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Determinant Factors of Regional Inflation in Decentralized Indonesia

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Abstract

The main purpose of this study is to identify determinant factors of regional inflation in the decentralized Indonesia. Inflation nowadays may spread widerly and more difficult to handle than in the past. This condition has created difficulties for the central bank to maintain targeted inflation. The study employs field surveys and econometric tools. The field surveys are conducted in six cities--Medan, Semarang, Surakarta, Palu, Banjarmasin, and Pontianak. It is found from the cross tabulation that regional inflation is significantly affected by the infrastructure condition in the corresponding regions. Aside from the infrastructure condition, the logistic analysis concludes that regional inflation is also affected by local regulations. However, infrastructure still has a larger effect on inflation. The econometric methodology use unit root and Engle-Granger cointegration tests to prove whether the purchasing power parity among regions holds. It is found that purchasing power parity does not hold for all regions. Another tool is the variance decomposition—it is used to determine whether regional inflation is dominantly monetary or non-monetary factors. This study found that non-monetary factors are main contributors to regional inflation. Pooled data estimation with fixed effect shows that inflation is significantly influenced by non-monetary factors--the growths of local government revenues, routine expenditures, and local transportation costs. Local government routine expenditures have the largest elasticity on inflation.

Keywords: *Price Level-Inflation-Regional Economy*
JEL Classification: *E31-R10*

1. INTRODUCTION[1]

The new law of central banking, Law No. 23 of 1999, states that the main objective of the Central Bank has changed from multiple objectives to be more focused on achieving and maintaining currency rate stability. The purpose of implementing the sole objective is to improve the effectiveness of monetary policy. This is stated on chapter 7 and 8 of Law No. 23 of 1999 as follows:

Chapter 7

"The objective of the Central Bank is to achieve and maintain currency rate stability"

Chapter 8

"To realize the objective as stated on chapter 7, the missions of the Central Bank are as follows:

To set up and apply monetary policies;

To regulate and secure a banking payment system;

To regulate and supervise banks

(The Legal Affairs of the Central Bank: Law No. 23 of 1999)

According to the Law, the main objective is to maintain currency rate stability. The internal dimension of maintaining currency rate stability is to control domestic inflation rate. In accomplishing the main mission, the Central Bank will set up an inflation rate target and then use it as the basis for planning and controlling the monetary targets.

It is understandable that the discussion on inflation will be mostly limited to national inflation. However, the inflation rate of every city in the country, or even in the same province, is in fact different. The following table shows the average inflation rates of 43 cities in Indonesia .

[1] The Authors would like to thank Nurcholis, Sartika Jamaludin, and Andi Alfian for the assistance in data collection and model simulation

Table 1.1.
Average Rate of Inflation in 43 Cities in Indonesia, 2004

No	Cities	Average Rate of Inflation (%)	No	Cities	Average Rate of Inflation (%)
	Indonesia	11.70			
1	Lhokseumawe	12.48	23	Yogyakarta	12.35
2	Banda Aceh	13.31	24	Jember	12.99
3	Padang Sidempuan	9.57	25	Kediri	11.88
4	Sibolga	9.57	26	Malang	10.82
5	Pematang Siantar	11.48	27	Surabaya	11.86
6	Medan	12.17	28	Denpasar	11.54
7	Padang	11.49	29	Mataram	12.13
8	Pekanbaru	14.08	30	Kupang	12.64
9	Batam	11.30	31	Pontianak	11.61
10	Jambi	11.84	32	Sampit	9.88
11	Palembang	14.18	33	Palangkaraya	11.25
12	Bengkulu	11.54	34	Banjarmasin	8.59
13	Bandar Lampung	11.86	35	Balikpapan	11.47
14	Jakarta	11.29	36	Samarinda	12.25
15	Tasikmalaya	13.59	37	Menado	12.55
16	Serang/Cilegon	12.27	38	Palu	17.18
17	Bandung	13.30	39	Makasar	10.90
18	Cirebon	12.99	40	Kendari	10.17
19	Purwokerto	11.31	41	Ternate	10.85
20	Surakarta	12.19	42	Ambon	11.37
21	Semarang	14.36	43	Jayapura	15.39
22	Tegal	11.47	44	Dili***	

Source: Badan Pusat Statistik
*** Dili has already not been part of the Republic of Indonesia

The important issue related to regional inflation is clearly the regional autonomy. Even though regional autonomy, as stipulated in the Law No. 22 of 1999, is more of a political phenomenon, it has a broad implication on the regional/local economic activities. One of the medium and long term impacts of this regional autonomy is inflation. As one may recall that an important assumption in preparing government budget (APBN) is the inflation rate where inflation target now becomes the responsibility of the central bank. In the autonomy era where regions have more freedom to manage their own economies, sources of inflation have spread out more broadly and are more difficult to control as in the past (Brodjonegoro, 2001). The tasks of the central bank to maintain the targeted inflation becomes more complicated and on the other hand, the government budget (APBN) will still be quite sensitive to inflation rate. Therefore, research on inflation is of an important and strategic in order to control domestic inflation.

The paper attempts to find answers to the following research questions: is regional inflation caused more by monetary factors or non-monetary factors? If we presume inflation is caused more by non-monetary factors, what non-monetary factors influence inflation rate significantly? What should policy-implication be applied by the central bank and the local government in order to achieve the policy objectives in national context?

To answer the above research questions some field surveys and desk survey were conducted. Besides obtaining detailed description on inflation in regions, field surveys are also intended to capture public perceptions on determinants of inflation, mainly non-monetary factors. Field surveys were conducted in six cities, namely Medan, Semarang, Surakarta, Banjarmasin, Pontianak, and Palu. Government agencies that are related to distribution and production activities were interviewed. To avoid government perspectives bias, the interviews were also conducted to business activities (firms).

Desk surveys are intended to explore and review literatures on theories and empirical studies conducted in other countries. Secondary data were acquired from BPS and Bank Indonesia to be further processed and analyzed. Methodologies are utilized according to the research objectives. Discussion on price differential among regions cannot be separated from the concept of purchasing power parity. To test whether purchasing power parity applies in the 43 cities in Indonesia where inflation is measured and calculated by BPS, first, unit root and cointegration tests were performed. Second, to know whether inflation in every city observed is more caused by monetary or non-monetary factors, variance decomposition was carried out. Third, in order to

identify what dominant factors determine inflation, a panel data regression was executed.

The following section will discuss the literature review covering the experiences from other countries and conceptual background of regional inflation. The Section 3 briefly summarizes the analysis of primary data, section 4 presents the purchasing power parity (PPP) tests for the 43 cities in Indonesia, section 5 describes the results of variance decomposition, section 6 exhibits the analysis of determinants of inflation, and section 7 concludes the paper.

2. REGIONAL INFLATION

There have been few discussion on regional inflation, both internationally and domestically in Indonesia. It is understandable that inflation is considered as national matter since the monetary policy clearly belongs to the national government. However, the hypothesis that independent central bank is the only most effective way in restraining inflation, turned out to be questionable for the cases of middle and low income countries (King and Ma, 2001). The refinement of the model using cross country data revealed that there were some additional key variables explaining variety of inflation rates among countries. Political stability, degree of openness, income were among some key variables, aside from central bank independence, that might explain the inflation pattern (see also Neyapti, 2004).

Both King and Ma (2001), and Neyapti (2004) also found a new and "unexpected" variable that was significantly affecting the difference in inflation rate, together with central bank independence. The variable of centralization degree became a very important explanatory variable that eventually also helped the performance of central bank independence as predetermined key explanatory variables. King and Ma (2001) started with the finding that the most centralized OECD countries tend to have the highest inflation. By assuming that the proportion of revenues accruing to a central government as an indication of the government activities proportion, it was quite convincing to conclude that the central government in those centralized countries might do too much and perform less well. It might restrain taxes and public sector wages less effectively, making inflation harder to control. King and Ma (2001) developed a regression and found out that the existence of degree of centralization variable stabilized other significant explanatory variables such as openness, income, central bank independence, and political stability. The influence of exchange rate regime was considered weak in the model.

Neyapti (2004) also started with similar idea that the effectiveness in revenue collection would help controlling inflation. Different with King and Ma (2001), Neyapti (2004) hypothesized that revenue decentralization leads to lower inflation provided that monetary discipline exists, and not necessarily otherwise. The reason was that the local authorities have much more limited tax bases available to them as well as capacity to issue debt. Moreover, local autonomy in collecting local revenues may be constrained for political considerations. The model used by Neyapti (2004) utilized panel data that led to larger size of sample than King and Ma (2001). The empirical evidence suggested that revenue decentralization had a negative impact on inflation, when it was accompanied by both central bank independence and local accountability.

The interesting case of regional inflation occurred in European Union that was applying single currency with single monetary policy (Maarten and Chapple). The single policy was certainly unable to capture regional economic dispersion, including regional inflation differences. If inflation differential increased, there could be divergence between desired and actual monetary policy. Hence, the monetary policy is not optimal. On the other side, regional inflation differential is predicted to be self adjusted and only temporary. Cecchetti, et al (2000) argued differently by claiming that regional inflation would spread by itself, through the divergence of regional economic activities. The regional real interest rate was the reason behind that. In the short run, the regional inflation will have pro-cyclical effect to the regional economic activities. The expectation of increasing regional inflation will push regional real interest rate down, and it will encourage more regional economic activities. However, in the long run, the relatively high inflation rate will discourage the regional economic activities, and vice versa. To avoid the divergence of monetary policy impacts in EU, a monitoring standard was developed to check whether the single monetary policy has been able to decrease the difference of inflation rate among EU member countries.

Kumari (1998) identified several factors that differentiated regional inflation rate in Srilanka. ***First*** was the personal income that led to different consumption behavior. ***Second*** was the individual preference or taste of the regions. ***Third*** was type of commodities to be consumed, ***fourth*** was the quality of agricultural products. The last two factors were price variation of perishable products and price of non agricultural commodity such as housing. Although the identification was done through decomposition analysis, the finding was still important as the background of Indonesian case since both countries are developing countries with relative dominance of agriculture sector.

3. PRIMARY DATA ANALYSIS

The field surveys were conducted in 6 cities, selected based on the average of inflation rate in 2002. The rate of inflation is categorized as high, medium, or low. High inflation is region's inflation rate above the national rate; medium is more or less the same as the national rate; and low is below the national rate. The sample cities represented the western and eastern parts of Indonesia. The table below lists the names of the cities selected along with their inflation categories.

Table 3.1:
Cities Surveyed and Their Inflation Categories

Area	Cities	Average Rate of Inflation Categories
Western Part of Indonesia (KBI)	1. Medan	Low
	2. Surakarta	Medium
	3. Semarang	High
Eastern Part of Indonesia (KTI)	4. Pontianak	Medium
	5. Banjarmasin	Low
	6. Palu	High

Government respondents consisted of local agriculture office (*Dinas Pertanian*); local industry and trade office (*Dinas Perindustrian dan Perdagangan*); local revenue office (*Dinas Pendapatan Daerah*); local transportation office (*Dinas Perhubungan*); local development planning agency, especially economic and transportation division (*Bappeda Ekonomi dan Bappeda Perhubungan*); local logistic office (*Dolog*); and local BPS (*BPS Daerah*). There were 35 respondents of this category. Firm respondents are randomly picked based on the sectors that have major contributions to gross regional domestic product (PDRB) in each city visited. There were 57 respondents of this firm category.

3.1. Descriptive Statistic Analysis

The results of descriptive statistic for the six cities visited on the condition of infrastructures, impacts of local regulation on business activities, transportation costs, social and political safety conditions, trades, and input availability are summarized on table 3.2 below.

All respondents considered that infrastructures in their cities were in good condition, except in Palu. This helped the mobility of goods and services. More than 50% of the respondents in every city agreed that local regulations had good impacts on business activities. More than 50% of the respondents said that their local governments had done some efforts in controlling local inflation. Majority respondents thought that transportation costs categorized as at medium level. Almost all respondents agreed that the condition in their cities in general was safe—not in the middle of social or ethnical conflicts. Except for Semarang and Palu, most respondents considered trade policies efficient. Last but not least, more than 60% of the respondents never have any problem of production input availability in their cities.

Table 3.2
Descriptive Statistics Analysis

	Medan	Semarang	Surakarta	Pontianak	Banjarmasin	Palu	Total
	%	%	%	%	%	%	%
Infrastructure Condition - Good	100	100	100	82.4	100	26,7	84,8
Impacts of Local Regulation on Business - Good	57,1	56.3	64,3	82.4	56.3	73.3	65,2
Local Governments' Efforts in Controlling Inflation	57,6	75	50	52.9	68.8	46,7	57,6
Transportation Costs							
- High	21,4	18.8	0	5.90	18,7	13,4	13,0
- Medium	50,0	37,5	50	35.3	50,0	53.3	45,7
- Low	28.6	43.8	50	58.8	31.3	33.3	41,3
Safety Condition	100	87.5	92.9	94,1	93,3	100	94.6
Trade and Distribution Policies - Efficient	92.9	68.8	78.6%	76.5	72	66.7	76.1
Input Availability	85.7	81.3	64.3%	64.7	87.5	73.3	76.1

3.2. Cross Tabulation Analysis

Cross tabulation analysis was carried out for all respondents, for firm respondents, and for government respondents (see table 3.3.1 – table 3.3.3). The dependent variable in this cross tabulation is inflation both in qualitative and quantitative terms. Qualitative inflation is grouped into

high and low/medium inflation, where high is defined for regional inflation above the national rate and low/medium below/more or less the same as the national level. Quantitative inflation is the nominal inflation rate of each city.

Table 3.3.1:
Crosstabulation Results for All Respondents

Crosstab Between Variables		Crosstab Results
Qualitative Inflation	Infrastructures	Significant
	Local Government Regulations	Insignificant
	Efforts in Controlling Inflation	Insignificant
	Transportation Costs	Insignificant
	Safety	Significant*
	Trades	Significant*
	Input Availability	Insignificant
Quantitative Inflation	Infrastructures	Significant
	Local Government Regulations	Insignificant
	Efforts in Controlling Inflation	Significant*
	Transportation Costs	Insignificant
	Safety	Significant*
	Trades	Significant*
	Input Availability	Significant

Table 3.3.2:
Crosstabulation Results for Firm Respondents

Crosstab Between Variables		Crosstab Results
Qualitative Inflation	Infrastructures	Significant
	Local Government Regulations	Significant*
	Efforts in Controlling Inflation	Insignificant
	Transportation Costs	Insignificant
	Safety	Significant*
	Trades	Insignificant
	Input Availability	Insignificant
Quantitative Inflation	Infrastructures	Significant
	Local Government Regulations	Insignificant
	Efforts in Controlling Inflation	Significant*
	Transportation Costs	Insignificant
	Safety	Significant*
	Trades	Significant
	Input Availability	Significant

Tabel 3.3.3:
Crosstabulation Results for Government Respondents

Crosstab Between Variables		Crosstab Results
Qualitative Inflation	Infrastructures	Significant
	Local Government Regulations	Insignificant
	Efforts in Controlling Inflation	Significant*
	Transportation Costs	Insignificant
	Safety	-
	Trades	Significant*
	Input Availability	Insignificant
Quantitative Inflation	Infrastructures	Significant
	Local Government Regulations	Insignificant
	Efforts in Controlling Inflation	Insignificant
	Transportation Costs	Insignificant
	Safety	-
	Trades	Insignificant
	Input Availability	Significant

* Significant at alpha=20%

For all respondents, the significant variables affecting inflation were infrastructure, safety, and trade policies. Besides infrastructure, safety, and trade condition, the significant variables affecting nominal inflation rates were local governments' efforts in controlling inflation and the availability of inputs.

For firm respondents, significant variables affecting inflation were infrastructure condition, local government regulations, and safety condition. For government respondents, significant factors affecting inflation were the infrastructure condition, efforts in controlling inflation, and trade condition. For them, local government regulations were not considered affecting inflation. On the other side, for firm respondents, local government regulations did affect inflation.

3.3. Logistic Analysis

Logistic regression allows a regression with a binary dependent variable—that is a variable that has values of 1 and 0. Value 1 is usually assigned for a success event and unsuccess event otherwise. In this paper, inflation (INFLA) is the dependent variable with 1 represents high inflation and 0 for others (low and medium inflation). The following are scores for every city observed.

Table 3.4:
Cities and Inflation Category

Cities	inflation category	Score for Inflation category
1. Medan	Low	0
2. Surakarta	Medium	0
3. Semarang	High	1
4. Pontianak	Medium	0
5. Banjarmasin	Low	0
6. Palu	High	1

The independent variables selected were infrastructure condition (INFRA), local government regulations (PERDA), efforts of local government in controlling inflation (KINFL), transportation costs (BTRANS), safety condition (AMAN), efficient trades dan distribution condition (TNIAGA), and input availability (BBAKU). Each of the independent variable also takes the value of 1 or 0 as follows. INFRA = 1 = good infrastructure condition, otherwise 0; PERDA = 1 = good impact on economic activities, otherwise 0. KINFL = 1 = local government do efforts in controlling inflation, 0 otherwise. BTRANS are categorized as high, medium, and low transportation cost, therefore two dummy variables were needed, namely BTRANS1 = 1 = high transportation cost, otherwise 0; BTRANS2 = 1 low transportation cost, otherwise 0. AMAN = 1 = safe condition, otherwise 0; TNIAGA = 1 = efficient trade dan distribution condition; otherwise 0; BBAKU = 1 = inputs are available in the correspond city, otherwise 0. Again, the analysis is made based on groups of respondents—all respondents, firm respondents, and government respondents.

3.3.1 All Respondents

Thirty four percent of the total respondents agreed that the inflation rate in their cities were high, while the rest said medium/low. The logistic regression is as follows :

$$Y = 1.99 - 0{,}84\ \text{PERDA} - 2.45\ \text{INFRA} \quad \ldots\ldots\ldots\ldots\ldots (1)$$

Z stat (2,47) (-1,54)* (-3,44)

where $Y = \ln (p_1/p_2)$ with p_1 = probability of INFLA = 1, high inflation; and p_2 = probability of INFLA = 0, low inflation. * : significant at alpha 20%.

The logit value (p1/p2) is -1.3 and by doing some transformation, it could be concluded that the probability of a region that had distortive

local government regulations and bad infrastructure condition, to have high inflation is approaching to 88%.

Infrastructure condition and PERDA were the two main factors signicantly affecting inflation. In other words, good infrastructure condition and supportive PERDA may reduce the possibility of high inflation. Compared to PERDA, good infrastructure condition had larger impacts in pushing inflation down.

3.3.2. Government Respondents

Government respondents is only 38% of the total respondents (35 respondents). Because of this data limitation, logistic regression cannot be performed, instead two OLS regressions were utilized with nominal inflation rate for the dependent variable. The followings are the regression results.

INFLASI = 17.59 − 4.78 INFRA − 1.23 TNIAGA ..... (2)
(12.6) (-3.22) (-1.29)

INFLASI = 17.17 − 5.33 INFRA + 0.0026 PERDA ..... (3)
(8.49) (-3.64) (0.002)**

the number in parantheses indicates the value of t statistics and superscript** indicates that the variable is not significant at alpha=20%.

According to government respondents, the significant factor affecting inflation is the infrastructure condition. The adequate infrastructure condition could push the inflation rate down. Neither trade and distribution policies nor other local government regulations were significantly affecting inflation.

3.3.3. Firm Respondents

To eliminate government perspective bias, the analysis was also conducted to business agents. Out of 92 respondents, 57 were businessmen in trading, service, and non-service sectors. 33% said that inflation in their cities was high. The logistic regression is:

Y = 1.99 − 1,28 PERDA − 2.40 INFRA ..... (4)
Z statistics (2.22) (-1,91) (-2,96)***

where $Y = \ln (p_1/p_2)$ with p_1 = probability of INFLA = 1, high inflation; and p_2 = probability of INFLA = 0, low inflation. ***: significant at alpha 10%.

The logit value (p1/p2) is –1.69 and by doing some transformation, it could be concluded that the probability of a region that had supportive PERDA and adequate infrastructure condition, to have a high inflation rate was 15.6%. According to businessmen, regions should have supportive PERDA and good infrastructure condition to reduce the probability of high inflation.

3.3.4. Field Survey Conclusion

From the above description, some conclusions in identifying determinant factors of regional inflation according to respondent groups are in Table 3.5.

Table 3.5 :
Identifying Determinant Factors of Regional Inflation

Respondents	Determinant Factors of Regional Inflation
Government and Businessmen	Infrastructure****
	PERDA*
Government	Infrastructure****
	Trade policies **
Businessmen	Infrastructure****
	PERDA***

* Significant at α=20%
** Insignificant at α=20%
*** Significant less than α=10%
**** Significant less than α=1%

All respondents agreed that in general, regional inflation was affected by local infrastructure condition. This is supported by the level of significance of less than α=1%.

4. PURCHASING POWER PARITY TEST FOR THE 43 CITIES IN INDONESIA

Many researches have been conducted to prove whether purchasing power parity (PPP) applies. One of the methods used is the econometric technique of cointegration. This technique determines whether two

variables or more tend to move in the same direction over time; and allows to perform long run relationship test that is derived from the short run equilibrium. Most of empirical studies find that PPP does apply (Gibson, 1996:55-56). The existence of tarriff, nominal exchange rate between countries, or transportation costs have made price differentiation of the same product in different regions/areas. Eventhough there is a monetary union that eliminate tarriffs and nominal exchange rate, deviations in law of one price still exist.

PPP can be considered as a theory that shows long run relationships. Most of PPP tests consists of stationarity tests of relative prices. Relative prices in general are not stationary. This implies the rejection of PPP.

This paper tested unit root with Philips Peron test. After testing the existence of unit root for each citiy separately, test of cointegration was also conducted to see whether prices in a city were integrated with prices in other cities.

4.1 Data

Data used to run the unit root test were the monthly CPI data from 1998-2002 periods for the 43 cities in Indonesia. The data obtained from the *Indikator Ekonomi* and *Kotamadya dalam Angka*, both are published by BPS. CPI is stated in 1996 constant price.

4.2 Results

The unit root test of Phillip Peron was utilized to see whether PPP applies to every one of the 43 cities in Indonesia. After plotting CPIs for every city, taking the test with intercept and trend, and running the cointegration test (since the data are not stationary), the prices in all cities are not cointegrated. This shows a rejection to PPP which implies deviations to the assumptions of PPP. These deviations may take the forms of the existence of transportation costs, non homogeneous infrastructure condition both qualitatively and quantitatively, or of other factors. All these factors may cause price differential in different places.

Table 4.1:
Results of Cointegration of 43 Cities in Indonesia

No.	Cities	With Intercept and Trend at α =1%	
		Cointegrated	Not Cointegrated
1	Lhokseumawe	12	30
2	Banda Aceh	12	30
3	Padang Sidempuan	7	35
4	Sibolga	7	35
5	Pematang Siantar	12	30
6	Medan	4	38
7	Padang	4	38
8	Pekanbaru	8	34
9	Batam	0	42
10	Jambi	4	38
11	Palembang	1	41
12	Bengkulu	11	31
13	Bandar Lampung	12	30
14	Jakarta	3	39
15	Tasikmalaya	0	42
16	Serang/Cilegon	3	39
17	Bandung	4	38
18	Cirebon	2	40
19	Purwokerto	6	36
20	Surakarta	6	36
21	Semarang	1	41
22	Tegal	5	37
23	Yogyakarta	3	39
24	Jember	3	39
25	Kediri	2	40
26	Malang	3	39
27	Surabaya	6	36
28	Denpasar	4	38
29	Mataram	1	41
30	Kupang	1	41
31	Pontianak	6	36
32	Sampit	0	42
33	Palangkaraya	2	40

Continue...

No.	Cities	With Intercept and Trend at α =1%	
		Cointegrated	Not Cointegrated
34.	Banjarmasin	15	27
35	Balikpapan	1	41
36	Samarinda	4	38
37	Menado	4	38
38	Palu	3	39
39	Makasar	5	37
40	Kendari	1	41
41	Ternate	2	40
42	Ambon	0	42
43	Jayapura	12	30

There are some reasons why PPP does not hold:

First, there are barriers to movement of goods across regions. These barriers are in the form of:

- Natural barriers, e.g. transportation costs, geographical location that is difficult to reach, etc.
- Impeding government policies, e.g. government regulations, retribution policies, beaurocracy, etc.
- Bad infrastructure condition, e.g. bad road, bridge, vehicle conditions, etc.

Second, production factors are not fully and completely mobile. Mobility of goods is also shaped by mobility of production factors. Capitals and labors are not completely mobile. For instance, price of a product in regency A is cheaper than in regency B. PPP will hold if a person in A buys the product and will sell it in B. This will make the price of the same product in B declines because of an increase in supply, but will raise the price in A because of an increase in demand. PPP may not hold because of the immobility of the person in A to B. This immobility of factor of production will impede the PPP to hold.

Third, not all goods and services in the CPI basket are traded good and services—meaning that they are easily traded among regions/cities. One example is *bandeng presto*—it is a non-traded good because it is not perfectly mobile and non-durable.

5. DECOMPOSING DETERMINANT FACTORS OF INFLATION BY VARIANCE DECOMPOSITION METHODS

Variance decomposition is a method used to see dynamics systems by decomposing variance of endogenous variables into their component shocks for endogenous variables in VAR (vector autoregressive)[2]. This method provides information on relative importance of every random innovations to variables in VAR.

In this paper, variance decomposition is used to decompose determinant factors of inflation which are grouped into monetary and non-monetary factors. Monetary factors covers amount of credits and interest rates, while non-monetary factors covers local revenues (PAD) and local transportation costs. By applying variance decomposition, we will know what factors—monetary or non-monetary-- are more of relative importance in influencing inflation in the 43 cities in Indonesia.

The weaknesses of this paper is the limitation of the length of the series used, particularly for non-monetary data such as PDRB (Gross Regional Domestic Product), PAD, transportation costs, infrastructures, etc. Because of this limitation, the number of variables to be included in decomposing variances is lower. If the number of series in the VAR is too many but with a very limited time span, it will cause near singular matrix.

Time span for the observation was 12 years—from 1991 to 2002. With a narrow time span, not all of the variables in the model could be included in the analysis. Therefore, there were some criterions in selecting the variables:

Variables that were highly correlated to inflation;

Variables that represented monetary and non-monetary factors.

With the above criteria, there were 4 scenarios in choosing the variables to be included in the analysis, they were:

[2] VAR is usually used to forecast interrelated variables and to analyze the impacts of random disturbance to the system of variables.

Scenario 1	Scenario 2	Scenario 3	Scenario 4
PAD (Local Own Revenue) growth	PAD (Local Own Revenue) growth	PDRB growth	PDRB growth
Local transportation cost growth	Local transportation cost growth	Local transportation cost growth	Local transportation cost growth
Credit growth	Growth of third party funds	Growth of third party funds	Growth of third party funds
Changes in real interest rate	Changes in real interest rate	Changes in real interest rate	Changes in real interest rate

All four variables in each scenario were compared to each other to find the major contributors to inflation variation. This was to determine whether inflation was caused more by monetary or non-monetary factors. Based on the above scenarios, non-monetary factors were represented by PAD, transportation costs, and PDRB growth; while monetary factors were represented by credit growth and changes in real interest rates. Credit growth was used as a proxy to money supply in a region/city. However, the use of credit growth had some weaknesses– credits were not definitely invested in the same place where they were approved. To overcome with these weaknesses, third party fund was used as another proxy for local money supply.

5.1 Definitions and Data Sources

1. Local Revenues (PAD)

Local revenues are revenues obtained from local sources such as local taxes and charges as ones of the local fiscal potential measures. By applying regional autonomy into operation, the role of PAD in local economy becomes more important.

2. Gross Regional Domestric Product (PDRB)

PDRB is the sum of all value added contributed by the 9 economic sectors (agriculture; mining; manufacturing; electriregency, gas, and water; construction; trades, hotel, and restaurant; transportation and communication; financial institution; and other services) in every regency. Data are obtained from BPS publication.

3. *Local Transportation Costs*

Local transportation cost is the intracity transportation cost. It is obtained from living cost survey (*Survey Biaya Hidup)* BPS, calculated as the average household expenditure for local transports.

4. *Credits*

Credits are used as a proxy to money supply in regions. Credits here are rupiah and foreign currencies credits in commercial banks in districts and municipalities. Data are obtained from Regional Financial Economic Statistics (SEKDA).

5. *Third Party Funds*

Third party funds are also used as another proxy to money supply in regions. They are in the form of demand deposits, time deposits, and savings both of rupiahs and foreign currencies. Again, the data source is from SEKDA. This variable is to cover up the weaknesses that may arise from using credit as the proxy to money supply in regions.

6. *Real Interest Rates*

Since regional nominal interest rate from SEKDA is not complete, real interest rate is used instead. Real interest rate is defined as the difference between nominal interest rates and expected inflation. In this paper, nominal interest rate is estimated by nominal SBI rates for provincial; while expected inflation by GDRP (PDRB) deflator growth. CPI is not utilized to measure expected inflation since it will cause some measurement error problems. To avoid such problems, GDRP deflator has to be used as the instrumental variable for expected inflation.

The following table summarizes the variable specifications and data used in variance decomposition analysis.

Tabel 5.1:
Variable and Data Specification

Variable	Variable Spesification	Data Sources
G_PAD	PAD growth	Kota Dalam Angka BPS
G_DLMKOTA	Growth of transportation costs	Survai Biaya Hidup BPS
G_PDRB	PDRB growth	Kota Dalam Angka BPS
G_KREDIT	Credit growth	SEKD Bank Indonesia
G_DPK	Growth of third party funds	SEKD Bank Indonesia
PERUBAHAN	Changes in real interest rates	SEKD dan SEKI Bank Indonesia Kota Dalam Angka BPS

5.3 Variance Decomposition Results in 43 Cities

A. Scenario 1

By defining growths of PAD and local transportation costs as non-monetary factors; and changes in real interest rates and credit growth as monetary factors, the decomposition identified which factor contributes most to the inflation. From the result below, it was obvious that non-monetary factors had more predictive power than monetary factor in the 33 cities; while the reverse applied for the 10 cities.

Table 5.2:
Variance Decomposition Results for 43 Cities
Scenario 1

Cities	Predictive Power of Non-Monetary Factors	Predictive Power of Monetary Factor	Major Contributor to Inflation
Lhokseumawe	5%	2%	Non Monetary
Banda Aceh	1.5-2%	< 0.5%	Non Monetary
Padang Sidempuan	8-9%	2%	Non Monetary
Sibolga	5-8%	< 4%	Non Monetary
Pematang Siantar	11-17%	16-17%	Monetary
Medan	9-20%	10%	Non Monetary
Padang	0.3-0.6%	0.7-0.8%	Monetary
Pekanbaru	6-7%	4-7%	Non Monetary
Batam	6-8%	11-14%	Monetary
Jambi	4-11%	< 2%	Non Monetary
Palembang	13-18%	2-4%	Non Monetary
Bengkulu	6-11%	3-6%	Non Monetary
Bandar Lampung	5-11%	3-5%	Non Monetary
Jakarta	9-31%	24-58%	Monetary
Tasikmalaya	4-8%	27-64%	Monetary
Serang/Cilegon	6-13%	6%	Non Monetary
Bandung	28-31%	<1%	Non Monetary
Cirebon	20%	3-17%	Non Monetary
Purwokerto	18-31%	39%-44%	Monetary
Surakarta	48%	6%	Non Monetary
Semarang	5-27%	11-14%	Non Monetary
Tegal	10-17%	4%	Non Monetary
Yogyakarta	53-76%	< 4%	Non Monetary
Jember	3%	5%	Monetary
Kediri	13-24%	0.2-7%	Non Monetary
Malang	1%	2%	Monetary
Surabaya	8-14%	< 1%	Non Monetary
Denpasar	1-2%	< 1%	Non Monetary
Mataram	42-45%	7-16%	Non Monetary
Kupang	4-6%	1-4%	Non Monetary
Pontianak	1-7%	2%	Non Monetary
Sampit	1-3%	5%	Monetary

Palangkaraya	2-5%	<.1%	Non Monetary
Banjarmasin	38%	7-9%	Non Monetary
Balikpapan	9-16%	14-25%	Monetary
Samarinda	20-77%	2-11%	Non Monetary
Menado	18-29%	4%	Non Monetary
Palu	7%	< 1%	Non Monetary
Makasar	7-19%	12%	Non Monetary
Kendari	10-17%	4%	Non Monetary
Ternate	44-50%	1-2%	Non Monetary
Ambon	2-5%	2-3%	Non Monetary
Jayapura	16-28%	4-7%	Non Monetary

For non-monetary factors, PAD growth had stronger predictive power than transportation costs (in 23 cities); while for monetary factors, changes in real interest rates had stronger predictive power than credit growth (in 6 cities). However, there were cities whose inflation dominated by transportation costs and by credit growth. There were 10 cities with transportation cost as the major contributor to inflation and 4 cities with credit growth. Cities like Lhokseumawe and Banda Aceh had transportation costs as the major contributor to inflation for the reason of safety that caused high transportation cost.

Jakarta is interesting to observe because it has specific characteristics that distinguish it from other cities in Indonesia. Jakarta takes the function as the capital of the country, and centers of governmental, economic, and trading activities. Jakarta, a city and a province at the same time, has the largest proportion of economic activities. The major contributor to inflation in Jakarta was the credit growth, hence monetary factor. This was consistent with the fact that 70% of total money supply circulates in Jakarta. The second most significant contributor was PAD growth. This was understandable because Jakarta always had largest PAD compared to other cities.

Palu, on the other hand, had only less than 1% of monetary factor that contributes to inflation. Only 0.15% of the total money circulates in Palu.

B. Scenario 2

Table 5.3 below shows variance decomposition based on scenario 2.. Non monetary factors were represented by growths of PAD and transportation cost; while monetary factors were represented by the growth of third party fund and changes in interest rates.

Table 5.3 :
Variance Decomposition Results for 43 Cities
Scenario 2

Cities	Predictive Power of Non-Monetary Factors	Predictive Power of Monetary Factor	Major Contributor to Inflation
Lhokseumawe	14%	19%	Monetary
Banda Aceh	5-6%	2-3%	Non Monetary
Padang Sidempuan	1.66%	0.3%	Non Monetary
Sibolga	9-10%	3%	Non Monetary
Pematang Siantar	0.9%	17%	Monetary
Medan	3-4%	7-8%	Monetary
Padang	0.6%	10%	Monetary
Pekanbaru	1.5%	2.9%	Monetary
Batam	9%	7%	Non Monetary
Jambi	14%	7%	Non Monetary
Palembang	36%	22%	Non Monetary
Bengkulu	9.1%	58%	Monetary
Bandar Lampung	1-2%	0.5%	Non Monetary
Jakarta	34%	20%	Non Monetary
Tasikmalaya	23%	10%	Non Monetary
Serang/Cilegon	2.5%	2%	Non Monetary
Bandung	32%	2-3%	Non Monetary
Cirebon	50%	32%	Non Monetary
Purwokerto	18%	0.5%	Non Monetary
Surakarta	12%	4%	Non Monetary
Semarang	5%	4.5%	Non Monetary
Tegal	1%	16%	Monetary
Yogyakarta	19%	9%	Non Monetary
Jember	2.5%	7%	Monetary
Kediri	0.003%	11%	Monetary
Malang	2%	7%	Monetary
Surabaya	6%	3%	Non Monetary
Denpasar	1.2%	1.1%	Non Monetary
Mataram	3%	2%	Non Monetary
Kupang	3-4%	0.03%	Non Monetary
Pontianak	4%	9%	Monetary
Sampit	1.5%	15%	Monetary
Palangkaraya	7%	3.5%	Non Monetary
Banjarmasin	37%	5%	Non Monetary
Balikpapan	19%	5%	Non Monetary
Samarinda	5%	1%	Non Monetary
Menado	7%	4%	Non Monetary
Palu	10%	27%	Monetary
Makasar	0.07%	16%	Monetary
Kendari	24%	1.5%	Non Monetary
Ternate	27%	1.5%	Non Monetary
Ambon	0.009%	4%	Monetary
Jayapura	22%	0.22%	Non Monetary

The table shows that non-monetary factors were more dominant in affecting inflation. In 28 out of 43 cities, non-monetary factors had stronger predictive power over inflation. By altering growths of credit to third party funds, a shift of dominant factors occured in some cities. There were cities, like Lhokseumawe and Tegal, whose inflation according to scenario 1 more affected by non-monetary factors had shifted to monetary factors. From this phenomena, there was a possibility that third party fund was more appropriate to be the proxy to money supply in regions.

C. *Scenario 3*

For scenario 3, PDRB growth and transportation costs were to represent non-monetary factors, while credit growth and changes of real interest rate to represent monetary factors. Table 5.4 below summarizes the results of variance decomposition for the 43 cities according to scenario 3.

Table 5.4 :
Variance Decomposition Results for 43 Cities
Scenario 3

Cities	Predictive Power of Non-Monetary Factors	Predictive Power of Monetary Factor	Major Contributor to Inflation
Lhokseumawe	14%	0.13%	Non Monetary
Banda Aceh	1%	0.33%	Non Monetary
Padang Sidempuan	7%	11%	Monetary
Sibolga	7.6%	8.2%	Monetary
Pematang Siantar	5.9%	8%	Monetary
Medan	3%	1%	Non Monetary
Padang	1%	0.4%	Non Monetary
Pekanbaru	14.6%	4.7%	Non Monetary
Batam	13%	6%	Non Monetary
Jambi	9.5%	4.5%	Non Monetary
Palembang	0.28%	4%	Monetary
Bengkulu	2.7%	0.2%	Non Monetary
Bandar Lampung	6%	0.26%	Non Monetary
Jakarta	7%	61%	Monetary
Tasikmalaya	6%	30.5%	Monetary
Serang/Cilegon	2.3%	1.6%	Non Monetary
Bandung	2%	0.3%	Non Monetary
Cirebon	3.1%	2.9%	Non Monetary
Purwokerto	2%	0.29%	Non Monetary
Surakarta	13.4%	12%	Non Monetary
Semarang	19%	7%	Non Monetary
Tegal	7%	24%	Monetary
Yogyakarta	1.5%	0.3%	Non Monetary
Jember	4%	0.6%	Non Monetary
Kediri	3%	4%	Monetary
Malang	0.4%	0.6%	Monetary

Surabaya	6%	0.6%	Non Monetary
Denpasar	1%	0.01%	Non Monetary
Mataram	0.6%	0.56%	Non Monetary
Kupang	5.5%	0.33%	Non Monetary
Pontianak	2.9%	7.9%	Monetary
Sampit	1.5%	0.5%	Non Monetary
Palangkaraya	3%	0.3%	Non Monetary
Banjarmasin	3%	9%	Monetary
Balikpapan	4%	0.01%	Non Monetary
Samarinda	11%	0.13%	Non Monetary
Menado	35%	7.5%	Non Monetary
Palu	19%	0.6%	Non Monetary
Makasar	3%	6%	Monetary
Kendari	0.3%	2.5%	Monetary
Ternate	39%	14%	Non Monetary
Ambon	4.6%	6%	Monetary
Jayapura	28%	3%	Non Monetary

According to scenario 3, non-monetary factors were more dominant in affecting inflation than monetary factors. Non-monetary factors had stronger predictive power in 29 cities. Altering PAD growth to PDRB growth had created smaller number of cities with non-monetary factors dominance, compared to scenario 1. It was probable that PDRB growth had smaller effect to the inflation.

D. Scenario 4

Represented by growths of PDRB and transportation costs as non-monetary factors and the growth of third party fund and changes of real interest rates as monetary factors, the results of variance decomposition were different from previous scenarios. Table 5.5 below indicates that in 22 cities monetary factors had stronger predictive power and the rest dominated by non-monetary factors. The number of the cities differred very little.

Table 5.5:
Variance Decomposition Results for 43 Cities
Scenario 4

Cities	Predictive Power of Non-Monetary Factors	Predictive Power of Monetary Factor	Major Contributor to Inflation
Lhokseumawe	8%	5%	Non Monetary
Banda Aceh	4%	1%	Non Monetary
Padang Sidempuan	6%	0.5%	Non Monetary
Sibolga	18.8%	19.8%	Monetary
Pematang Siantar	8%	13%	Monetary
Medan	6%	3%	Non Monetary
Padang	2%	14%	Monetary
Pekanbaru	2%	5.5%	Monetary
Batam	1%	7%	Monetary
Jambi	13%	34%	Monetary
Palembang	34%	17%	Non Monetary
Bengkulu	4%	30%	Monetary
Bandar Lampung	0.3%	0.05%	Non Monetary
Jakarta	17%	12%	Non Monetary
Tasikmalaya	11%	30%	Monetary
Serang/Cilegon	3%	1%	Non Monetary
Bandung	3%	15%	Monetary
Cirebon	27%	40%	Monetary
Purwokerto	1.8%	3%	Monetary
Surakarta	2%	8%	Monetary
Semarang	6%	5%	Non Monetary
Tegal	33%	5%	Non Monetary
Yogyakarta	30%	3%	Non Monetary
Jember	5%	4%	Non Monetary
Kediri	4.5%	30%	Monetary
Malang	0.05%	4%	Monetary
Surabaya	1.5%	2.5%	Monetary
Denpasar	2%	7%	Monetary
Mataram	2%	1%	Non Monetary
Kupang	0.8%	0.33%	Non Monetary
Pontianak	7%	12%	Monetary
Sampit	2.5%	6%	Monetary
Palangkaraya	1%	28%	Monetary
Banjarmasin	11%	2%	Non Monetary
Balikpapan	2%	1%	Non Monetary
Samarinda	14%	8%	Non Monetary
Menado	20%	2%	Non Monetary
Palu	9%	3%	Non Monetary
Makasar	9%	7%	Non Monetary
Kendari	10%	49%	Monetary
Ternate	0.184%	0.185%	Monetary
Ambon	5%	6%	Monetary
Jayapura	18%	0.2%	Non Monetary

There were cities that had balanced predictive power between monetary and non-monetary factors. Cities that had predictive power of 1% at the most were Sibolga, Surabaya, and Ambon. Ternate even had the least predictive power of less than 0.01%.

Conclusion of Variance Decomposition Results

The table below summarizes variance decomposition results of every scenario. 3 out of 4 scenarios tested emphasized that the major contributor to inflation was the non-monetary factors.

Table 5.6
Conclusion of Variance Decomposition Results for 43 Cities According to All Scenario

Scenario	Scenario Component	Major Contributor to Inflation
1	PAD, Transportation Cost, Interest Rate, dan Credit	Non Monetary
2	PAD, Transportation Cost, Third Party Fund, dan Interest	Non Monetary
3	PDRB, Transportation Cost, Credit, dan Interest Rate	Non Monetary
4	PDRB, Transportation Cost, Third Party Fund, dan Interest Rate	Monetary

6. DETERMINANT FACTORS OF INFLATION: PANEL DATA REGRESSION

Previously, the temporary conclusion leads to the non monetary factors as major contributor of inflation almost in all cities. This section will observe what factors affecting inflation in Indonesia according to the regional data. The model includes both monetary and non-monetary factors that might affect inflation; INFLA = f (PAD, PDRB, RE, DE, INFRA, KOTA, BUNGA, DANA3). The definition of the variables is available in the next sub-section. The method used was panel data regression. The cross section unit was the 43 cities in Indonesia and the time series unit is 1990-2002. Therefore, the total balanced panel observation was 516.

6.1 Variable Specification and Data Sources

The variables that can be included/considered as non-monetary factors are PAD, local routine expenditures (RE), local development expenditures (DE), PDRB, infrastructure condition (INFRA), local

transportation cost (KOTA). PAD and PDRB have the same definition as mentioned in the previous section. The following are the definitions for:

1. Local Routine Expenditures

   Include all expenses for staff and non-staff items, such as expenses to purchase goods, maintenance and travel expenses. The data are obtained from APBD of each district/municipality.

2. Development Routine Expenditures

   Expenses spent for local development programs of the 21 economic sectors, such as industry, agriculture, transportation, and other sectors. The data are also obtained from APBD of each district/ municipality.

3. Infrastructure Condition

   Infrastructure condition covers road condition, electricity availability, and numbers of vehicles. If two of the three criteria are fulfilled, the infrastructure is considered as in "good condition", otherwise it will be considered as "bad condition". This condition was represented with dummy variable with 1 = good infrastructure condition and 0 = otherwise. The data are obtained from *Statistik Kotamadya dalam Angka* published by BPS.

The variables representing monetary factors were third party fund (DANA3) and real interest rate (BUNGA). The definitions for these variables are the same as in the previous section.

All variables were hypothesized to have positive effect on inflation, except for INFRA and BUNGA. Before running the regression, all variables were transformed into growth terms, except for INFRA, a dummy variable. The transformation was aimed to directly obtain the elasticity of every independent variable. The data panel regression used fixed effect because it takes all the population (43 cities) of inflation in Indonesia.

The panel data regressions demonstrated that some of the independent variables were insignificant in affecting inflation and some had opposite signs to the above hypothesis. The best one is following :

INFLA =	0.0456*GPAD +	0.099*GRE	+	0.035*GKOTA
t-stat	2.384	9.655		2.034
F-stat	95.548			

The regression above shows that inflation is affected by non-monetary factors—they are PAD growth (GPAD), growth of local routine expenditures (GRE), growth of local transportation cost (GKOTA). All of

the independent variables are significant at alpha 5% and all of the signs are as hypothesized.

Conceptually, GPAD and GRE represent regional autonomy aspect; and GKOTA represents the rejection to purchasing power parity, which has been discussed in the previous section. Every coefficient of the independent variables demonstrates the value of elasticity. Local routine expenditure elasticity is the largest one, followed by PAD and transportation cost. This implies that the highest elasticity variable should command more attention since it will easily trigger inflation. The result of the above regression is much more interesting to analyze since two variables come from the APBD (local budget)—PAD from the revenue side and routine expenditure from the expenditure side.

Hence, in the autonomy era, local governments should be precautious in increasing their own revenues due to the fact that new taxes and charges can generate high cost of doing business and consequently, high cost economy. This type of inflation phenomena is known as cost-push inflation. Uncontrolled routine expenditures are also potential in triggering inflation. Large amount of routine expenditures can push aggregate demand up, hence cause high inflation. This type of inflation phenomena is known as demand-pull inflation. Transportation costs, of course, have contribution to push inflation up because they are part of living cost component.

7. CONCLUSION AND POLICY RECOMENDATION

7.1 Conclusion

1. The findings of primary data:

Based on cross tabulation analysis, infrastructure condition was considered by all respondents as one of the factors determining regional inflation. Government respondents believed that besides infrastructure condition, inflation was also affected by efficiency of trade and distribution policies, while firm respondents said that another factor affecting inflation was local government regulation (PERDA).

2. The findings of secondary data:

2.1 Unit root and cointegration tests showed a rejection to purchasing power parity for the reasons of (1) barriers to goods mobility; (2) production factors are not perfectly mobile; (3) not all goods and services are easily traded among regions.

2.2 Variance decomposition analysis was used to determine whether regional inflation was of monetary or non-monetary factors. 4

scenarios were tested in choosing variables to be included in the analysis. Scenario 1 (PAD growth, growth of local transportation costs, credit growth, and changes in real interest rate) showed that inflation in 33 cities was more affected by non-monetary factors. Scenario 2 (PAD growth, growth of local transportation cost, credit growth, and changes in real interest rates) again showed that inflation in 28 cities was more a non-monetary phenomenon. Scenario 3 (PDRB growth, growth of local transportation cost, growth of third party funds, and changes in real interest rates) showed that inflation in 29 cities was more affected by non-monetary factors. Scenario 4 (PDRB growth, growth of local transportation cost, growth of third party fund, and changes in real interest rates) had a different conclusion. Monetary factors had stronger predictive power than non-monetary factors, but this phenomenon only happened in 22 cities whereas for other 21 cities, the inflation was affected more by non-monetary factors. From these 4 scenarios, regional inflation was affected more by non-monetary factors.

2.3 The results of data panel regression also support the previous findings—both of primary data analysis and variance decomposition analysis-- that inflation was significantly affected by non-monetary factors. Based on this regression, PAD growth (PAD), local routine expenditure growth (GRE), and growth of local transportation cost (GKOTA) significantly affecting inflation. Among these variables, GRE had the largest elasticity value to inflation.

7.2. Policy Recommendation

The finding that non-monetary factors were relatively dominant as the source of inflation, should lead the national as well as local policy makers to seriously consider the following recommendations :

There should be a harmonization between the inflation-targeting objective of the central bank and government regulation both at the national and regional level. The central bank efforts in maintaining money supply growth will not be able to stabilize inflation if they are not supported by central and local government regulations. From variance decomposition analysis, it is clear that non-monetary factors have stronger influence to inflation, especially growths of PAD and transportation costs. In the mid of regional autonomy spirit, if the local government augments PAD in an over-expansive way, this will induce inflation even though the central bank is precautious to maintain money supply growth. An excessive increase in PAD may cause high cost economy. High transportation costs may also induce inflation. If there is

no effort from the local government and its related institutions in controlling transportation cost, this will also induce inflation. For this reason, synchronized policies between the central bank and the government become an important issue in controlling inflation.

In order to achieve a harmony between the central bank and the government, a sustainable coordination in between the two is obviously needed. The coordination can be in the forms of (1) socializing the central bank policies in maintaining inflation and implementing inflation targeting and (2) socializing policy planning on fiscal, targeted PAD, routine expenditure, transportation costs, infrastructure building, etc. by the central or local government. By developing a good coordination, a harmony and synchronization are expected to present among the central bank, local government, central government, and their related institutions.

7.3 Limitations of the Study

The result of this research should be interpreted cautiously because there are unavoidable limitations to the study, such as:

1. Limitations on secondary data, particularly for non-monetary data;
2. The emergence of new districts/municipalities due to regional autonomy affects the process of data collection;
3. Rejections to purchasing power parity are because of production factor immobility. An interesting issue for further research is how the impacts of regional autonomy on production factor mobility—whether production factors are more mobile or not in the era of regional autonomy.

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