222)*LOG(PISU) +C(223)*LOG(PDBR)$$

$$LOG(MPSU) = C(230)+C(231)*LOG(100*MPIN/XPIN) -C(232)*LOG(100*MFSU/XFSU)+C(233)*LOG(100*MDSU/XDSU)$$

$$LOG(XPSU) = C(240)+C(241)*LOG(100*MPIN/XPIN) -C(242)*LOG(100*MFSU/XFSU)+C(243)*LOG(100*MDSU/XDSU)$$

$$LOG(DMPI) = C(250)+C(251)*LOG(100*MPIN/XPIN) -C(252)*LOG(100*MFSU/XFSU)+C(253)*LOG(100*MDSU/XDSU)$$

$$LOG(DXPI) = C(260)+C(261)*LOG(100*MPIN/XPIN) +C(262)*LOG(100*MFSU/XFSU)-C(263)*LOG(100*MDSU/XDSU)$$

$$LOG(PISU) = C(270)-C(271)*LOG(RESU+NXSU)+C(272)*LOG(PINA) +C(273)*LOG(PISU(-1))$$

$$IFSU = C(280)-C(281)*LOG(PISU(-1))+C(282)*LOG(PISU)$$

$$EPSU = C(291)*IFSU+C(292)*EGSU+C(293)*UNSU$$

Results and Discussion

To estimate the interest rate channel of monetary transmission mechanics we began by testing with 3 Stage Least Square Model are reported in Table 1.

Table 1. Estimated-Interest Rate Model.

System: SYS03
Estimation Method: Three-Stage Least Squares
Date: 10/10/08 Time: 05:25
Sample: 2000:1 2007:4
Included observations: 32
Total system (unbalanced) observations 926
Linear estimation after one-step weighting matrix

	Coefficient	Std. Error	t-Statistic	Prob.
C(150)	-8.161829	0.380106	-21.47253	0.0000
C(151)	-0.213633	0.024802	-8.613468	0.0000
C(152)	1.038957	0.015237	68.18727	0.0000
C(153)	1.566650	0.037561	41.70939	0.0000
C(160)	-17.19431	0.539377	-31.87810	0.0000
C(161)	-0.566536	0.038892	-14.56687	0.0000
C(162)	1.218534	0.025809	47.21408	0.0000
C(163)	2.385327	0.053258	44.78812	0.0000

Determinant residual covariance 4.88E-98

Equation: LOG(DESU) = C(150)+C(151)*LOG(DRSU)+C(152)*LOG(LRSU)
+(1-C(151)-C(152))*LOG(SBIR)+C(153)*LOG(0.01*PISU*PDRB)
Instruments: C BRES EGSU HKSU LDSU LIBR MOBS MPIN NBSU NRSU NXSU PDBR PDRO RAS2 RESU RKSG RKSU SBIR UNSU XPIN WGSU
Observations: 32

R-squared	0.867379	Mean dependent var	10.60787
Adjusted R-squared	0.853170	S.D. dependent var	0.294058
S.E. of regression	0.112678	Sum squared resid	0.355499
Durbin-Watson stat	0.528390		

Equation: LOG(CRSU) = C(160)+C(161)*LOG(DRSU)+C(162)*LOG(LRSU)
+(1-C(161)-C(162))*LOG(SBIR)+C(163)*LOG(0.01*PISU*PDRB)
Instruments: C BRES EGSU HKSU LDSU LIBR MOBS MPIN NBSU NRSU NXSU PDBR PDRO RAS2 RESU RKSG RKSU SBIR UNSU XPIN WGSU
Observations: 32

R-squared	0.907974	Mean dependent var	9.971948
Adjusted R-squared	0.898114	S.D. dependent var	0.546145
S.E. of regression	0.174327	Sum squared resid	0.850921
Durbin-Watson stat	0.486390		

Coefficients of the model are in table only of the monetary policy variable, interest rate. Interest rate model in regional banking sector intermediation and monetary that mean the intermediation function and transformation of bank funds sourced from four linkage balance sheet, Increased liquidity of the banking system is likely to increase the efficiency of intermediation and transforms banking funds so that loans to deposit ratio [LDSU] higher, namely:

$$BRES = [1 - 0.01 \times GWMR] \times [DESU + DEPO] - [CRSU + CREO]$$

$$LDSU = 100 \times CRSU/DESU$$

The results of the investigation of structural equation deposit and bank credit regions is

$$LOG[DESU] = - 8.1618 - 0.2316 \times LOG[DRSU] + 1.0390 \times LOG[LRSU] + 0.1926 \times LOG[SBIR] + 1.5667\ LOG[0.01 \times PISU \times PDRB]$$

$$LOG[CRSU] = - 17.1943 - 0.5665 \times LOG[DRSU] + 1.2185 \times LOG[LRSU] + 0.3480 \times LOG[SBIR] + 2.3853 \times LOG[0.01 \times PISU \times PDRB]$$

Elasticity of deposit banking regions [DESU] to the interest rate deposit banking regions [DRSU] is negative 0.2318 percent, the rate of credit interest regions [LRSU] amounting to 1.0390 percent, SBI rate [SBIR] amounting to 0.1926 percent and interacts consumer price index regions with aggregate production The real regions [0:01 x PISU x PDRB] of 1.5667 percent. On the other hand the elasticity of bank credit regions [CRSU] to the interest rate deposit banking regions [DRSU] is negative 0.5665 percent, the level of bank lending regions [LRSU] amounting to 1.2185 percent, SBI rate [SBIR] amounting to 0.3480 percent and interacts consumer price index regions with real aggregate production regions [0:01 x PISU x PDRB] of 2.3853 percent.

The objective of this paper has been to assess the interest rate channel of monetary transmission mechanism in macroeconomics model North Sumatera for the period 2000:S1-2015:S2. Theatrically, the interest rate channel is the link through which changes in interest rate are transmitted to the economy through its effect on aggregate output and prices.

For aggregate output can start from model the stock of human capital region [HKSU] labor explained educated regions S1, S2 and S3. The stock of human capital region is a stimulant to increased productivity or technological advancement regions, meaning that technological progress or increases in productivity are augmented-human capital stock and augmented-labor. The results of the investigation of structural equation productivity or progress of technology in the is

$$LOG\ [TECH] = - 1.7887 + 0.1689 \times LOG\ [HKSU]$$

Elasticity changes in technology advances [TECH] against the stock of human capital region [HKSU] was 0.1689 percent, each percentage point increase in the stock of human capital will increase the region of technological progress or productivity of 0.1689 percent.

The stock of human capital regions can be a stimulant improvement of production facilities and the accumulation of physical capital stock that will simultaneously improve labor productivity. As said by King and Rebelo (1987) and Lucas (1988) that the stock of human capital is a labor expert at the commodity end of the production process and skilled manpower in the sector of research and development. The results of the investigation of structural equation are the regional real aggregate production:

$$LOG\ [the\ GDP] = - 8.6010 + 0.0339 \times LOG\ [TECH \times HKSU] + 0.0549 \times LOG\ [TECH \times NDSU] + 1.4899 \times LOG\ [RKSU]$$

Aggregate production of real regions are increasing returns to scale, in which the elasticity of aggregate production real region [the GDP] of the augmented-human capital stock [TECH × HKSU] amounting to 0.0529 percent, augmented-labor [TECH × NDSU] amounting to 0.0529 percent and the stock capital of the physical real region [RKSU] of 0.0529 percent. This indicator explains that each percentage point increase in the stock of human capital, labor and physical capital stock of the real region would encourage increased production of real aggregate region of 1.5480 percent. Therefore, the acceleration of growth in the stock of human capital, labor

and capital stock of the real physical region would accelerate economic growth in the region, namely:

$$EGSU = 100 \times [PDRB - PDRB_{t-1}] / PDRB_{t-1}$$

The results of the investigation of structural equation is the local labor supply

LOG [NSSU / NDSU] = 0.0483 + 0.0854 × [EPSU - IFSU] or

LOG [NSSU] = LOG [NDSU] + 0.0483 + 0.0854 × [EPSU - IFSU]

Labor force supply elasticity or region [NSSU] to request or use local labor [NDSU] by 1 percent and the difference in inflation expectations for inflation region [EPSU-IFSU] is 0.0754 per cent of the difference [EPSU - IFSU]. The higher the inflation expectations parity with regional inflation higher elasticity of supply or the workforce. The results of the investigation of structural equation are the region of labor demand:

LOG [NDSU] = 13.9466 - 0.0854 × LOG [100 × WGSU / PISU] + 0.1304 × LOG [the GDP]

Elasticity of demand or the use of regions labor [NDSU] the real wage manufacturing regions [100 × WGSU / PISU is negative 0.0854 percent and the real aggregate production regions [the GDP] of 0.1304 percent. This indicator explains that each percentage point increase in the real wage manufacturing sector regions will reduce the use of labor by 0.0854 percent, otherwise every percentage of regional economic growth will increase the use of labor by 0.1304 percent, or 6441 workers soul [0.001304 × 4.93981 million inhabitants]. On the other hand, every percentage parity inflation expectations inflation will increase the supply regions or 0.0854 percent of the labor force or labor souls 4598 [0.000854 × 5,385,023 souls]. Increased economic growth will reduce inflation expectations, as a result of labor supply and labor demand down so that the unemployment rate rising labor downstairs region.

The economic growth created by the increase in aggregate supply and aggregate demand. The results of the investigation structure equation are regions household real consumption:

LOG [HCSU] = - 0.1879 - 0.0028 × IFSU - 0.0293 [100 × RAS2] + 0.9811 × LOG [the GDP]

Elasticity of real household consumption regions [HCSU] against inflation is negative 0.0028 regions × IFSU, the region's ability to collect taxes negatively 0.0293 × [100 × RAS2] and the real aggregate production regions [the GDP] of 0.9811 percent.

Real physical capital stock of a private company is an accumulation of real investment region [IVSU], and real investment region is the sum of real domestic private investment [IVDP] and private real investment abroad [IVFP], namely:

RKSP = 0.975 × RKSPt-1 + IVSU

The accumulation of physical capital stock explained by the low real behavior of real consumption companies. Consumption or real investment behavior of private companies both domestic and abroad stimulated by the level of bank lending region, the value of corporate tax and real aggregate production region. The results of

structural equation investigation of real investment and domestic private companies abroad are

$$\begin{aligned} LOG\,[IVDP] &= -\,5.4798 - 0.1399 \times LOG\,[LRSU] \\ &\quad + 1.3881 \times LOG\,[(1\text{-}RAS2) \times GRDP] \\ LOG\,[IVFP] &= 1.8539 - 0.5718 \times LOG\,[LRSU] \\ &\quad + 0.6326 \times LOG\,[(1\text{-}RAS2) \times GRDP] \end{aligned}$$

Real investment elasticity of domestic private enterprises [IVDP] on the level of bank lending region [LRSU] is negative 0.1399 percent, the tax value of the company [RAS2 × PDRB] negative 1.3881 percent and the real aggregate production region [the GDP] of 1.3881 percent. Likewise, the elasticity of real investment of private companies abroad [IVFP] to the interest rate loans / credits the regional banking [LRSU] is negative 0.5718 percent, the tax value of the company [RAS2 × PDRB] negative 0.6326 percent and the production of aggregates real region [the GDP] at 0.6326 percent.

Conclusions

The results are able to explain how the process of transmission of the mechanisms and effects of changes in supply-side and demand-side policy and external policy change on the aggregate economic activity of the region. The objective of this paper has been to assess the interest rate channel of monetary transmission mechanism in macroeconomics model North Sumatera for the period 2000:S1-2015:S2. Theatrically, the interest rate channel is the link through which changes in interest rate are transmitted to the economy through its effect on aggregate output and prices. Conclusion investigation establishment of North Sumatra Province macroeconomic model projections With Stochastic Simulation region consists of aggregate supply, aggregate demand regions, local government budgets, intermediation and transformation fund regional banking and monetary sector and the prices of common regions. These findings also illustrate their potential contribution in strengthening the theory and literature review that has been there.

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