



# **Decentralization and Regional Inflation in Indonesia**

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### 1.1. Background of the Study

Low and stable inflation is regarded as a prerequisite for the sustainable economic growth that will ultimately bring benefits through improvements in public welfare, and therefore, many developing countries make this stability of inflation rate become one of the targets in their economic development policy, including in Indonesia. The mechanism behind the notion that low inflation as a necessary condition for economic growth can be explained as follows: when inflation is low, consumers and businesses are better able to make long-term plans because they know that the purchasing power of their money will hold and will not be steadily eroded from year to year. Low inflation also means that lower nominal and real interest rates and this reduce

borrowing costs. This encourages households to purchase durable goods, and also encourages companies to invest in order to increase productivity so that they can remain competitive and continue to prosper without having to raise prices. Moreover, sustainable and low inflation is self-reinforcing. If businesses and individuals are convinced that inflation is under long-term control, they do not react as quickly to the short-term price pressure by trying to raise prices and wages. This helps to keep inflation low and create stability which is a requirement for long-run growth.

National inflation is basically a reflection of the dynamics of general prices that formed in regions. According to Indonesia Bureau of Statistic (BPS), per 2013, inflation calculations are performed in 66 major cities in Indonesia, which consists of 33 provincial capitals and 33 other cities that are considered to have a high level of economic activities. This implies that a national effort to achieve the inflation target cannot be separated from efforts to maintain price stability in regions.

In addition to the importance of inflation stability mentioned previously, at the regional level, a higher level of regional inflation in comparison to neighboring regions may deteriorate regional competitiveness. The continuously rising costs in a region will be very unfavorable for productive activities and this will make investors choose to leave and move to another region with a lower inflation rate. It is also found by Brodjonegoro (2006) that the provincial inflation rate has a negative correlation with banking credit growth, while the banking credit growth is positively correlated with regional growth rate. Therefore, we can conclude that regional inflation control policy is needed to encourage growth of regional economy. However, one important thing to note is that each region has its own inflation characteristics due to differences in cost structure, such as living expenses, transportation costs, local taxes, wage rates, and infrastructure conditions, and these add to the complexity of the inflation controlling problem.



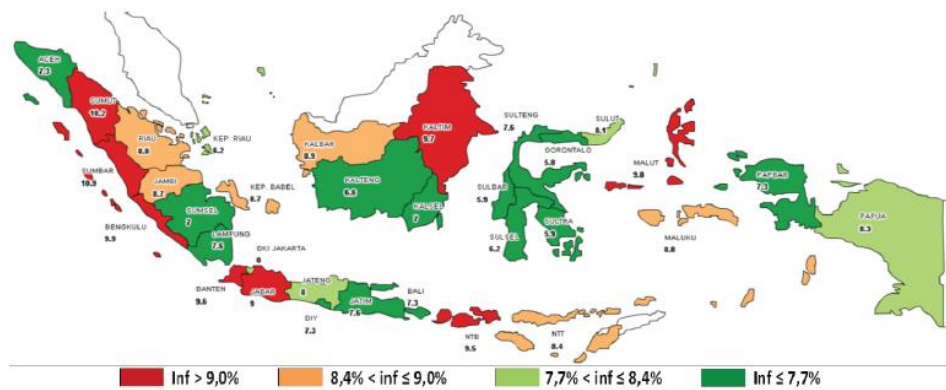


Figure 1.1.: Annual Inflation in Indonesia, December 2013.  
 Source: Regional Inflation Controlling Task Force National Workgroup of Indonesia (2014a:10) – Figure 2.1

Indonesia Bureau of Statistic publishes inflation figures based on a classification known as disaggregation of inflation. This disaggregation is performed to produce an inflation indicator that can better depict the influence of fundamental factors. Inflation of Consumer Price Index in Indonesia is disaggregated into two main components:

1. Core Inflation, which is inflation of goods and services that tends to be permanent in nature, persistent, and are general. The price movement of this goods and services is influenced by general economic development and fundamental factors such as: (a) supply and demand interaction, (b) external environment including exchange rate, international commodity prices, trading partner inflation, and (c) trader and consumer expectations of inflation. Based on 2007 Survey of Living Cost, the amount of commodities in this category is 694, such as rice, house rents, wages, noodles, milk, cars, motorcycles, and so on.
2. Non-Core Inflation, which is the inflation component marked by volatility due to the influence of non-fundamentals. The non-core components of inflation are:
  - a. Volatile goods inflation, which is inflation of goods and services which its price movement very volatile. Inflation predominantly influenced by shocks in the food stuffs category, such as harvests, disruptions from natural events or movements in domestic food commodity prices and international food commodity prices.

- b. Administered prices inflation, which is inflation of goods and services that predominantly influenced by shocks from government-announced prices, such as for subsidized fuels, electricity billing rates, transport fares and so on.

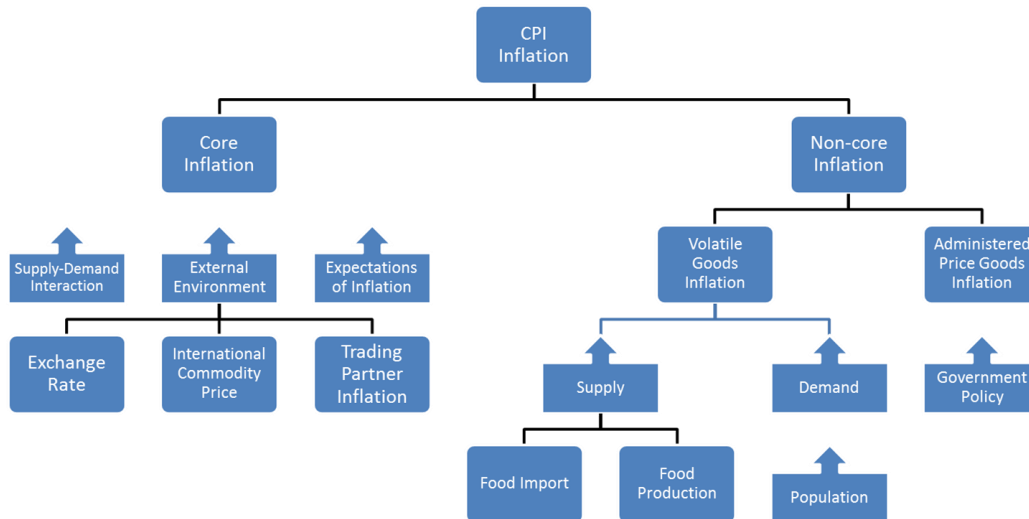


Figure 1.2.: The Disaggregation of CPI Inflation in Indonesia.

Source: Indonesia Bureau of Statistics ([www.bps.go.id](http://www.bps.go.id)), accessed 01/04/15, figured by author.

From the disaggregation above, inflation in Indonesia can be sorted into three categories: inflation that arises from pressures on the supply side or cost push inflation, inflation that caused by an increase in demand side or demand pull inflation, and inflation that caused by inflation expectation.

According to Atmadja (1999), factors driving cost push inflation arise from exchange rate depreciation, the impact of inflation in foreign countries and especially trading partners, increases in administered prices, and negative supply shocks brought about by natural disasters and disruptions to distribution. On the other hand, demand pull inflation is driven by high demand for goods and services relative to supply. Within the macroeconomic context, this condition is illustrated by real output in excess of potential output or aggregate demand beyond the capacity of the economy.

Inflation expectations factor is influenced by the behavior of the public and economic actors in applying expected inflation figures in their economic activities. These inflation expectations may tend to be adaptive or forward looking. Reflecting this is the price forming behavior at the producer and

trader levels, especially in the period leading up to major religious festivities such as Idul Fitri, Christmas and New Year, and when new rulings are issued on the regional minimum wage. Although the general availability of goods is seen as adequate to cope with increased demand, prices of goods and services at times of religious festivities mount beyond the levels explained by the supply-demand condition. Similarly, when new rulings are issued on the regional minimum wage, traders also raise prices even though the wage increase has only modest significance in fuelling increased demand.

Atmadja (1999) found that inflation in Indonesia is relatively caused by more economic structural aspects than that of related to monetary policies. Similarly, Brodjonegoro et al. (2005) showed that inflation rate for most regions in Indonesia are mostly affected by non-monetary factors. This situation is due to economic activity in regions is still faced with various fundamental problems such as low connectivity and efficiency of the logistics system, the high dependence of food production on weather factors, as well as distorted market structure. Faced with this condition, implementation of decentralization is expected to be one of the solutions. Decentralization entails a shifting authority from central government towards regional governments to enhance efficiency of public sector, by delegating power to design local spending in accordance to suit local preferences. As an implication, decentralization enables regional governments to manage their regional inflation rate as they have the knowledge and information on source and factors of inflation in their regions. Regional governments also have the authority to allocate fiscal resources and formulate local policies or regulations to support stability and low inflation rates. This condition is expected to suppress the width of inter-regional inflation gaps and lead to an inflation convergence among regions (Tirtosuharto and Adiwilaga, 2013).

Regarding fiscal and economic decentralization implementation and the characteristics of inflation that is still vulnerable to shocks, efforts to achieve the inflation target requires solid and sustainable policy harmonization and coordination among Bank Indonesia, central government, regional governments, and various elements of government. That is what underlies the formation of an *Inflation Controlling Task Force* (Tim Pemantauan dan Pengendalian Inflasi) at central level in 2005. Coordination strengthening then was continued further in 2008 with forming *Regional Inflation Task Force* (Tim Pengendalian Inflasi Daerah), a collaborative effort between the central and regional governments. RITF is also formed as a part of the initiative to monitor and control the inflation in regions, particularly the inflation caused

by the cost push factors. The main task of RITF is to conduct evaluation, monitoring, and controlling over sources and potential regional inflationary pressures, and provide policy recommendations related to national inflation target to central government and central bank.

In strengthening the legal basis of RITF, Ministry of Internal Affairs issued Instruction No. 027/1696/SJ 2013 about Maintaining Affordability of Goods and Services in Regions as guidance in RITF coordination. One of main points that the Minister instructs to regional governments heads is to immediately establish RITF. This is a new milestone that marked the presence of RITF; its role is expected to be more significant in contributing to the economic development and create price stabilization in regions. The number of RITF that already formed is shown in Table 1.1 (from total of 34 provinces and 508 municipalities in Indonesia).

Table 1.1: The Number of RITF in Indonesia

<b>Year</b>	<b>Number of RITF at Provincial Level</b>	<b>Number of RITF at Municipality Level</b>
2010	16	22
2011	26	38
2012	33	53
2013	33	150
2014	34	362
2015*	34	398

\* Per May, 2015

Source: Coordinating Ministry of Economic Affairs, figured by author.

## 1.2. Research Objectives and Questions

### 1.2.1. Research Objective

The research aims to understand the relationship between fiscal decentralization and regional inflation in 65 municipalities in Indonesia. It will also analyze whether the RITF establishment as an inflation controlling policy in regions has an impact to the regional inflation rate.

### **1.2.2. Research Question**

In order to achieve the research objective, the main question of the research paper is: What is the impact of fiscal decentralization on regional inflation in Indonesia?

The sub question is: What is the impact of RITF establishment on regional inflation in Indonesia?

### **1.3. Limitations of Study**

1. This study exclude Jakarta, the capital city of Indonesia, while it has the largest proportion in economic activities in Indonesia, due its special characteristics that distinguish it from other cities. Jakarta is administratively equal to a province with special status as the capital of Indonesia. Consequently, it has only two tiers of government, while the other cities in this study has three tiers.
2. Limited availability of data for 65 cities sampled. This study uses a number of regional data sourced from Statistics Books of each region. Although the publication comes from official sources (regional offices of Statistics Bureau of Indonesia), but the availability of data and statistics is greatly varies among municipalities. Some cities has poorer databases compared to others. In addition, the format of the data displayed is also not uniform across the region. This leads to the limited number of variables that can be used in this study.
3. Since RITF is an institution that is still relatively new, time-series data available are still few and may not fully reflect the performance of the task force. Not to mention that in some cities, RITF is just newly formed or have not been formed at all.

### **1.4. Organization of Research Paper**

This research paper consists of six chapters. Chapter 1 contains introduction with the background of the research, research objective, research question,

and limitation of the study. Chapter 2 presents theoretical framework and literature reviews focusing on regional inflation and decentralization. Chapter 3 provides an overview on decentralization process, inflation trend, and the RITF establishment in Indonesia. Chapter 4 delivers the methodology and data used in this study. Chapter 5 will focuses on the results and discussion. Lastly, Chapter 6 will conclude the result of the study.

# Chapter 2 Theoretical Framework and Literature Review

## 2.1. General Theory of Inflation

There is a quite general understanding that inflation is a general increase in prices and the fall of the purchasing value of money. However, regarding its determinants and effects, there have been extensive discussions and debates in economic field. Understanding the nature of inflation is an important matter, since it has implication on what tools should be utilized in order to control the inflation. In this section, the causes of inflation will be discussed in accordance to Expectation Augmented Philips Curve theory, which classified the sources as follows:

### 1. Demand pull inflation.

Demand pull inflation is a price level increase that associated with the excessive aggregate demand. Change in aggregate demand can be triggered by: (1) the expectation of money supply, increase in money supply will raise the purchasing power of economic actors and subsequently will increase demand, if this condition is not accompanied by rise of supply, price level will increase; (2) the increase in consumption which caused by population growth or increase in per capita income, this will lead to an excess demand and cause price level increasing; (3) the increase in investment, it will give rise to demand of raw materials and supporting materials, which eventually will move income and price level to a higher level; (4) the increase in government expenditure will stimulate the economic activities and in turn, will raise the demand of goods and services.

### 2. Cost push inflation

Cost push Inflation or supply-driven inflation is term for a rise in the price level attributed to the rising cost of production. In line with the increase of production cost, the price is also moving to a higher level. Hence, according to supply theory, inflation might be caused by: (1) increase in wages, because it will raise the production cost, and if assumed that producers maintain their marginal return at the same level, there will be a raise in selling price; (2) increase in domestic goods price, particularly the goods that used as production factor, since it will added the production cost; and (3) increase in imported goods, because it will boost the

production cost which involving imported goods. The main differences between demand-pull inflation with cost-push inflation are: (1) demand-pull inflation increase output, while the cost-push inflation actually reduce output, and (2) in demand-pull inflation, rising prices of goods ahead of the rise in prices of input materials, while in the cost-push inflation, rising prices of input goods ahead of the increase in output prices.

### 3. Inflation expectation.

Inflation expectations is the inflation which is in the mind of public. Inflation expectations are dependent on the subjective views of the economic actors. The behavior of inflation expectations formation can basically adaptive (backward-looking), forward looking, or a combination of both. Formation of adaptive inflation expectations means that people still make the events of the past or historical facts as a reference. In the case of adaptive inflation expectations, inflation expectations that are formed heavily influenced by inflation realization in the previous period.

## **2.2. Fiscal Decentralization**

Litvack and Seddon (2002: 9) defined decentralization as ‘the transfer of authority and responsibility for public functions from central government to subordinate or quasi-independent government organization or the private sector’.

There are four main concepts of decentralization, namely political decentralization, administrative decentralization, fiscal decentralization, and market decentralization. Each concept has their own characteristics, policy implications, and required circumstances for success. Political decentralization has a main objective to allocate more power to the citizens and elected representatives in public decision making process, while administrative decentralization implies the redistribution of authority, responsibility, as well as financial resources among various tiers of government for the sake of public service provision. Fiscal decentralization seeks to transfer the authority of exploring revenue sources, the rights to receive transfers and making loans, and to decide the expenditure and investment to the regions. Lastly, economic or market decentralization implies the shifting responsibility for certain function from public sectors to private sectors (Litvack and Seddon, 2002: 4).

The main principle of fiscal decentralization is ‘finance follows function’, hence it involves expenditure assignments; the transfer of authority of



government expenditure responsibilities from the central government to local governments or expenditure assignment, as well as revenue assignment; the transfer of authority in the government revenue side (Brodjonegoro, 2006: 4).

Bird and Vaillancourt (1998: 3) classified three types of fiscal decentralization based on degree of decision-making independency authorized to the lower level of government: deconcentration, delegation, and devolution. Deconcentration refers to the handing over of some amount of responsibilities within a central government, ministries or agencies to lower levels or local administrative units. Delegation describes the situation of principal-agents relationship, in which regional governments act as agents for the central government, carrying out specific functions on its behalf. Devolution refers to a situation in which the local governments hold the implementation as well as the decision authority and implies that the activities of the subnational units are outside of the direct control of central government.

### **2.3. Decentralization and Inflation**

Nowadays more and more countries have adopted the decentralized system of government. For many developing countries, the implementation of decentralization in various forms is regarded as one of the ways that is worth a try to escape from various problems due to the ineffective and inefficient governance, macroeconomic instability, and inadequate economic growth that have undermined their countries for many years (Bird and Vaillancourt, 1998).

The argument that decentralization can help to solve national economic issues departed from basic assumption that local governments can provide public service for their people more efficiently compared to that of established by central government (Oates, 1972). This allocative efficiency occurs because the local government possess more knowledge on what their people needs and, at the same time, on how to fulfill those needs with the most efficient way. In addition, local government also will react in more responsive way when the needs come, and eventually, local society will be satisfied for the local government services. In other words, demand for local services, including the needs of stable price level, are more likely represented by public spending decisions that are made by a level of government that is closer and more responsive to a local constituent than by decisions made by a distant central government.

From the revenue aspect of fiscal decentralization, Neyapti (2004) argue that the local governments may collect revenue more effectively than the central government since they have informational advantage and potential for better collaboration between local governments and tax payers. This revenue collection effectiveness, consecutively would help in controlling inflation.

Despite the aforementioned potential benefits, there are some concerns that decentralization can complicated the efforts to achieve macroeconomic stability of a country. The delegation of economic stabilization function from central to sub-national government was regarded as a badly chosen decision, and the arguments for this according to Shah (2006: 439) are as follows:

1. Regional costs occurred from raising debt at the local level would be bigger than the benefits acquired from such stabilization, since it would spill beyond the regional borders.
2. A risk for price stability can occurred due to inflationary pressures caused by monetization of local debt.
3. To create currency stability, both monetary and fiscal policy functions should be accomplished by the center alone.
4. The scope of cyclical shocks are typically nationwide, which implies that it is symmetric across all regions, hence the response to that is expected from national government as well.

In the similar notion, efforts by lower level governments to implement macroeconomic stabilization are also supposed to be ineffective due to the substantial economic “leakages” associated with local expenditures (Martinez-Vazquez and McNab, 2003).

An interesting discussion on relationship between fiscal decentralization and inflation was brought up by Treisman (2000). As stated by him, there are two contrary perspectives toward inflation which will have different implications on how fiscal decentralization should affect inflation. In the first perspective, inflation is seen as a consequence of commitment problem. The government officials tend to break their promises of a monetary stabilization since an unanticipated inflation results in a positive real effect. A low inflation is attainable only if they restrain their future actions. One way to restrain such renege ability of central government is by partially devolute the control over expenditure or monetary policy to lower levels of government. Additionally, competition among regions to attract market and investment may increase the

incentive for local governments to fulfill their promise and to pursue the lower inflation rate, instead of showing a renege behavior. What is more, different tiers of government is expected to watch and control one another, and there will be less political pressure toward central bank. Following this logic, decentralization is expected to reduce inflation.

The second perspective proposed by Treisman (2000) is that inflation associated with the collective action problems. This view reckon monetary stability as a public good, along with its nonexcludability and nonrivalness features. How much price stability is provided will depend on the extent to which each actor with capacity to regulate over fiscal and monetary policy willing to “contribute” by restraining its demands for public expenditure expansion and newly generated money. Since public goods have a tendency to be underprovided if the number of potential beneficiaries who must agree to contribute is high, sharing out authority between different tiers of government understandably raise the coordination costs and complicate the efforts to reduce inflation, and will eventually reduce the “amount” of monetary stability provided.

The contradicting assessments of relationship between fiscal decentralization and inflation not only take place in hypothetical level, but also in the findings of empirical studies. Many researchers conducted studies on this topic with various contexts and approaches, and also with varied results.

King and Ma (2001) found in their study that the role of independent central bank as the most effective inflation controller is doubtful, at least for middle and low income countries. Using cross country data, they found out that variety of inflation among countries can be explained by some additional key variables, aside from central bank independence, such as political stability, degree of openness, and income.

Moreover, King and Ma (2001) and Neyapti (2004) also revealed one variable that unexpectedly has significance in affecting the inflation rate difference, along with central bank independence, that is centralization degree of a country. Centralization degree turned out became an important explanatory variable which is eventually support the performance of central bank independence as a predetermined explanatory key variable. King and Ma (2001) started with the finding from their previous study that for OECD countries, the degree of centralization is positively correlated to the inflation rate; the more centralized the country, the higher its inflation (King and Ma, 1999). By inferring that the proportion of revenues accruing to a central

government as a hint for the government activities proportion, to wrapping up that central government in those centralized countries might do too much but function less well is quite acceptable. This may lead to taxes lock up and public sector wages ineffectiveness, making it harder to control inflation. By developing a regression, King and Ma (2001) revealed that the incorporation of degree of centralization variable would stabilize other important explanatory variables, such as openness, income, independence degree of central bank, and political stability. They also found that exchange rate regime variable only have weak significance in the model.

Starting from similar idea that revenue collection effectiveness would make the inflation controlling efforts easier, Neyapti (2004) hypothesizing that revenue decentralization bring on lower inflation, presumed that the existence of monetary discipline, and not necessarily otherwise. The reason of such assumption is that the tax bases that available for local government are much more limited, as well as the authority to issuing debt. Moreover, due to political considerations, the regional autonomy to collecting local revenues might be constrained. Using panel data with larger sample than King and Ma (2001), Neyapti (2004) found evidence that revenue decentralization has a negative correlation with inflation, when it was accompanied by central bank independence and local accountability.

Shah (2006) conduct a study to investigated whether the fiscal decentralization indicates hazardous risks for fiscal discipline and national macroeconomic management or not. In addition cross country regression, he also used data from two case studies: Brazil to represent federal country and China to characterize unitary country. He discovered that a decentralized fiscal system offer more promising potential for a better macroeconomic governance compared to centralized fiscal system. This becomes possible due to the decent anticipation of possible problems that might be posed by fiscal decentralization in federal countries, which followed up by establishment of countervailing institutions that specially designed to prevail the unfavorable incentives related to incomplete contracts or the problems of public goods resource management or behaviors of rent-seeking.

Martinez-Vazquez and McNab (2006) investigated the relationship between fiscal decentralization, inflation, and economic growth using developed and developing countries as sample. They arrived at a conclusion which support the hypothesis that decentralization apparently is not a threat to price stability. They found evidence that fiscal decentralization per se does not bring into existence conditions that impair price stability attainment efforts. While fiscal

decentralization implementation without careful design may imaginably lead to macroeconomic instability, they found that, in reality, revenue decentralization leads to more stable prices. The possible explanation for this is that decentralization allows local governments at different levels to mobilize their own revenues, which consequently leads the local governments to put less pressure on the central government consolidated budgeting, thus casting down the chances for larger central government deficits and ultimately bring more stable prices.

Policy to control regional inflation are highly required to boost the regional growth. For a country like Indonesia, where the regional inflation is more affected by non-monetary factors (Brodjonegoro et al., 2005), local government has an opportunity to affect economic growth in its jurisdiction through local policies to manage the regional fiscal, to develop real sectors, to facilitate the flow of transports, as well as to build and improve the infrastructures (Brodjonegoro, 2006). Those policies are expected to be effective in reduce the rate of regional inflation or at least neutralize the effect of non-monetary factors in the calculation of regional inflation rate.

Feltenstein and Iwata (2005) examined the relationship between decentralization and macroeconomic indicators in China for 1952 until 1996 period. They utilized a Vector Autoregressive (VAR) model to reveal that while economic decentralization has positive correlation with the growth of total output, fiscal decentralization apparently have adverse implications for inflation rate.

Treisman (1998) investigated the correlation between political and fiscal decentralization and average inflation rates with a broad sample of countries for 1970s and 1980s periods, and found quite different results between developed and developing countries. For developed countries sampled, the study found that the political institutions did augment the credibility of central government promises to maintain monetary stability. However, for developing countries, the commitment advantage and the independence of monetary authorities were eroded by coordination and other problems related to decentralization. This eventually encouraged the inflationary deficit spending and a higher inflation compared to the centralized developing countries.

Despite the growing number of discussions on decentralization and inflation, there are only few literatures that specifically examine the regional aspects of inflation in a country. That is probably due to a common perception that

inflation is considered as a national matter; the monetary policy is undoubtedly under authority of central government. However, for European Monetary Union context where the single currency with single monetary policy was applied, Hendriks and Chapple (2002) revealed an interesting finding. The single policy apparently incapable to capture the regional economic dispersion, including regional inflation differences. When an increase in inflation differential occurred, it could be an indication of divergence between desired and actual monetary policy, hence the monetary policy is not effective. However, the regional inflation differential was predicted to be self-adjusted and temporary in nature. Cecchetti et al. (2000) claimed that regional inflation would spread automatically through the divergence of regional economic activities, and this mechanism is made possible by regional interest rate. In the short run, the regional inflation will affect the regional economic activities in a pro-cyclical way. The expectation of a higher regional inflation will press the regional real interest rate down, and thus, will stimulate more economic activities in the regions, and vice versa. As an effort to avoid the adverse impacts of the divergence of monetary policy in European Union, a monitoring standard has been developed to examine the capability of the single monetary policy in lowering the inflation rate differentials among European Union member countries.

A study using decomposition analysis by Kumari (1998), as cited in Brodjonegoro et al. (2005: 6), has identified several factors that determined the regional inflation differentials in Srilanka. These factors include individual income which led to different consumption patterns, individual preference or taste of the regions, type of commodities to be consumed, quality of agricultural products, price variation of perishable products, and price of non-agricultural commodity, such as housing. This finding is important as Srilanka has relatively the same economy background as Indonesia since both countries are categorized as developing countries with strong agricultural sector.

Specific to Indonesia, Brodjonegoro et al. (2005), utilizing field surveys and cross tabulation analysis in six cities, found that regional inflation in the country was determined by some factors, primarily by infrastructure condition, efficiency of trade, and distribution policies, and local government regulation. They also utilized econometric methodology of unit root and Engle-Granger co-integration tests to prove whether the purchasing power parity among regions holds. It is found that purchasing power parity does not hold for all regions. Variance decomposition was also used to determine

whether regional inflation is dominantly monetary or non-monetary factors, and the result showed that the non-monetary factors are main contributors to regional inflation. A pooled data estimation with fixed effects shows that inflation is significantly influenced by non-monetary factors; they are: local government revenues, routine expenditures, and local transportation costs. These findings that non-monetary factors were relatively dominant as the source of inflation then leads to a recommendation for policy makers to harmonize between the inflation-targeting objective of the central bank and government regulation, both at the national and regional level.

An empirical study by Tirtosuharto & Adiwilaga (2013) was conducted to examine whether RITF (Regional Inflation Controlling Task Force) as the institutions play a role in the recent downward trend of inflation volatility in Indonesia. Panel Least Squares regression with 10 years of observation data from 2003 to 2012 was used to measure the potential contribution of RITF on controlling inflation volatility in their respective areas. Inflation volatility as a measure of standard deviation of monthly inflation rate provinces regarded as the proper way to analyze the contribution RITF in controlling inflation. Dummy variables RITF used for 4 years of RITF formation, beginning in 2009. The sample observations include four provinces who have received awards for their achievements in controlling inflation in 2011 and 2012. Fuel price policies and percentage of growth of the weighted average price of five global commodity prices with the greatest impact on the domestic economy of Indonesia are used as control variables. The result shows that the relationship between RITF performance and regional inflation is not significant, but in the expected negative sign.

Regardless the inconclusiveness of its relationship with inflation, either in direction or significance, provided in previous empirical studies, decentralization has much to recommend it, politically and economically (Treisman, 2000: 838). For this reason, many countries has shifted to implement decentralized system in their governance, including Indonesia.

## Chapter 3 Overview

### 3.1. Fiscal Decentralization in Indonesia

Decentralization and regional autonomy in Indonesia became effective on January 1, 2001, in accordance with the mandate of Law No. 22 of 1999 on Regional Government and Law No. 25 of 1999 on Fiscal Balance between Central and Local Government. This implementation of decentralization and regional autonomy, which was a logical consequence of the democratization process that began to bloom after the New Order regime, marked a fundamental change in the governance mechanism of the country. Both laws stipulated delegation of authority in the form of a broad, tangible, and accountable autonomy to the Regions.

Implementation of decentralization is relevant and important for Indonesia, given its wide diversity and vast territory. With more than 13,000 islands that stretches as far as over 5,000 km, Indonesia has 210 million inhabitants which are divided into 300 different ethnicities. If in the previous regime Indonesia was one of the most centralized countries in the world, the implementation of regional autonomy has radically transformed Indonesia into one of the most decentralized countries in the world (Haryanto and Astuti, 2009).

The complexity of the process of decentralization in Indonesia can be described with the transfer of authority from the central government that were previously very dominant to more than 400 local/municipality governments, the transfer of 2,800 civil servants, the handover of 16,000 service facilities owned by central government, as well as the shift of the majority of governmental authorities from the central government to the local governments. This complexity was also coupled with a relatively short transition period, which is only one year, to prepare the full implementation after the enactment. Not to mention that the decentralization laws itself, which can be regarded as the blueprint of decentralization in Indonesia, were formulated and prepared in a very short time.

It is not a matter of surprise that in 2004, both of laws governing regional autonomy were revised. Law No. 22 of 1999 on Regional Government and Law was revised by Law No. 32 of 2004, and Law No. 25 of 1999 on Fiscal Balance between Central and Local Government was revised by Law No. 33 of 2004. The revision of the decentralization laws implied that Indonesia still looking for an appropriate form to implement decentralization for the country context (Brodjonegoro, 2006).



Based on Law No. 32 of 2004, decentralization is the devolution of government authority from the government to autonomous regions to set up and administer governmental affairs in the system of the Republic of Indonesia. Decentralization implementation in Indonesia uses three concepts, which are political decentralization, administrative decentralization, and fiscal decentralization (Sidik, 2004).

Fiscal decentralization implementation has mandated devolution of fiscal powers to the regions, which include (1) self financing or cost recovery in the public service in the form of levies; (2) co-financing or co-production, in which public service users participate in a contribution of cooperation or payment services; (3) transfer from central government to regional governments; and (4) authority of the regions to make loans (Haryanto dan Astuti, 2009).

Fiscal decentralization basically implies the expenditure assignments and revenue assignment implementation. The realization of fiscal decentralization in the local government budgets revealed in the Local Owned Revenue (PAD) and the Balancing Fund parts. Local Owned Revenues are revenue obtained from local taxes, local user charge/retributions, profit of enterprises owned by local government, and other legitimate locally generated revenue. On the other hand, Balancing Fund is a fund that transferred by central government to local governments to finance the needs of regions and aims to reducing gap between local governments. The component of Balancing Fund are general allocation fund (DAU), specific allocation fund (DAK), and revenue sharing fund (DBH).

## **3.2. Inflation in Indonesia**

### **3.2.1. Inflation Trend in Indonesia**

Very high inflation which were experienced by Indonesia at the time of the economic crisis hit in 1998 (Figure 3.1), became one of the factors which prompted Bank Indonesia, as one of the most responsible institutions in controlling inflation, to begin to adopt inflation targeting framework in 2005. Explicitly, low and stable inflation become the main objective of this monetary policy, while in the long run, the achievement of this goal is believed to support a sustainable economic growth.

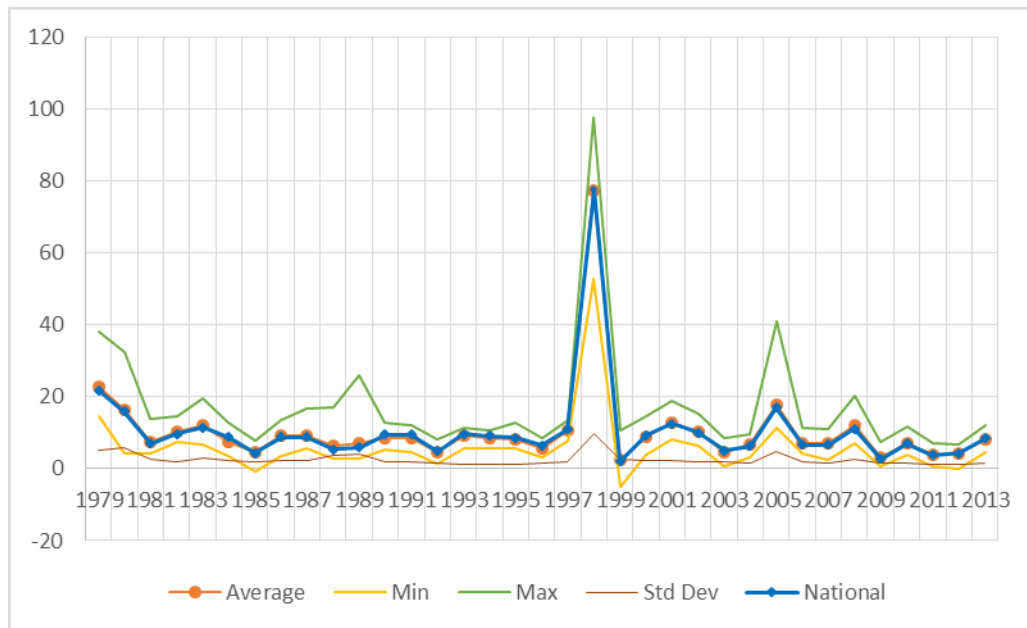


Figure 3.1.: Statistics Summary of Annual Regional Inflation in Indonesia 1979-2013.  
 Source: Indonesia Bureau of Statistics ([www.bps.go.id](http://www.bps.go.id)), accessed 01/04/15, figured by author.

Although national inflation is the main objective of the inflation targeting regime, it is important to note that as much as 81% of national inflation is attributed by regional inflation (RTIF, 2014b). In fact, the inflation rate in every city within the same country, even within the same province are often vary. As an illustration, when there is an increase in the world oil prices in 2005 that forced the government to raise the price of subsidized fuels, regional inflation in Indonesia is quite high and varied with an average inflation rate of 17.7%. The lowest and highest regional inflation rate were, respectively, 11.3% and 41.1%. Similar thing happened in 2008, higher inflation was also triggered by rising fuel prices. With average inflation of 12.1%, the lowest inflation was 6.9% while the highest was 20.5%. The difference between the highest and lowest figures which reached double digits in both years, 29.8% in 2005 and 13.6% in 2008, indicates the considerable inflation disparities among regions in Indonesia. One interesting fact about this inflation differential can be seen in Table 3.1 which shows the list of cities with highest and lowest inflation for 2008-2013. While there is no subtle pattern suggested by this table, it can be observed that all cities that suffered from highest inflation for those periods are off-Java cities and has a considerable distance relative to capital city, either in western or eastern part of the country.

Table 3.1: The highest and the lowest inflation rate for period 2008-2013.

Year	Maximum	City	Minimum	City	Differential	Average
2008	20.51	Manokwari	6.96	Surakarta	13.55	12.11
2009	7.52	Manokwari	0.8	Dumai	6.72	3.33
2010	11.83	Sibolga	3.87	Kendari	7.96	7.21
2011	7.19	Bima	0.67	Manado	6.52	3.92
2012	6.73	Ambon	0.06	Banda Aceh	6.67	4.35
2013	12.02	Pematang Siantar	4.63	Manokwari	7.39	8.09

Source: Indonesia Bureau of Statistics ([www.bps.go.id](http://www.bps.go.id)), accessed 01/04/15, figured by author.

According to Bank Indonesia, CPI inflation in the last ten year were more affected by the surge rise of administered price inflation and volatile food. On the other hand, the core inflation movement was relatively stable, and even decreased in the last ten year, from the previous average of 7-8%, to around 4%. This is an indication that the pressure of CPI inflation in Indonesia is dominated by the influence of unfavorable shocks, such as the increase in prices of strategic commodities and weather or nature disturbances. Oil price surge in the world market which put pressure on the government fiscal condition, particularly for fuel subsidies spending, has led the government to increase the fuel price in 2002, 2005, 2008, and 2013. This approach to raise fuel retail prices had triggered a quite big surge of inflation in the respective periods. Not only provide an immediate impact, the government policy also contributed an indirect impact, particularly on the increase in transport fares and on the formation of society expectations of the increasing prices of other goods and services.

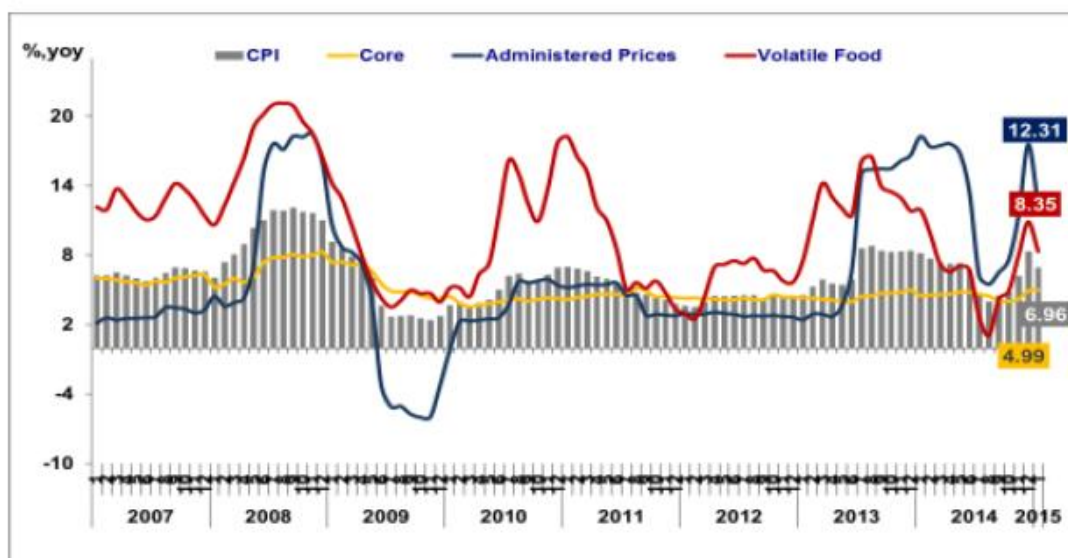


Figure 3.2.: The Disaggregation of Inflation in Indonesia, per January 2015.  
 Source: Inflation Controlling Task Force National Workgroup of Indonesia (2015:1) – Graphic 1.

In the same way, the high influence of the supply side in the movement of inflation in Indonesia is also seen when the shocks that occur are favorable for the economy. Favorable shocks that are sourced from falling prices of strategic commodities, which tend to be temporary, can lower inflation pressures although it is not sustainable. This can be observed in 2003, 2009, and 2011, which in those years there were quite abundant food supplies, resulting in a low inflation pressure.

Per December 2013, CPI in Indonesia is the result of the weighting of the price of a basket of goods and services commodity consumed by the population in 66 cities (Indonesia Bureau of Statistics, 2015). The magnitude of the weight of the cities outside Jakarta is a reflection of the magnitude of the role of regions in forming national inflation. The archipelagic form and the vast area with different geographical conditions causing factors and patterns that affect the formation of prices also varied between regions. Furthermore, there are unequal availability of connectivity and energy supporting infrastructure in each region. In most of off-Java area, the availability of infrastructure are still very limited. Cultural diversity also affects the consumption pattern. All these factors will ultimately influences inflation rate of the regions. Brodjonegoro et al. (2005) found the evidence that regional inflation in Indonesia is more influenced by non-monetary factors and regional

fiscal operations, mainly from revenue expansion efforts, public spending, and transportation costs. They also revealed that there are different maximum range limit of inflation in each regions.

According to RTTF (2014b), based on previous studies in Indonesia, some factors that generally affecting regional inflation in Indonesia are as follows:

1. Supply and distribution constraints. A mutual dependence relationship in fulfilling the needs of goods is reflected in inter-regional economic linkages. Considering geographical conditions of Indonesia, the risk of supply and distribution constraints is moderately high so that it potentially increase the cost and price.
2. Limited infrastructure. Limited infrastructure, especially in energy and transportation sectors have lowered potential capacity and productivity, which in turn resulted in the slow response of supply side (supply) to changes in demand.
3. Structure of the market and the price formation mechanism. Distorted market structure or imperfect competition market tend to have a higher level of price rigidity, especially in the phase of falling prices. In this condition the price is easily move upward but difficult to subside.
4. Inflation expectations. The adverse shocks that often occurs in the national economy, added with the strong tendency to see the past inflation experience or backward-looking behavior may lead to persistently high inflation expectations perceived by society. In this regard, a shift in perspective that the actual inflation is influenced by what is happening today and in the future is needed.

### **3.2.2. Policy Coordination in Indonesia**

Monetary policy is an integral part of macroeconomic policies in boosting national economic development to improve the welfare of society. In Indonesia, Bank Indonesia determined BI Rate (policy rate) as one of monetary policy strategy, which implies a signal of policy direction that pursued. Determination of BI Rate is expected to affect various economic and fiscal variables through different channels, such as interest rate, credits, exchange rate, asset price, as well as expectation, which eventually will affect inflation. However, due to characteristics of regional inflation which more disturbed by structural supply shocks, the impact of monetary policy becomes less effective. Therefore, the more appropriate policy is through real sector

policies that, in fiscal decentralized regime, are within the authority of local government. It implies that efforts to reduce inflation effectively, requires coordination and close cooperation between the government as the fiscal authorities, sectoral policy makers, as well as Bank Indonesia as a determinant of monetary policy. The importance of the role of policy coordination is realized in the form of Coordination Meeting between Bank Indonesia and the Government which were held regularly to discuss the latest economic developments.

In technical level, the coordination between the government and Bank Indonesia have been realized by establishment of an Inflation Controlling Task Force (ITF) at the national level in 2005. Members of ITF consists of Bank Indonesia and some relevant ministries in the central government, namely: (1) Ministry of Finance, (2) Ministry of Energy and Mineral Resources, (3) Coordinating Ministry for Economic Affairs, (4) Indonesian Bureau of Logistics, (5) Ministry of Manpower and Transmigration, (6) Ministry of Transportation, (7) Ministry of Agriculture, (8) Ministry of Trade, and (9) Indonesian Bureau of Statistics.

Treisman (1998) acknowledged that coordination problem can be hazardous for inflation controlling efforts in decentralized system context, since the larger actors involved in negotiating stabilization policy, the more complicated the task of reducing inflation. Government officials of Indonesia seems quite aware of this complication; the establishment of ITF can be seen as an effort to strengthen the multilevel and multisector coordination.

### **3.3. Regional Inflation Controlling Task Force**

Started in 2008, the coordination of inflation control extended to the regional level, with members consists of Bank Indonesia Representative Office, some local government work units, and other relevant agencies, now known as Regional Inflation Controlling Task Force (RITF). In 2011, Coordinating Minister for Economic Affairs, Minister of Internal Affairs, and Bank Indonesia agreed to establish an RITF National Working Group aiming for improving the policies coordination and synchronization to support efforts to stabilize prices in the area, strengthening resources synergy to coordinate and monitor the implementation of regional inflation management efforts, establishing data and information exchange related to price stability in the regions.

Until February 2014, the number of RITF that has already established formally based on legal basis in form of Memorandum of Understanding (MoU) or Regional Head Decree, is 197 (RITF, 2014b). Figure 3.3 displays the classification of RITF in 65 inflation sampled cities based on the establishment year. It can be noticed that for the first three year of RITF initiatives, only less than a quarter of inflation cities that already established RITF. More than a half of sampled municipalities had just started to set up RITF in the three last year.

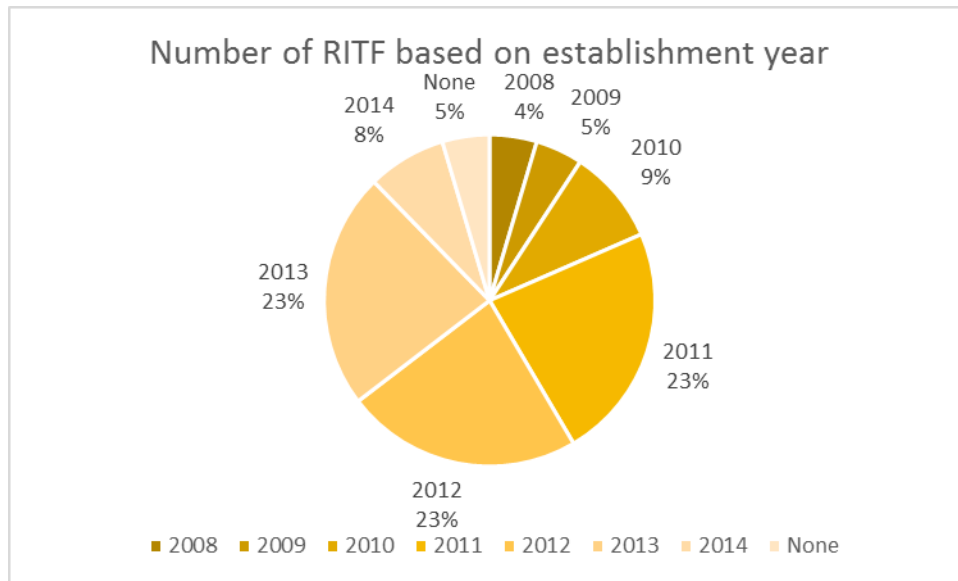


Figure 3.3.: Number of RITF based on establishment year for 65 sampled cities.  
Source: Coordinating Ministry of Economic Affairs, figured by author.

### 3.3.1. RITF Membership

RITF membership consists of various elements, namely the local government, Bank Indonesia Representative Office, and other relevant agencies. In general, the RITF membership referring to Ministry Instruction are as follows:

Steering: Head of the Local Government (Mayor/Regent)

Chair: Regional Secretary

Vice Chairman: Head of Bank Indonesia Representative Office

Secretary: Secretary Assistant of Regency/City in charge of the economy

Members:

1. SKPD head in charge of agricultural affairs;
2. SKPD head in charge of transportation affairs;
3. SKPD head in charge of the affairs of trade and industry;
4. Other elements of stakeholders.

SKPD which included as members of RITF should be tailored to the characteristics of the local economy. If the economy of the region is highly dominated by agricultural sector, the elements of the Department of Agriculture is expected incorporated as a member of RITF. Likewise, if the local economy is led by manufacturing sector, the elements of the Department of Industry is expected to play an active role as a member of the local RITF. Meanwhile, for the regions whose economy is supported by the tourism industry, the elements of the Department of Tourism is expected to become a member of RITF.

The composition of the membership in the RITF should also reflect the handling priority of the inflation problems faced in the area. If inflation in a city is caused by distribution problems, then the existence of an element of the Department of Transportation in the membership composition of RITF is very important. Similarly, if inflation in the region is caused by an uncompetitive market structure, the business entity that handles marketing and associations of commerce market is expected to become members of the local RITF.

### **3.3.2. RITF Financing**

Sources of financing for the implementation of the tasks of RITF are expected to be supported by each member, namely the local government, the relevant agencies, and Bank Indonesia. Costs related to the implementation of the coordination activities for RITF members outside of Bank Indonesia can be charged to the APBD (local government budget), while the costs for the members from Bank Indonesia charged to the budget of Bank Indonesia. Costs incurred in connection with the execution or implementation of the recommendations be wholly borne by the implementing agency through the APBD.

### **3.3.3. Tasks and Responsibilities**

Tasks and responsibilities of RITF as contained in the annex of Ministry Instruction are as follows:



1. Deciding on policies that will be taken related to regional inflation controlling efforts;
2. Monitoring and evaluating the effectiveness of measures taken related to regional inflation controlling efforts;
3. Formulating recommendations of sectoral policies related to efforts to maintain the affordability of goods and services in the regions, to be followed up by related local government work units (SKPD), in accordance with their respective duties and authorities.
4. Performing an analysis of actual or potential sources of regional inflationary pressure;
5. Conducting an analysis of regional economic problems which may interfere with the stability of prices and the affordability of goods and services;
6. Conducting an inventory of data and information on change of general prices of goods and services through the observation of the inflation fluctuation in their region;
7. Identify and analyze the regional economic problems which may interfere with the affordability of goods and services in the region;
8. Delivering recommendations to support the formulation and determination of general cost standards associated with planning and budgeting, as well as the minimum wage in the region;
9. Communicating, socializing, publishing, as well as providing an appeal or moral suasion to the public on matters that are required in order to maintain price stability;
10. Optimizing the supply, utilization, and dissemination of data or information that is credible and easily accessible to the public regarding the production, supply, and price, especially on basic food commodities;
11. Performing coordination and synchronization of regional policies to address the problem of affordability of goods and services through the forum of RITF Regional Coordination Meeting, Central and Regional Coordination Meeting, as well as RITF National Coordination Meeting;

12. Preparing reports on the implementation of tasks every 6 months that includes:
  - a. Inflation changes and prospects;
  - b. Identification and analysis of the economic problems of the real sector;
  - c. The formulation of policy recommendations;
  - d. Policy implementation;
  - e. Monitoring and evaluation of policies; and
  - f. Work program plan for next year.
13. Each RITF at the municipality level is required to submit a report of tasks implementation to the Governor every first week of July and first week of January.

#### **3.3.4. Coordination Mechanism**

Policy coordination is an important element to determine the successful inflation controlling efforts, considering that inflation in Indonesia are affected by a number of monetary, fiscal, and sectoral policies which involving various institutions, not only at central level of government, but also at provincial and municipality level. In order to improve the effectiveness of the national inflation controlling efforts, a coordination between central and regional level is necessary. Furthermore, since there is an inter-regional economic linkage among regions, inflationary pressure that occurs in an area has a potential to spread to other areas, and consequently, inter-regional coordination is also required. In addition, there could be a case in which a source of inflationary pressure in an area located outside the authority of the local government.

Those facts signify the need for coordination among various inflation controlling institutions, so that the constraints identified in the inflation control activities can be addressed in accordance with their respective authorities. In practice, the RITF coordination mechanisms can be carried out through: (1) national coordination meeting, which involving all RITF in provincial and municipality level and the Inflation Controlling Task Force National Workgroup; (2) coordination meeting between provincial RITF and the Inflation Controlling Task Force National Workgroup; (3) coordination meeting between a provincial RITF with all RITF of the regency/city in the

province; and (4) coordination meeting between provincial RITF in the same area.

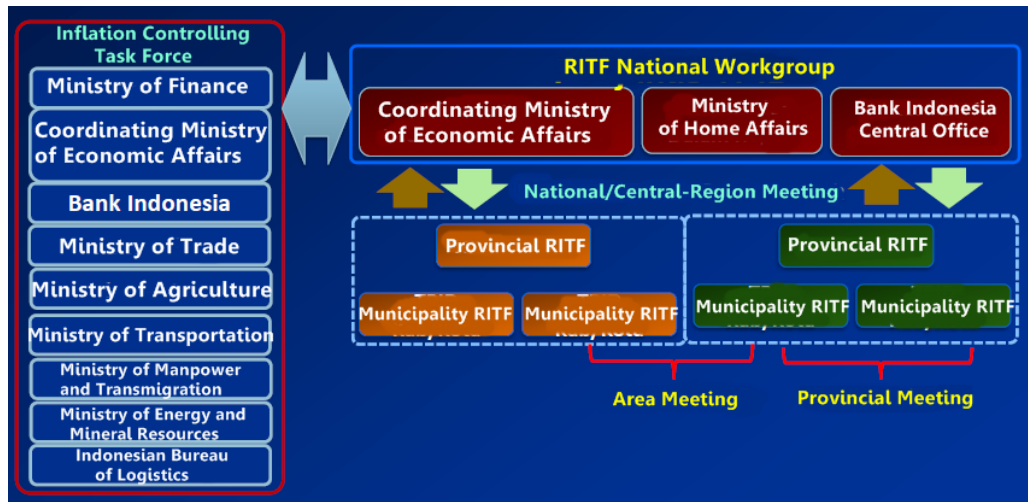


Figure 3.4.: RITF Coordination Mechanism.

Source: Regional Inflation Controlling Task Force National Workgroup of Indonesia (2014b), figured by author.

### 3.3.5. Work Programs

To give some insights about the actual work program of RITF, this section will provide examples from two provincial RITF which obtain national award for their performance in 2013, namely South Sumatera and North Sumatera.

Implementation of the work program of South Sumatera RITF in strengthening supply, social programs, intense communication, and dissemination of price information is as follows:

1. The local government in collaboration with the Indonesian Bureau of Logistics build rice warehouses near the production centers. In addition, the local government also develop some organic rice clusters.
2. Facilitating the distribution of Food Security and Energy Credit Scheme as soft loans for farmers. This is expected to overcome the problem of difficulty in the fulfilment of rice stocks.
3. The implementation of warehouse receipt system for coffee in Pagaralam and for rice in Banyuasin. The warehouse receipt system is expected to maintain stable market prices as it can facilitate the sale throughout the year. In addition, this system can enable the government to monitor and

maintain the resilience of supply, over a data network and integrated information of the system.

4. Controlling inflation strategic commodities through a bazaar and managing expectation of inflation through press releases and public service announcements. RITF of South Sumatera also build a website and SMS service as an information center for strategic food prices.

In North Sumatra case, RITF has built an Information Center for Strategic Food Prices (PIHPS), which is equipped with an early warning system that can inform stakeholders when there is increasing in price. The government also strive to increase agricultural production, especially rice and red pepper, through the provision of seed and fertilizer subsidies, optimize the program of Integrated Crop Management Farmer Field School for producing rice, and red chili production development in various areas, so that it does not concentrated in one area only.

To reduce the level of consumption of rice, the local government promotes a program called 'manggadong', which literally means 'eating cassava', and 'one day without rice' program. In addition, various programs were carried out by North Sumatra RITF to cope with the price hikes ahead of religious holidays, such as market operation, bazaar, market inspection, and held a talk show on TV and radio to maintain the inflation expectations in the community.

## Chapter 4 Data and Research Methodology

### 4.1. Data

Data used in this research are secondary data from financial data on Revenue and Expenditure Budget (APBD), Gross Regional Domestic Product (GRDP), population, inflation rate, food price inflation rate, and road length information covering 65 municipalities that are considered as contributor to the national inflation rate from 2008 to 2013. The data set are taken from various sources. Data on GRDP, population, regional revenue and expenditure, and road length are obtained from annual Statistical Year Book of Indonesia and annual statistical book of each municipality published by Indonesia Bureau of Statistic. Meanwhile, information about RITF establishment in regions is acquired from Coordinating Ministry of Economic Affairs.

### 4.2. Variables

To control the effect of fiscal decentralization on inflation rate, following some previous studies on the same topic, this research paper incorporates GRDP per capita, population, food inflation rate, and infrastructure condition as control variables.

GRDP per capita is included in the model to represent regional economic development, following previous studies by Treisman (1998), Shah (2006). Since this study is using data from cities which regarded as regions with high economic activities, the incorporation of this variable is an attempt to control for theory that economic growth and inflation rate has a pro-cyclical relationship in the short run through regional interest rate mechanism (Cecchetti, 2000). This implies that faster growing regions will have higher inflation, and vice versa. For this reason, it is expected in this study that GRDP will have positive correlation with regional inflation rate.

This study takes account of population variable in accordance to Tirtosuharto and Adiwilaga (2013) and Shah (2006). This inclusion is motivated by demand pull inflation theory which postulated that population growth may move consumption to a higher level. This will lead to an excess demand and eventually the price level will increase. Therefore, the relationship between population and inflation rate is expected to be positive.

Food price inflation is chosen as one of variables in the model to control for the well-recognized experience that developing countries happen to be more prone to shocks on primary commodities such as foods (Wardhana, 2012: 9). This inclusion of food inflation also based on previous research by Tirtosuharto and Adiwilaga (2013) and Kumari (1998) as cited in Brodjonegoro et al. (2005). Expected sign for this variable is also positive.

The last control variable, infrastructure condition, incorporated in the model of this study as it is closely related to connectivity, distribution, and factor mobility problems, which is one of the most crucial problems for Indonesia in inflation controlling efforts, taking into account its vast area and geographical conditions. Roads, as one of the most vital infrastructure, with good conditions will facilitate the distribution and reduce transport costs, thus controlling the selling price of goods. Hence, the expected coefficient sign for infrastructure condition variable is negative. This variable was also used earlier in Hanifah (2011).

Table 4.1: Variables definition and sources

Variable	Definition	Source
Inflation	Regional inflation rate in per cent.	Indonesia Bureau of Statistics official website
Fiscal Decentralization 1	Expenditure ratio	Local govt. expenditure per national govt. expenditure
Fiscal Decentralization 2	Revenue autonomy ratio	Local owned revenue per total regional government revenue
Local Govt. Expenditure	Total spending from municipality /local government in billion rupiahs.	Municipality Government Financial Statistics book (BPS)
National Govt. Expenditure	Total spending from national government in billion rupiahs.	Indonesia Bureau of Statistics official website
Local Owned Revenue (PAD)	Revenues earned from the regional resources, such as local taxes, local retributions, and charges in billion rupiahs.	Municipality Government Financial Statistics book (BPS)
Total Regional Govt. Revenue	Income earned from regional resources with grant in billion rupiahs.	Municipality Government Financial Statistics Book (BPS)
RITF Existence	Dummy variable for RITF existence; 0 if RITF is non-existent, 1 if otherwise.	Official website of municipalities and decree of the head of the regions

GRDP	Real Gross Regional Domestic Products per capita of regions in billion rupiahs.	GRDP of Municipalities in Indonesia book (BPS)
Food Price Inflation	Inflation rate for food commodity.	Indonesia Bureau of Statistics official website
Population	The number of people who live in region.	Municipality in Figures book (BPS)
Infrastructure condition	Proportion of roads with good condition in regions.	The length of roads with good condition per total length of roads
Length of road with good condition	Length of road in region with flat surface, no waves and no damage to the road surface in kilometers.	Municipality in Figures book (BPS)
Total length of road	Length of all roads in region, regardless the condition in kilometers.	Municipality in Figures book (BPS)

### 4.3. Methodology

This study will analyze how changes in inflation rate correspond to the fiscal decentralization and the formation of RITF across the regions using panel data. Two indicators to measure fiscal decentralization in this study are adopted from Zhang and Zou (1998) and Akai and Sakata (2002).

The first indicator of fiscal decentralization is expenditure indicator. This indicator is based on expenditure local and state government, which is measure as share of total regional expenditure to central expenditure. This indicator represents regional authorities based on the amount of expenditure and adopted from Zhang and Zou (1998).

The second indicator is autonomy indicator. This indicator reflects fiscal independence of local government which defined by Akai and Sakata (2002) as the local government's own revenue share of its total revenue. Autonomy indicator is share of local owned revenue (PAD) in total regional government revenue (TRR) in Indonesia.

Other explanatory variables incorporated in this study are Gross Regional Domestic Products (GRDP) per capita, proportion of length of good roads to total length of roads as proxy of infrastructure conditions, number of population, and inflation rate for food commodities of each municipality.

The empirical model:

$$INF_{it} = \alpha + \beta_1 \ln DEC1_{it} + \beta_2 \ln GRDP_{it} + \beta_3 \ln INFR_{it} + \beta_4 FOOD_{it} + \beta_5 \ln POP_{it} + \epsilon_{it}$$

$$INF_{it} = \alpha + \beta_1 \ln DEC2_{it} + \beta_2 \ln GRDP_{it} + \beta_3 \ln INFR_{it} + \beta_4 FOOD_{it} + \beta_5 \ln POP_{it} + \epsilon_{it}$$

INF : Inflation rate

DEC1 : Decentralization Ratio 1: ratio of local expenditure to national expenditure

DEC2 : Decentralization Ratio 2: ratio of local owned revenue to total regional government revenue

GRDP : Gross Regional Domestic Products per capita

FOOD: Food price inflation rate

INFR : Municipality infrastructure condition: length of road with good condition to total length of road in municipality

i : Municipality (1, 2, 3, ..., 65)

t : Year (2008-2013)

To capture the effect of RITF establishment on the inflation rate, the main model is modified by changing the main variable from fiscal decentralization ratio to RITF dummy variable which represents the existence of RITF in each region. This study assumes that RITF began serving effectively in the next budget year from the date of the formal establishment. The formal establishment date is the date of enactment of the legal basis for the establishment of RITF in regions, in the form of Decree of Regional Head, MoU with Bank Indonesia, or other legal basis.

$$INF_{it} = \alpha + \beta_1 RITF_{it} + \beta_2 \ln GRDP_{it} + \beta_3 \ln INFR_{it} + \beta_4 FOOD_{it} + \beta_5 \ln POP_{it} + \epsilon_{it}$$

RITF : Dummy variable for RITF existence

This study use panel data set to estimate the regression model. Panel data can be defined as data that are collected in cross-sectional units but then are observed periodically. Some advantages using panel data sets according to Baltagi (2005) is (1) panel data can minimize bias that generated by the aggregation of individuals since it contains more data units; (2) panel data is able to accommodate the heterogeneity of the variables that are not



incorporated in the model (unobserved heterogeneity); (3) panel data can be very useful in indicating and measuring effects which cannot be done using either time series data or cross section data only; and (4) panel data is able to reduce collinearity between variables.

Nachrowi and Usman (2006: 309) mentioned that to estimate using panel data model, there are three methods that is can be used, they are as follows:

1. Ordinary Least Square or pooled data method. It is used when data is just a combination of cross-section data and time-series data, and this pooled data is treated as new set of data without take into account the cross-section and time-series behaviors.
2. Fixed effects method. This technique suppose that all individual characteristics, as well as the cross-section specifics are captured in the intercepts of the model. Consequently, the intercept can change over time or across individual or both ways.
3. Random effects method. This approach presume that both of individual characteristics and cross-section specifics are captured in residuals. As a result, the residual has individual components, time-series components, and both components.

However, among the three methods mentioned above, only two of them that is commonly utilized, namely fixed effects and random effects methods. The pooled data approach is rarely used due to its unrealistic assumption of constant intercepts and residuals across individual and over time. To decide which one to be used between fixed effects and random effects method, we can refer back to the type and characteristics of data set and/or performing formal statistics test named Hausman test.

Non-statistics consideration is performed by comparing between the amounts of time periods ( $T$ ) and the amount of cross-sectional units ( $N$ ). If  $T$  is bigger than  $N$ , it is suggested to use fixed effects method. Conversely, if  $N$  is larger than  $T$ , random effects method is more recommended (Nachrowi and Usman, 2006). For this study, the value of  $T$  is 6, and  $N$  is 65. Since  $T$  is larger than  $N$ , fixed effects method appears more suitable. This is also in line with a statement by Wooldridge (2005: 502) that 'fixed effects is almost always much more convincing than random effects for policy analysis using aggregated data'.

## Chapter 5 Results and Discussion

### 5.1. Estimation Results

#### 5.1.1. Estimation Result on Fiscal Decentralization Effect on Inflation Rate - Indicator 1 (DEC1)

In this section, to estimate the effect of fiscal decentralization on inflation rate of 65 municipalities in Indonesia, fiscal decentralization ratio of expenditure (DEC1) is used over the period 2008-2013. Table 5.1 shows the result of estimation using two methods of panel data: fixed effects and random effects. Both methods suggest negative values for coefficient of fiscal decentralization indicator with 5 per cent significance. This result implies that a higher expenditure ratio correlates with a lower regional inflation rate. Hausman test suggests that the more appropriate method for this model is fixed effects method. Therefore, one per cent increase in fiscal decentralization expenditure ratio will lower the regional inflation rate about 1.7 per cent, keeping others variable constant. Positive and significant coefficients are also found for GRDP, population, and food inflation variable. On the other hand, the model does not imply a significant relationship between infrastructure condition and inflation rate, although this variable of infrastructure has the expected negative sign. R-squared in the fixed effects model estimation result is 0.6683, which implies that as much as 66.83% of inflation rate variance in 65 cities in Indonesia can be explained by the model.

Table 5.1. Estimation of fiscal decentralization indicator 1 and inflation rate

Dependent variable: Regional inflation rate		
Independent variables	FE	RE
Log fiscal decentralization - expenditure ratio	-1.778089** (0.6285169)	-0.8109283** (0.3968706)
Log per capita GRDP	2.866988** (1.225091)	0.1819821 (0.1841633)
Log infrastructure condition	-0.5366342 (0.3978988)	-0.3188117 (0.2553319)
Food price inflation	0.5440624*** (0.0247425)	0.519854*** (0.0201849)
Log number of population	4.572408** (1.91362)	0.1741785 (0.2347854)
Constant	-57.54668** (25.54316)	-5.786631 (5.359949)

Observations	390	390
R-squared	0.6683	0.6438

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.05, \* p<0.1

### 5.1.2. Estimation Result on Fiscal Decentralization Effect on Inflation Rate - Indicator 2 (DEC2)

Table 4.2 shows the result of estimation of the effect of fiscal decentralization on inflation rate using revenue autonomy ratio variable as a proxy for fiscal decentralization utilising fixed effects and random effects method. Both methods suggest negative values for coefficient of fiscal decentralization indicator, but the estimates do not imply a significant relationship, therefore the coefficient for revenue autonomy ratio variable cannot be interpreted.

Based on Hausman test suggestion, the more appropriate method for this model is fixed method. It proved the significance of food price inflation, population, and GRDP with positive sign, while the infrastructure variable is not significant. At any rate, as much as 66.16% of inflation rate variance in 65 cities in Indonesia can be explained by the model, as indicated by the R-squared score.

Table 5.2. Estimation of fiscal decentralization indicator 2 and inflation rate

Dependent variable: regional inflation rate		
Independent variables	FE	RE
Log fiscal decentralization – revenue autonomy ratio	-0.6619623 (0.529346)	-0.2579484 (0.2298381)
Log per capita GRDP	4.126455** (1.387826)	0.1265752 (0.1870241)
Log infrastructure condition	-0.5811303 (0.4039781)	-0.2486625 (0.2579977)
Food price inflation	0.565116*** (0.0242872)	0.5208036*** (0.0202919)
Log number of population	5.815824* (2.146953)	-0.1259764 (0.1571497)
Constant	-57.30338** (27.4098)	2.909216 (2.365625)

Observations	390	390
R-squared	0.6616	0.6411

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.05, \* p<0.1

### 5.1.3. Estimation Result on RITF Existence Effect (RITF) on Inflation Rate

The last empirical test in this study is conducted to estimate the possible contribution of RITF establishment to the inflation rate volatility. It is expected that coordination and cooperation between regions in controlling inflation improved after the formation of RITF, as there will be a better awareness of the local government to the problem of inflation in each regions.

Panel Least Squares Regression with 6 years of observation data interval from 2008 to 2013 was used to measure the potential contribution of RITF on controlling inflation volatility in their respective areas. Dummy RITF variables are used to represent the existence of operating RITF in regions.

Table 5.3. Estimation of RITF existence and inflation rate

Dependent variable: Regional inflation rate		
Independent Variables	FE	RE
Dummy RITF existence	-0.189742 (0.3866248)	0.3686084 (0.2528255)
Log per capita GRDP	3.352309** (1.442924)	0.327235 (0.1720113)
Log infrastructure condition	-0.529145 (0.4028683)	-0.2942265 (0.25557)
Food price inflation	0.5621747*** (0.0245567)	0.5266551*** (0.020347)
Log number of population	4.689656** (2.130189)	-0.2312876* (0.1264808)
Constant	-44.68883 (26.63611)	4.254881** (1.941357)
Observations	390	390
R-squared	0.6600	0.6419

Standard errors in parentheses; \*\*\* p<0.001, \*\* p<0.05, \* p<0.1

The estimation result shown in Table 4.3 indicates that there is no significant correlation between the RITF existence and the regional inflation rate.

Moreover, different coefficient signs are resulted from different estimation methods. With fixed effects method, the coefficient of RITF existence variable is negative, as expected, while with random effects method the result is in positive sign. Hausman test that conducted to find out which method is more appropriate to be used suggests the fixed effects method.

## **5.2. Discussion**

### **5.2.1. The Impact of Fiscal Decentralization on Regional Inflation**

The estimation results from econometric regression model indicate that implementation of fiscal decentralization in Indonesia has two different implications. Firstly, the ratio of expenditure as the first fiscal decentralization indicator exhibit negative and significant relationship toward inflation rate. In other words, the higher the fiscal decentralization ratio in expenditure side, the lower inflation rate. It proved that expenditure assignment implementation in regions is quite right on target in supporting regional price stability. This result can also regarded as indication of the successful creation of allocative efficiency in local government expenditure.

The second indicator, however, turned out as not as expected. Revenue decentralization implementation does not show any significance in relationship with regional inflation rate. The insignificant results probably indulged by the experience that only very small amount of sources of local owned revenue which available for local governments, generally, in Indonesia. Yet, the negative sign is quite encouraging is enough to give hope that decentralization in the revenue side has the potential of creating macroeconomic stability of regions.

### **5.2.2. The Impact of RITF on Regional Inflation**

The result in the third model suggests that RITF contribution is not significant enough, and other factors which are better in affecting price level. The possible explanation of this result is because the majority of the municipalities included in this model had just started to establish the RITF in the final half of observation period (as can be seen in Figure 3.3), hence the impact of the establishment of the task force are not too clear yet. Moreover, formal establishment date is not necessarily indicated the performance, and the assumption of the effectiveness of RITF at the first year after the formal establishment is probably wrongly picked. It is possible that at the beginning of its operation, RITF still has limited

capability in controlling inflation. Nevertheless, the sign of coefficient is already as the expected, which is negative. This indicate that RITF has a potential role in maintaining price stability. This finding is also consistent with Tirtosuharto and Adiwilaga (2013).

### **5.2.3. The Impact of Control Variables on Regional Inflation**

From the four control variables that employed in this study, three of them shows significance and predicted sign of coefficient in all three models regressed; they are GRDP per capita, population, and food inflation. Thus, it quote convincing to infer that higher economic activities can be associated with higher inflation. This is in accordance with the aggregate supply equation which postulate that regions with faster development will have high inflation. Similarly, a larger population also will result in inflationary pressure as the aggregate demand increase. Food inflation undoubtedly will rise the inflation rate as food stuff are one of the most important commodities, though at the same time very volatile to shocks. Based on experience, price of food is often the main reason for inflation increase, in addition to oil prices.

The only controlling variable that shows an unusual behavior in this study is infrastructure, in this case, road condition. It does not show any significance in all three models employed. Possible explanation for this condition is that either land transportation is not the main choice for transporting goods and commodities method for archipelagic context of Indonesia, or land transportation cost is not the largest determinant of selling price of goods. The possibility of data accuracy problem should also be considered, as the categorization of road condition data provided by each municipality in their Statistics Book is not in the same format and might be not using the same criteria.

### **5.3. Suggestion**

Considering the limitations of this study, future researches on this topic should incorporate more control variables in order to capture variety in regional inflation rate better. Also, because the RITF is a relatively new institution, future researches should incorporate more timeframe to be able to have a grasp of its performance.

## Chapter 6 Conclusion

This study aims to examine the impact of the fiscal decentralization and Regional Inflation Task Force (RITF) on regional inflation rate in Indonesia. This study embarks from other studies that have been done in several countries in focusing how fiscal decentralization implementation affects the inflation rate of the respective country.

The variable used in this paper are regional inflation rate (INF), fiscal decentralization – expenditure ratio (DEC1), fiscal decentralization – revenue autonomy ratio (DEC2), RITF existence (RITF), per capita gross regional domestic product (GRDP), infrastructure condition (INFR), population (POP), and regional food inflation (FOOD) from 65 cities that regarded as inflation contributors in Indonesia.

The results of the paper shows that expenditure ratio as an indicator of fiscal decentralization has a negative relationship with regional inflation rate, indicating that implementation of expenditure assignment is associated with a lower regional inflation rate. However, regional revenue autonomy ratio and the existence of RITF in regions do not bring any significant impact to the volatility of inflation rate in regions, hence the relationships between variables are inconclusive. Future researches should incorporate more timeframe and regional variables to address limitations of this study.

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## Appendices

### Appendix 1. List of sampled cities

No.	Name of City	Province	No.	Name of City	Province
1	Banda Aceh	Aceh	34	Kediri	East Java
2	Lhokseumawe	Aceh	35	Malang	East Java
3	Sibolga	North Sumatera	36	Probolinggo	East Java
4	Pematang Siantar	North Sumatera	37	Madiun	East Java
5	Medan	North Sumatera	38	Surabaya	East Java
6	Padang Sidempuan	North Sumatera	39	Denpasar	Bali
7	Padang	West Sumatera	40	Mataram	West Nusa Tenggara
8	Pekanbaru	Riau	41	Bima	West Nusa Tenggara
9	Dumai	Riau	42	Maumere	East Nusa Tenggara
10	Batam	Riau Islands	43	Kupang	East Nusa Tenggara
11	Tanjung Pinang	Riau Islands	44	Pontianak	West Kalimantan
12	Jambi	Jambi	45	Singawang	West Kalimantan
13	Palembang	South Sumatera	46	Sampit	Central Kalimantan
14	Pangkal Pinang	Bangka Belitung	47	Palangkaraya	Central Kalimantan
15	Bengkulu	Bengkulu	48	Banjarmasin	South Kalimantan
16	Bandar Lampung	Lampung	49	Balikpapan	East Kalimantan
17	Bogor	West Java	50	Samarinda	East Kalimantan
18	Sukabumi	West Java	51	Tarakan	East Kalimantan
19	Bandung	West Java	52	Manado	North Sulawesi
20	Cirebon	West Java	53	Gorontalo	Gorontalo
21	Bekasi	West Java	54	Palu	Central Sulawesi
22	Depok	West Java	55	Watampone	South Sulawesi
23	Tasikmalaya	West Java	56	Makassar	South Sulawesi
24	Serang	Banten	57	Parepare	South Sulawesi
25	Tangerang	Banten	58	Palopo	South Sulawesi
26	Cilegon	Banten	59	Mamuju	West Sulawesi
27	Purwokerto	Central Java	60	Kendari	Southeast Sulawesi
28	Surakarta	Central Java	61	Ambon	Maluku
29	Semarang	Central Java	62	Ternate	North Maluku
30	Tegal	Central Java	63	Jayapura	Papua
31	Yogyakarta	Special Region of Yogyakarta	64	Manokwari	West Papua
32	Jember	East Java	65	Sorong	West Papua
33	Sumenep	East Java			

Appendix 2. Result of fixed effects model of fiscal decentralization indicator 1 – expenditure ratio and regional inflation rate

```

Fixed-effects (within) regression
Group variable: district

Number of obs   -   390
Number of groups -   65

R-sq:  within - 0.6683
      between - 0.0346
      overall  - 0.1864

Obs per group: min -   6
                avg  -  6.0
                max  -   6

F(5,320)        -   128.93
Prob > F        -   0.0000

corr(u_i, Xb)  - -0.7877
    
```

inf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
l_decl	-1.778089	.6285169	-2.83	0.005	-3.014637	-.5415422
l_gdp	2.866988	1.225091	2.34	0.020	.4567385	5.277239
l_inf=	-.5366342	.3978988	-1.35	0.178	-1.319462	.2461938
food	.5440624	.0247425	21.99	0.000	.4953838	.5927409
l_pop	4.572408	1.91362	2.39	0.017	.8075427	8.337273
_cons	-57.54668	25.54316	-2.25	0.025	-107.8004	-7.292934
sigma_u	4.0767695					
sigma_e	2.1662862					
rho	.77981373	(fraction of variance due to u_i)				
F test that all u_i=0:		F(64, 320)	-	0.72	Prob > F - 0.9440	

Appendix 3. Result of random effects model of fiscal decentralization indicator 1 – expenditure ratio and regional inflation rate

```

Random-effects GLS regression           Number of obs   -      390
Group variable: district                Number of groups -       65

R-sq:  within - 0.6551                  Obs per group:  min -       6
      between - 0.4726                      avg -      6.0
      overall - 0.6438                      max -       6

corr(u_i, X)  - 0 (assumed)              Wald chi2(5)    -      694.02
                                                    Prob > chi2    -      0.0000
    
```

inf	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
l_decl	-.8109283	.3968706	-2.04	0.041	-1.58878	-.0330763
l_y-dp	.1819821	.1841633	0.99	0.323	-.1789713	.5429356
l_inf	-.3188117	.2553319	-1.25	0.212	-.8192529	.1816296
food	.519854	.0201849	25.75	0.000	.4802923	.5594157
l_pop	.1741785	.2347854	0.74	0.458	-.2859924	.6343495
_cons	-5.786631	5.359949	-1.08	0.280	-16.29194	4.718676
sigma_u	0					
sigma_e	2.1662862					
rho	0	(fraction of variance due to u_i)				

Appendix 4. Result of Hausman test for fiscal decentralization indicator 1 model – expenditure ratio and regional inflation rate

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fa	(B) ra		
l_decl	-1.778089	-.8109283	-.9671611	.4873676
l_gdp	2.866988	.1819821	2.685006	1.21117
l_infr	-.5366342	-.3188117	-.2178225	.3051706
food	.5440624	.519854	.0242084	.0143095
l_pop	4.572408	.1741785	4.398229	1.899162

b - consistent under H<sub>0</sub> and H<sub>a</sub>, obtained from xtreg  
 B - inconsistent under H<sub>a</sub>, efficient under H<sub>0</sub>, obtained from xtreg

Test: H<sub>0</sub>: difference in coefficients not systematic

chi2(5) - (b-B)'[(V\_b-V\_B)<sup>(-1)</sup>](b-B)  
 - 17.21  
 Prob>chi2 - 0.0041

Appendix 5. Result of fixed effects model of fiscal decentralization indicator 2 – revenue autonomy ratio and regional inflation rate

```

Fixed-effects (within) regression                Number of obs   -   390
Group variable: district                       Number of groups -   65

R-sq:  within - 0.6616                          Obs per group:  min -   6
        between - 0.0350                          avg   -   6.0
        overall - 0.0910                          max   -   6

                                                F(5, 320)       -   125.15
corr(u_i, Xb)  - -0.8907                          Prob > F        -   0.0000
    
```

inf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
l_dec2	-.6619623	.529346	-1.25	0.212	-1.7034	.3794757
l_grdp	4.126455	1.387826	2.97	0.003	1.396039	6.85687
l_inf=	-.5811303	.4039781	-1.44	0.151	-1.375919	.2136593
food	.565116	.0242872	23.27	0.000	.5173332	.6128988
l_pop	5.815824	2.146953	2.71	0.007	1.591897	10.03975
_cons	-57.30338	27.4098	-2.09	0.037	-111.2296	-3.377206
sigma_u	5.9952333					
sigma_e	2.1878695					
rho	.88247433	(fraction of variance due to u_i)				

```

F test that all u_i=0:      F(64, 320) -   0.65          Prob > F - 0.9808
    
```

Appendix 6. Result of random effects model of fiscal decentralization indicator 2 – revenue autonomy and regional inflation rate

```

Random-effects GLS regression              Number of obs   -      390
Group variable: district                   Number of groups -      65

R-sq:  within - 0.6457                    Obs per group:  min -      6
        between - 0.5705                    avg   -      6.0
        overall - 0.6411                    max   -      6

                                           Wald chi2(5)    -    685.92
corr(u_1, X)  - 0 (assumed)                Prob > chi2     -    0.0000

```

inf	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
l_dec2	-.2579484	.2298381	-1.12	0.262	-.7084228	.192526
l_grdp	.1265752	.1870241	0.68	0.499	-.2399854	.4931358
l_inf=	-.2486625	.2579977	-0.96	0.335	-.7543288	.2570038
food	.5208036	.0202919	25.67	0.000	.4810322	.560575
l_pop	-.1259764	.1571497	-0.80	0.423	-.4339842	.1820313
_cons	2.909216	2.365625	1.23	0.219	-1.727323	7.545755
sigma_u	0					
sigma_e	2.1878695					
rho	0	(fraction of variance due to u_1)				



Appendix 7. Result of Hausman test for fiscal decentralization indicator 2 model – revenue autonomy and regional inflation rate

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fa	(B) ra		
l_dec2	-.6619623	-.2579484	-.4040139	.4768456
l_gdp	4.126455	.1265752	3.999879	1.375166
l_inf	-.5811303	-.2486625	-.3324678	.3108625
food	.565116	.5208036	.0443124	.0133457
l_pop	5.815824	-.1259764	5.9418	2.141194

b - consistent under H<sub>0</sub> and H<sub>a</sub>, obtained from xtreg  
 B - inconsistent under H<sub>a</sub>, efficient under H<sub>0</sub>, obtained from xtreg  
  
 Test: H<sub>0</sub>: difference in coefficients not systematic  
  
 $\chi^2(5) = (b-B)' [(V_b-V_B)^{-1}] (b-B)$   
                   -          16.16  
 Prob>chi2 -          0.0064

Appendix 8. Result of fixed effects model of RITF existence and regional inflation rate

```

Fixed-effects (within) regression
Group variable: district

Number of obs   -   390
Number of groups -   65

R-sq:  within - 0.6600
      between - 0.0362
      overall - 0.1221

Obs per group: min -    6
                avg  -   6.0
                max  -    6

F(5,320)        -   124.23
Prob > F        -    0.0000

corr(u_i, Xb)  - -0.8560
  
```

inf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_ritf	-.0189742	.3866248	-0.05	0.961	-.7796217 .7416732	
l_gdp	3.352309	1.442924	2.32	0.021	.5134942 6.191124	
l_inf	-.529145	.4028683	-1.31	0.190	-1.32175 .2634601	
food	.5621747	.0245567	22.89	0.000	.5138617 .6104877	
l_pop	4.689656	2.130189	2.20	0.028	.4987119 8.8806	
_cons	-44.68883	26.63611	-1.68	0.094	-97.09284 7.715191	
sigma_u	5.1247632					
sigma_e	2.1932007					
rho	.8452007	(fraction of variance due to u_i)				

```

F test that all u_i=0:      F(64, 320) -    0.61      Prob > F - 0.9910
  
```

Appendix 9. Result of random effects model of RITF existence and regional inflation rate

```

Random-effects GLS regression              Number of obs   -      390
Group variable: district                  Number of groups -       65

R-sq:  within - 0.6503                    Obs per group:  min -       6
        between - 0.5147                    avg -      6.0
        overall - 0.6415                    max -       6

Wald chi2(5) -      688.33
corr(u_i, X) - 0 (assumed)                Prob > chi2     -      0.0000
    
```

inf	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_ritf	.3686084	.2528255	1.46	0.145	-.1269205	.8641372
l_gdp	.0327235	.1720113	0.19	0.849	-.3044125	.3698596
l_infr	-.2942265	.25557	-1.15	0.250	-.7951345	.2066816
food	.5266551	.020347	25.88	0.000	.4867757	.5665344
l_pop	-.2312876	.1264808	-1.83	0.067	-.4791854	.0166103
_cons	4.254881	1.941357	2.19	0.028	.4498906	8.059871
sigma_u	0					
sigma_e	2.1932007					
rho	0	(fraction of variance due to u_i)				

Appendix 10. Result of Hausman test for RITF existence and regional inflation rate model

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fa	(B) ra		
=itf	-.0189742	.3686084	-.3875826	.2925029
l_gdp	3.352309	.0327235	3.319586	1.432634
l_inf	-.529145	-.2942265	-.2349185	.3114271
food	.5621747	.5266551	.0355196	.0137489
l_pop	4.689656	-.2312876	4.920944	2.126431

b - consistent under H<sub>0</sub> and H<sub>a</sub>, obtained from xtreg  
 B - inconsistent under H<sub>a</sub>, efficient under H<sub>0</sub>, obtained from xtreg

Test: H<sub>0</sub>: difference in coefficients not systematic

chi2(5) = (b-B)'[(V\_b-V\_B)<sup>-1</sup>](b-B)  
 = 10.75  
 Prob>chi2 = 0.0565