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Takahiro Akita
*Visiting Research Fellow, IUJ Research Institute*
*International University of Japan*

Awaludin Aji Riadi
*Directorate General of Taxation*
*Ministry of Finance, Indonesia*

Ali Rizal
*Directorate General of Budget*
*Ministry of Finance, Indonesia*

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IUJ Research Institute
International University of Japan

# Fiscal Disparities in Indonesia under Decentralization: To What Extent Has General Allocation Grant (DAU) Equalized Fiscal Revenues?

Takahiro Akita*
Visiting Research Fellow, IUJ Research Institute
International University of Japan, Japan

Awaludin Aji Riadi (IUJ Class of 2014)
Directorate General of Taxation, Ministry of Finance, Indonesia

and

Ali Rizal (IUJ Class of 2015)
Directorate General of Budget, Ministry of Finance, Indonesia

## Abstract

This study analyzes the level and trend of fiscal disparity across districts and explores the determinants of fiscal disparity by two inequality decomposition methods. Disparity in per capita shared revenue (DBH) has been the highest since 2003 due to the very uneven spatial distribution of natural resources and tax bases. DBH is unambiguously an inequality-increasing fiscal transfer. While general allocation grant (DAU) has served to equalize fiscal revenue, fiscal disparity is still very high. To further reduce the disparity, it may be necessary to modify the DAU allocation formula. This study proposes a new allocation formula. Though the reduction in fiscal disparity is not substantial under the new formula, it would encourage resource-poorer districts to raise own source revenue (PAD). This could create a virtuous cycle, since the rise in PAD would enable district governments to promote their economy through further development of human resources and infrastructure and this would in turn raise PAD. Another option to reduce fiscal disparity would be the further expansion of special allocation grant (DAK). If the government allocates the DAK funds effectively across districts, then it could make DAK an inequality-decreasing fiscal transfer.

Key Words: fiscal disparity; decentralization; general allocation grant; inequality decomposition analysis; Indonesia

JEL Classification Code: H71; H77; R51

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## 1. Introduction

Large disparities in socio-economic indicators persist in Indonesia among its regions due mainly to unequal spatial distributions of natural resources, public infrastructure and economic activities.[1] Among 34 provinces, the capital province of Jakarta has the largest GDP per capita, which is followed by the resource-rich provinces of East Kalimantan, Riau and Papua. Meanwhile, the conflict-ridden province of North Maluku registers the smallest and the ratio of the largest to smallest GDP per capita is 18. At the district (*kabupaten* and *kota*) level, spatial disparity is much more pronounced. Central Jakarta has the largest per capita GDP, while the smallest is registered by *kabupaten* Nduga in the province of Papua.[2] Central Jakarta has more than 100 times as much GDP per capita as Nduga.

Due in part to large regional income disparity, there is a large variation in poverty incidence across provinces and districts. In the provinces of Papua and West Papua, more than quarter of their population are still under the official poverty line. High poverty incidence is registered also by the provinces of East Nusa Tenggara, West Nusa Tenggara and Maluku, though their poverty incidence is not as much as Papua and West Papua. These five provinces are all located in the eastern part of Indonesia. On the other hand, Jakarta has the smallest poverty incidence at 4%, which is followed by the provinces of Bali, South Kalimantan, Bangka-Belitung and Banten. At the district level, *kota* South Tangerang in the province of Banten has the smallest at less than 2%, which is followed by *kota* Denpasar in Bali and *kota* Depok in West Java. Meanwhile, many districts in

[1] Numerous studies have been conducted to analyze interregional inequalities in Indonesia. Among them are Akita and Lukman (1995), Garcia Garcia and Soelistianingsih (1998), Akita and Lukman (1999), Skoufias (2001), Tadjoeddin, Suharyo and Mishra (2001), Akita and Alisjahbana (2002), Resosudarmo and Vidyattama (2006), Hill, Resosudarmo and Vidyattama (2008), Vidyattama (2010), Akita, Kurniawan and Miyata (2011), Vidyattama (2013), and Hill and Vidyattama (2014).

[2] In 2014, there are 514 districts including 416 *kabupaten*s and 98 *kota*s in Indonesia.

Papua and West Papua have their incidence of poverty exceeding 30%.

In order to reduce inter-regional disparities and cope with periodic secessionist movements, Indonesia embarked on a 'Big Bang' decentralization in the aftermath of the 1997/98 financial crisis and the subsequent fall of the Suharto regime (World Bank, 2003; Fitrani, Hofman and Keiser, 2005). Under the Law on Regional Government (Law 22/1999, revised by Law 32/2004)), the hierarchical governance system linking district governments to the central government was replaced by the system where district governments are granted greater autonomy (Brodjonegoro and Asanuma 2000; Silver, Azis and Schroeder 2001). The central government is responsible for religious affairs, national defense and security, judicial system, fiscal and monetary policy, foreign affairs and other specially designated functions such as macroeconomic planning and national standards, while authority over and responsibilities for most other functions, including education, health management and public works is devolved to regional governments, particularly district governments (Brodjonegoro and Asanuma 2000; Alm, Aten and Bahl 2001). Decentralization is expected to make the government closer to the people, thereby ensuring the effective and efficient provision of public services in line with local needs and costs (Oates 1999).

On the other hand, under the Law on Fiscal Decentralization implemented in 2001 (Law 25/1999, revised by Law33/2004), autonomous region subsidy (SDO: *Subsidi Daerah Otonom*) and presidential instruction development grants (Inpres: *Instruksi Presiden*) were replaced by inter-governmental fiscal transfers including general allocation grant (DAU: *Dana Alokasi Umum*), special allocation grant (DAK: *Dana Alokasi Khusus*) and shared revenues from natural resources and taxes (DBH: *Dana Bagi Hasil*) (Lewis, 2001; Silver, Azis and Schroeder, 2001). Fiscal revenues of regional governments now consist of these inter-governmental transfers, own source revenues

(PAD: *Pendapatan Asli Daerah*) and other revenues including regional government borrowings.

Fiscal revenue varies across regions (provinces and districts); by the Gini coefficient, disparity across districts in fiscal revenue per capita is more than 0.4. The largest per capita fiscal revenue is 120 times as much as the smallest. However, the extent of regional variation differs among revenue sources. Due to the uneven spatial distributions of natural resources and tax bases, shared revenue from natural resources and taxes (DBH) varies substantially across districts; disparity in DBH per capita exceeds 0.7 by the Gini coefficient. General allocation grant (DAU), on the other hand, has a much smaller regional disparity, as the DAU funds are allocated relative to population size, land area and some other socioeconomic indicators. In other words, while DBH is a dis-equalizing revenue source, DAU serves to equalize fiscal revenue.

Indonesia's decentralization was implemented in an attempt to mitigate inter-regional inequality in welfare levels; but, its effects remain uncertain. How transfer funds, such as DBH, DAU and DAK, are allocated across regions and how effectively and efficiently they are used in regional development are very important questions for policy makers and researchers. Against this background, this study is devoted to an analysis of the level and trend of fiscal disparity across districts and explores the determinants of fiscal disparity by two inequality decomposition methods: decomposition by revenue sources and decomposition by population subgroups. Since DAU accounts for more than 60% of total fiscal revenue, it is the most important source of fiscal disparity. This study thus critically evaluates how the DAU funds are allocated across districts and examines the extent to which the DAU allocation has equalized fiscal revenue. Among the other specific questions that are addressed in this study are as follows. (1) What is the level and trend of disparity in PAD per capita across districts? (2) To what extent has DBH dis-

equalized fiscal revenue? (3) Has DAK equalized fiscal revenue? (4) Are there any differences among five regions in mean DAU per capita, where Indonesia is divided into the following five regions: Sumatra, Java-Bali, Kalimantan, Sulawesi and Eastern Indonesia? (5) Are there any differences among the five regions in within-region disparity in DAU per capita?

There have been a number of studies on administrative and fiscal decentralization in Indonesia.[1] To the best of our knowledge, however, none of them have analyzed fiscal disparities using the methods we employ. The next section describes how fiscal revenues of regional governments are determined. The third section describes the data and the methods used, while the fourth section presents the empirical results. Section five proposes a new formula for the allocation of the DAU funds. The final section provides the conclusions.

## 2. Fiscal Revenues of Regional Governments under Fiscal Decentralization

After the implementation of Law 25/1999 in 2001, revenues of regional governments consist of own-source revenue (PAD), shared revenues from natural resources and taxes (DBH), general allocation grant (DAU), special allocation grant (DAK) and other revenues including regional government. While PAD is a revenue generated within each region, DBH, DAU and DAK are funds transferred from the central government to regional governments.

### 2.1. Own Source Revenues (PAD)

Own-source revenue (PAD) comprises regional taxes, user charges and fees. The

[1] See, for example, Brodjonegoro and Asanuma (2000), Alm, Aten and Bahl (2001), Lewis (2001), Silver, Azis and Schroeder (2001), Bahl and Tumennasan (2004), Brodjonegoro and Martinez-Vazquez (2005), Fitrani, Hofman and Kaiser (2005), Hofman, Kadjatmiko, Kaiser and Sjahrir (2006), Lewis (2006), Firman (2009), Fadliya and McLeod (2010), Agustina, Schulze and Fengler (2012), Shah, Qibthiyyah and Dita (2012), Firman (2013), Lewis (2014), Seifert and Li (2015), Lewis and Smoke (2017), Sudhipongpracha and Wongpredee (forthcoming).

main taxes of provincial governments include taxes on motor vehicles, transfer of the ownership of motor vehicles, motor vehicle fuel and cigarettes. On the other hand, the main taxes of district (*kabupaten* and *kota*) governments include taxes on restaurants, hotels, advertisements, street lighting, entertainment, parking and ground water. In addition to revenues from these taxes, district governments are entitled to receive certain proportions of provincial tax revenues. PAD thus depends very much on the services sector.

**2.2. Shared Revenues (DBH)**

Shared revenues (DBH) comprise revenues from natural resources and taxes. Under the natural resources revenue sharing scheme, revenues generated by natural resources must be shared between the central government and regional governments. Regions (provinces and districts) are entitled to receive 15% of oil revenue, 30% of gas revenue, and 80% of revenues from other natural resources (i.e., forestry, fishery and general mining). With a few exceptions, of the amount given to the producing regions, 20% goes to the province, 40% to the producing districts, and the remaining 40% is shared equally among the non-producing districts in the province (Brodjonegoro and Asanuma, 2000; Brodjonegoro and Martinez-Vazquez, 2004; Bahl and Tumennasan, 2004). Under the revised decentralization law in 2004 (Law 33/2004), which was fully implemented in 2008, the shares of producing regions were increased to 15.5 and 30.5%, respectively, for oil and gas, and geothermal energy has been added to a list of other natural resources (Soesastro and Atje, 2005). We should note however that the special autonomous provinces of Aceh, West Papua and Papua receive 70% of their oil and gas revenues (Brodjonegoro and Martinez-Vazquez, 2005; Agustina, Schulze and Fengler, 2012).

Meanwhile, under the tax revenue sharing scheme, regions (provinces and districts) receive 20% of the revenue from personal income tax, and the rest is retained by the

central government (Brodjonegoro and Martinez-Vazquez, 2005). Of the amount allocated to regions, 40% goes to provincial governments, while 60% goes to district governments. Regions also receive 90% and 80%, respectively, of the revenues from property tax (PBB: *Pajak Bumi dan Bangunan*) and fees on the transfers of land and building ownership (BPHTB: *Bea Perolehan Hak atas Tanah dan Bangunan*), while the rest is shared equally among all districts in Indonesia (Brodjonegoro and Martinez-Vazquez, 2005). Of the amount allocated to the regions, 20% goes to provinces and 80% to districts.

### 2.3. General Allocation Grant (DAU)

General allocation grant (DAU) is a fiscal equalization grant from the central government to regional (provincial and district) governments and also a general-purpose block grant where only general provisions are given to each regional government as to the allocation of the grant (Brodjonegoro and Martinez-Vazquez, 2005). Under the fiscal decentralization law, the total pool of the DAU funds is set at 25% of planned net domestic revenues (= domestic revenues minus shared revenue funds transferred to regional governments) in the central government budget. But, since 2008, the proportion has increased to at least 26%. The shares for provincial and district governments are 10% and 90%, respectively. While formula for the allocation of the DAU funds have undergone some changes, DAU consists of three major components: basic allocation, equal lump sum amount and fiscal gap allocation.

### 2.4. Special Allocation Grant (DAK)

Special allocation grant (DAK) is given to regional governments to assist with specific activities that relate to national priorities. Initially, DAK was used to fund only reforestation. But, in 2003, the following core activities were added to the DAK activity list: education, health, roads, irrigation and governance infrastructure (Fadliya and

McLeod, 2010). While DAK for reforestation was terminated in 2005, the following activities have been added gradually since 2004: marine and fishery, water and sanitation, agriculture, environment, family planning, forestry, rural infrastructure and trade (Fadliya and McLeod, 2010). With the expansion of the DAK activity list, the number of districts receiving DAK has been increasing gradually and in 2012, most districts received DAK.

## 3. Data and Method

### 3.1. Data

This study uses fiscal revenue data for districts (*kabupaten*s and *kota*s) from the Ministry of Finance. The data set includes data on own source revenue (PAD), shared revenues from taxes and natural resources (DBH), general allocation grant (DAU) and special allocation grant (DAK) from 2001 to 2012. Due to missing observations, it does not cover all districts.[1] It does not include Jakarta districts either since no DAU is allocated to these districts. Figure 1 presents fiscal revenues of district governments by revenue sources (shares of PAD, DBH, DAU and DAK). DAU had the largest share at more than 60% of total fiscal revenue of district governments, which is followed by DBH and PAD. Though not shown in the figure, more than half of DBH is generated by natural resources. On the other hand, DAK had the smallest share; but it has been increasing gradually with the expansion of DAK activities.

There is, however, a large variation across regions in the structure of fiscal revenue of district governments. While DAU had the largest share in Sumatra and Kalimantan, the share, at around 60% and 50% respectively, was smaller than that in Indonesia as a whole. Since these two regions are rich in natural resources, the share of DBH is relatively large, amounting to 25% and 40% of total fiscal revenue respectively, which are compared

[1] For example, the data set includes 331, 334, 357, 419, 476 and 491 districts, respectively, in 2001, 2003, 2005, 2007, 2009 and 2012.

to less than 20% in Indonesia as a whole. On the other hand, DAU accounted for more than 70% of total fiscal revenue in Java-Bali, Sulawesi and Eastern Indonesia, while the share of DBH amounted to less than 15%.[1] Except in Kalimantan, the share of DAK has been increasing gradually.

Figure 2 presents fiscal revenue of district governments as % of GDP. The decentralization in 2001 raised total fiscal revenue of districts substantially in Indonesia from 3% to 7% of GDP. For the first 5 years under the decentralization, however, total fiscal revenue as % of GDP has declined slightly; but after reaching the bottom in 2005 at 6.3%, it started to increase. In 2012, it was 7.3% of GDP. Among five regions, Java-Bali had the smallest fiscal revenue as % of GRDP, which has been around 5%. Sumatra and Kalimantan followed next, respectively, at around 7% and 8%, though there were some fluctuations. On the other hand, Sulawesi and Eastern Indonesia had much larger fiscal revenue as % of GRDP. In Sulawesi, fiscal revenue has risen to 17.5% in 2007; but after reaching the peak, it started to decrease. It was 13.5% in 2012. Eastern Indonesia is the poorest region and its fiscal revenue has been very large as % GRDP. Between 2001 and 2004, it has been around 15-17% of GRDP. But, after reaching the bottom in 2005, it started to rise and in 2012, it was around 25% of GRDP. A rapid rise in fiscal revenue in Sulawesi and Eastern Indonesia in 2006 is due mainly to the expansion of DAK activities in these regions as well as an increase in DAU.

### 3.2. Method

This study employs the Gini coefficient, the coefficient of variation and the Theil index T to measure fiscal disparity across districts, as they satisfy several desirable properties, such as anonymity, income homogeneity, population homogeneity and the

[1] Eastern Indonesia includes West Nusa Tenggara, East Nusa Tenggara, North Maluku, Maluku, West Papua and Papua.

Pigue-Dalton principle of transfer (Anand, 1983). While the Gini coefficient and the coefficient of variation are additively decomposable by revenue sources, the Theil index T is additively decomposable by population sub-groups. Since fiscal revenue depends on population, we measure disparity in per capita fiscal revenue rather than disparity in fiscal revenue. Hereafter, we use 'fiscal disparity' to denote 'disparity in per capita fiscal revenue' unless otherwise noted.

### 3.2.1. Decomposition of Fiscal Disparity by Revenue Sources: Gini Coefficient

Let $\boldsymbol{y} = (y_1, y_2, \cdots, y_n)$ denote the distribution of per capita fiscal revenue for *n* districts and $\mu$ be its mean. These districts are indexed by their ranks with respect to per capita fiscal revenue, and $i(\boldsymbol{y})$ is the ranking of districts. Then, fiscal disparity is measured by the Gini coefficient as follows:

$$G = \frac{2}{n\mu}\mathrm{cov}(i(\boldsymbol{y}), \boldsymbol{y}) .$$

Suppose that total fiscal revenue is composed of *K* revenue sources such that $y_i = y_{1i} + y_{2i} + \cdots + y_{Ki}$ and $\mu = \mu_1 + \mu_2 + \cdots + \mu_K$ . Let $w_k$ , $C_k$ , $G_k$ and $R_k$ be, respectively, the share of fiscal revenue from source *k*, the concentration ratio for source *k*, the Gini coefficient for source *k* and the rank correlation ratio for source *k*. They are given, respectively, by $w_k = \frac{\mu_k}{\mu}$, $C_k = \frac{2}{n\mu_k}\mathrm{cov}(i(\boldsymbol{y}), \boldsymbol{y_k})$, $G_k = \frac{2}{n\mu_k}\mathrm{cov}(i(\boldsymbol{y_k}), \boldsymbol{y_k})$ and $R_k = \frac{\mathrm{cov}(i(\boldsymbol{y}), \boldsymbol{y_k})}{\mathrm{cov}(i(\boldsymbol{y_k}), \boldsymbol{y_k})}$ where $\boldsymbol{y_k} = (y_{k1}, y_{k2}, \cdots, y_{kn})$ and $i(\boldsymbol{y_k})$ is the ranking of districts in the distribution of per capita fiscal revenue from source *k*. Then, the Gini coefficient *G* can be additively decomposed as follows (Fei, Ranis and Kuo ,1978; Pyatt, Chen and Fei, 1980):

$$G = \sum_{k=1}^{K} w_k C_k = \sum_{k=1}^{K} w_k R_k G_k . \qquad (1)$$

If we define $g_k = \frac{R_k G_k}{G}$, then we have

$$1 = \sum_{k=1}^{K} w_k g_k \qquad (2)$$

$g_k$ is called the relative concentration ratio of the *k*th revenue source. If $g_k$ is greater (smaller) than one, then the *k*th revenue source is considered an inequality-increasing (decreasing) component.

**3.2.2. Decomposition of Fiscal Disparity by Revenue Sources: Coefficient of Variation**

Fiscal disparity can also be measured by the coefficient of variation (*CV*) as follows:

$$CV = \frac{\sigma}{\mu},$$

where $\sigma$ is the standard deviation of the distribution of per capita fiscal revenue.

Let $\rho_k$ and $CV_k$ be, respectively, the coefficient of correlation between the distribution of per capita fiscal revenue from source *k* and the distribution of per capita total fiscal revenue and the coefficient of variation for source *k*. They are given, respectively, by $\rho_k = \frac{\mathrm{cov}(\boldsymbol{y_k}, \boldsymbol{y})}{\sigma_k \sigma}$ and $CV_k = \frac{\sigma_k}{\mu_k}$ where $\sigma_k$ is the standard deviation of the distribution of per capita fiscal revenue from source *k*. Then, the coefficient of variation *CV* can be additively decomposed as follows (Shorrocks, 1982):

$$CV = \sum_{k=1}^{K} w_k \rho_k (CV_k) \qquad (3)$$

If we define $s_k = \rho_k \frac{CV_k}{CV}$, then we have

$$1 = \sum_{k=1}^{K} w_k s_k \,. \qquad (4)$$

$s_k$ is called the relative concentration ratio of the *k*th revenue source. If $s_k$ is greater

(smaller) than one, then the *k*th revenue source is considered an inequality-increasing (decreasing) component.

### 3.2.3. Decomposition of Fiscal Disparity by Population Subgroups: Theil index T

Suppose that *n* districts are classified into *m* mutually exclusive and collectively exhaustive groups such as five regions. Let $\mu_i$, $n_i$, $y_{ij}$ be, respectively, the mean per capita fiscal revenue of districts in region *i*, the number of districts in region *i*, and the per capita fiscal revenue of *j*th district in region *i*. Then, overall fiscal disparity is given by the Theil index T as follows:

$$T = \frac{1}{n}\sum_{i=1}^{m}\sum_{j=1}^{n_i}\left(\frac{y_{ij}}{\mu}\right)\log\left(\frac{y_{ij}}{\mu}\right)$$

The Theil index T can be decomposed into the within-region component ($T_W$) and the between-region component ($T_B$) as follows (Bourguignon, 1979; Shorrocks, 1980):

$$T = \sum_{i=1}^{m}\left(\frac{n_i}{n}\frac{\mu_i}{\mu}\right)T_i + \sum_{i=1}^{m}\left(\frac{n_i}{n}\frac{\mu_i}{\mu}\right)\log\left(\frac{\mu_i}{\mu}\right) = T_W + T_B \qquad (5)$$

where $T_i$ is the Theil index T for the within-region disparity of region *i*.

## 4. Empirical Results

### 4.1. Levels and Trends of Fiscal Disparities

Figure 3 presents fiscal disparity across districts as measured by the Gini coefficient and the Theil index T. These two inequality indexes show a similar trend pattern.[1] According the Gini coefficient, after declining to 0.37 in 2003, fiscal disparity started to increase and reached the highest at 0.47 in 2011. Though it declined slightly in 2012, it was 0.45, which was much larger than the lowest value in 2003.

Figure 4 presents disparities in PAD, DBH, DAU and DAK by the Gini coefficient

[1] Though not shown in the figure, fiscal disparity by the coefficient of variation has a similar trend pattern to the ones by the Gini coefficient and the Theil index T.

and the coefficient of variation.[1] Disparity in DAK was the highest among four revenue sources in 2001 and 2002 since there was only one DAK activity (reforestation) in these two years and much of DAK was allocated to districts in Kalimantan. But, as the number of DAK activities has increased, the disparity has been declining gradually. In 2012, only 4 districts did not receive any DAK grant and the fiscal disparity went down to 0.55 by the Gini coefficient. Since 2003, disparity in DBH has been the highest, exceeding 0.65 by the Gini coefficient. There has been a wide variation in per capita DBH across districts due to the very uneven distribution of natural resources and tax bases. In 2012, 80% of districts had their per capita DBH less than the mean, while 10% of districts had their per capita DBH more than twice as much as the mean and these districts are mostly in the resource rich provinces of Riau, Riau Islands, East Kalimantan, West Papua and Papua.

Disparities in PAD and DAU were much smaller than disparity in DBH, but had different trend patterns. While disparity in PAD showed a declining trend before 2006, disparity in DAU exhibited an increasing trend. As a result, these two disparities have been very similar to each other since 2006; by the Gini coefficient, the disparities have been in the range of 0.42-0.46. Disparity in DAU rose sharply to 0.42 in 2006 from 035 by the Gini coefficient. In 2006, a lump sum equal DAU was abolished in an effort to mitigate the proliferation of districts. This lump sum component is, in fact, an inequality-increasing rather than decreasing component, since high-density poorer districts tend to have a smaller per capita lump sum amount. If this DAU component was not terminated, disparity in DAU would have been even higher. The main reason why overall fiscal disparity has been increasing since 2003 appears to have been the rise in disparity in DAU.

### 4.2. Effects of Fiscal Transfers (DBH, DAU and DAK) on Fiscal Disparity

[1] 'Disparities in PAD, DBH, DAU and DAK' mean 'disparities among districts in per capita PAD, DBH, DAU and DAK'.

In order to investigate the effects of fiscal transfers (DBH, DAU and DAK) on overall fiscal disparity, we decompose overall fiscal disparity by revenue sources using the Gini coefficient and the coefficient of variation (see equations (1), (2), (3) and (4)). The result is shown in Table 1 and Figure 5. No matter which inequality measure we use, relative concentration ratio for DBH was greater than one, while that for DAU was less than one. This confirms that DBH is an inequality-increasing fiscal transfer, while DAU is an inequality-decreasing fiscal transfer. However, relative concentration ratio for DAU rose prominently in 2006 and since then has been quite stable at around 0.9, suggesting that DAU's inequality-reducing effect has been weakened since 2006. Though relative concentration ratio for DAK was greater than one, it has been declining gradually, and since 2007 it has been very close to one.

It is instructive to see how fiscal disparity changes as DBH and DAU are added to own source revenue (PAD). Figure 6 presents disparities in PAD, PAD + DBH and PAD + DBH + DAU as measured by the Gini coefficient.[1] If we add DBH to PAD, fiscal disparity rose substantially to 0.60 - 0.65. If we further add DAU to the sum of PAD and DBH, fiscal disparity returned to the level of disparity in PAD. Since DAK is very small in share, adding DAK will not change the disparity very much.

### 4.3. Between- and Within-region Disparities in Per Capita DAU

Since DAU accounts for more than 60% of total fiscal revenue, we explore the factors of disparity in DAU by conducting a Theil decomposition analysis by regions (see equation (5)). Figure 7 presents the decomposition result.[2] While Java-Bali showed a

[1] 'Disparity in A + B' means 'disparity in per capita A + B among districts', where A and B are fiscal revenues.

[2] To check whether the result is robust or not, the Gini coefficient is also used to estimate within-region disparities. The result is very similar to the one by the Theil index T qualitatively, thus it is not presented. It should be note that the Gini coefficient cannot be decomposed into the within and between-region inequality components.

slight decreasing trend in within-region disparity, Kalimantan and Eastern Indonesia exhibited an increasing trend.[1] Sulawesi also showed an increasing trend, but not as much as Kalimantan and Eastern Indonesia. As shown by the contributions of within-region disparities to disparity in DAU, the rapid rise in Eastern Indonesia's within-region disparity appears to have been the major contributor to the rise in disparity in DAU in 2006. It accounted for 37% of total disparity in 2006, up from 22% in 2005.

Under decentralization, a large number of new districts have been created in Eastern Indonesia by splitting, particularly in the sparsely populated province of Papua. According to our data set, between 2001 and 2012, the number of districts have increased from 40 to 91 in Eastern Indonesia, but most of the increase have occurred in Papua. This might have raised Eastern Indonesia's within-region disparity in DAU substantially, since those districts that were split might have a much larger per capita DAU for their wage bill than before if they increased the total number of their government officials after splitting.

Another factor of the rise in disparity in DAU in 2006 would be the increase in the between-region disparity, as the disparity rose from 0.07 to 0.14 by the Theil index T and its contribution rose from 34% to 38%. According to Figure 8, which presents mean per capita DAU by region relative to Indonesia's mean per capita DAU (= 1.0), Eastern Indonesia raised its mean per capita DAU conspicuously in 2006, while the other four regions exhibited a declining trend. In other words, Eastern Indonesia not only raised its within-region disparity but also its mean per capita DAU relative to Indonesia's mean per capita DAU in 2006, and this seems to have raised disparity in DAU. Eastern Indonesia's large within-region disparity and large mean per capita DAU have persisted until 2012.

If Eastern Indonesia is excluded, disparity in DAU would have been much smaller

[1] Kalimantan had a very large disparity in 2010; but this is due to an exceptionally large per capita DAU registered by *kabupaten* Tana Tidung in East Kalimantan (now in North Kalimantan), though the reason is unknown. Without this *kabupaten*, its within-region disparity will be decreased to 0.31.

since 2006. For example, in 2007, 2009 and 2012, the Gini coefficient would be 0.36, 0.36 and 0.34, respectively. These values are much smaller than the ones when Eastern Indonesia is included. Furthermore, the between-region disparity in DAU would have been much smaller since 2006, if Eastern Indonesia is excluded.

### 4.4. Effects of Fiscal Transfers (DBH, DAU and DAK) on Fiscal Disparity: Excluding Eastern Indonesia

Since Eastern Indonesia had a much larger mean per capita DAU than the other four regions, it is instructive to examine the effects of fiscal transfers on fiscal disparity by excluding Eastern Indonesia. Figure 9 present the result of a decomposition analysis by revenue sources. DBH is unambiguously an inequality-increasing fiscal transfer since its relative concentration ratio was ranging from 1.6 to 1.8 by the Gini coefficient, which is larger than the ratio when Eastern Indonesia is included. On the other hand, DAU is an inequality-decreasing fiscal transfer as its relative concentration ratio was around 0.7-0.8. There was a slight increasing trend, but the ratio was much smaller than 1.0. These observations signify that when Eastern Indonesia is excluded, DAU has had a stronger revenue equalizing effect, even after 2006. Figure 10 presents disparities in PAD, PAD + DBH and PAD + DBH + DAU. If we add DAU to the sum of PAD and DBH, fiscal disparity declined substantially to the level lower than disparity in PAD.

Even if Eastern Indonesia is excluded, disparity in DAK has been declining gradually with the expansion of DAK. According to Figure 9, DAK's relative concentration ratio has been smaller than one since 2010 by the Gini coefficient (since 2007 by the coefficient of variation), signifying that DAK has become an inequality-decreasing fiscal transfer together with DAU. We should note that there has been a very high correlation between the distributions of per capita DAU and per capita DAK across districts at around 0.8. This is true whether Eastern Indonesia is included or not. This

means that those districts that have a large (small) per capita DAU tend to have a large (small) per capita DAK.

## 5. Designing a New DAU Allocation Formula

While DAU has served to equalize fiscal revenue across districts, fiscal disparity is still very high at around 0.4 by the Gini coefficient. To further reduce fiscal disparity, the formula for fiscal transfers may need to be modified. This section proposes a new formula for the allocation of DAU funds as DAU has played an important role in determining fiscal disparity.

Under the Law on Fiscal Decentralization (Law 25/1999, revised by Law 33/2004), total fiscal revenue for a district (TFR) is given by the following equation, where for simplicity, there are no other fiscal revenues.

$$TFR = PAD + DBH + DAU + DAK. \quad (6)$$

From 2008 onward, general allocation grant (DAU) is determined by

$$DAU = \max\{BA + FG, 0\} \quad (7)$$

Basic allocation (BA) is given to each district to cover 100% of the total wage bill of the district government, while fiscal gap (FG) is determined by the difference between fiscal need (FN) and fiscal capacity (FC). Here, FN is estimated by

$$FN = AFE \times \left(0.3POP + 0.15AR + 0.3CP + 0.1\left({}^{1}/_{HDI}\right) + 0.15PGRDP\right) \quad (8)$$

where AFE is average fiscal expenditure, while POP, AR, CP, ${}^{1}/_{HDI}$ and PGRDP are, respectively, indices for population, land area, construction price, inverse of human development index and per capita GRDP. Meanwhile, FC is given by

$$FC = PAD + DBH \quad (9)$$

Substituting equations (7), (8) and (9) into equation (6), we obtain

$$TFR = PAD + DBH + \max\{BA + (FN - PAD - DBH), 0\} + DAK$$

As shown in Figure 11, district governments can be classified into three groups depending on the values of FN, BA + FN and PAD + DBH, for which total fiscal revenue (TFR) is given by

$$\text{TFR} = \begin{cases} \text{BA} + \text{FN} + \text{DAK} & \text{if BA} + \text{FN} > \text{FN} \geq \text{PAD} + \text{DBH (Group 1)} \\ \text{BA} + \text{FN} + \text{DAK} & \text{if BA} + \text{FN} > \text{PAD} + \text{DBH} > \text{FN (Group 2)} \\ \text{PAD} + \text{DBH} + \text{DAK} & \text{if PAD} + \text{DBH} \geq \text{BA} + \text{FN} > \text{FN(Group 3)} \end{cases} \quad (10)$$

These three groups can be described as follows:

(a) Group 1: districts poor in own source and shared revenues ($\text{BA} + \text{FN} > \text{FN} \geq \text{PAD} + \text{DBH}$)

In this case, total fiscal revenue is given by the sum of basic general allocation grant (BA), revenue to cover fiscal needs (FN) and special allocation grant (DAK). Since the sum of own source revenue (PAD) and shared revenue (DBH) is smaller than FN, it cannot cover FN, and thus the district will receive general allocation grant to fill the fiscal gap ($\text{FG} \geq 0$) plus BA, in other words, $\text{DAU} = \text{BA} + \text{FG} \geq \text{BA}$.

(b) Group 2: districts relatively rich in own source and shared revenues ($\text{BA} + \text{FN} \geq \text{PAD} + \text{DBH} > \text{FN}$)

In this case, total fiscal revenue is the sum of basic general allocation grant (BA), revenue to cover fiscal needs (FN) and special allocation grant (DAK). Since the sum of own source revenue (PAD) and shared revenue (DBH) is greater than FN, it can more than cover FN; thus, the fiscal gap is negative ($\text{FG} < 0$) and thus the district will not receive the full amount of basic general allocation grant, in other words, $\text{DAU} = \text{BA} + \text{FG} < \text{BA}$.

(c) Group 3: districts rich in own source and shared revenues ($\text{PAD} + \text{DBH} > \text{BA} + \text{FN} > \text{FN}$)

In this case, total fiscal revenue is the sum of own source revenue (PAD), shared revenue (DBH) and special allocation grant (DAK). Since the sum of PAD and DBH

is greater than the sum of basic general allocation grant (BA) and fiscal needs (FN), the sum of BA and FG is negative ($BA + FG < 0$) and thus the district will not receive general allocation grant at all, in other words, $DAU = 0$.

As shown by equation (10), total fiscal revenue (TFR) does not include own source revenue (PAD) for districts in groups 1 and 2, since PAD is cancelled out when determining TFR. If the district governments realize this fact, they have hardly any incentive to increase PAD since the rise in PAD will reduce DAU according to equation (7). Since basic allocation (BA) is intended to finance the wage bill and special allocation grant (DAK) is used to assist with specific activities that relate to national priorities, an amount equivalent to fiscal need (FN) is the only amount which could be used for local public services, such as education, healthcare services and public works.

In order to increase total fiscal revenue for districts in groups 1 and 2, the DAU allocation formula may need to be modified. The following provides a new proposed formula for the allocation of the DAU funds (see Figure 11).

$$DAU = \max\{BA + (FN - FC), 0\} \quad (11)$$

where $FC = \alpha PAD + DBH \qquad 0 \leq \alpha < 1$

If equation (11) is substituted to equation (6), then total fiscal revenue (TFR) will be given by

TFR =

$$\begin{cases} (1-\alpha)PAD + BA + FN + DAK & \text{if } BA + FN > FN \geq \alpha PAD + DBH \text{ (Group 1)} \\ (1-\alpha)PAD + BA + FN + DAK & \text{if } BA + FN > \alpha PAD + DBH > FN \text{ (Group 2)} \\ PAD + DBH + DAK & \text{if } \alpha PAD + DBH \geq BA + FN > FN \text{(Group 3)} \end{cases} \quad (12)$$

$\alpha = 1$ corresponds to the current allocation formula. If $\alpha = 0$, total fiscal revenue includes the full amount of PAD for all districts and thus, district governments will have a strong incentive to raise PAD to increase total fiscal revenue.

To examine how the new formula will affect fiscal disparity, we first define the

following ratio.

$$\text{RATIO} = \frac{\text{PAD+DBH}}{\text{TFR−DAK}} \quad (13)$$

For groups 1 and 2, this ratio will be given by

$$\text{RATIO} = \frac{\text{PAD+DBH}}{\text{BA+FN}}$$

Since $\text{BA} + \text{FN} > \text{PAD} + \text{DBH}$ for these groups, we have RATIO < 1. As a simulation analysis, we set RATIO < 0.6 to identify districts in groups 1 and 2. In 2012, 463 districts out of 491 districts meet this criterion. In other words, 28 districts are assumed to be in group 3; they are mostly in the resource rich provinces of Riau, Riau Islands and East Kalimantan. We next set $\alpha = 0.5$ and an amount equivalent to 0.5PAD is added to total fiscal revenue for districts in groups 1 and 2. Under this setting, fiscal disparity will be 0.444 by the Gini coefficient, which is smaller than 0.452 in 2012. If we set $\alpha = 0$ and an amount equivalent to PAD is added to total fiscal revenue for districts in groups 1 and 2, then fiscal disparity will be further reduced to 0.437. It should be note that with this arrangement, total DAU funds need to be increased; thus, some adjustments may be necessary to keep the DAU funds unchanged.[1]

The reduction in fiscal disparity is not substantial in the short run under the new formula. However, governments in groups 1 and 2 have an incentive to raise PAD as long as $\alpha$ is smaller than one since a certain proportion of PAD will be added to total fiscal revenue. This could create a virtuous cycle, since the rise in PAD would enable district governments to promote their economy through further development of human resources and infrastructure and this would in turn raise PAD. In practice, $\alpha$ may be changed depending on the value of RATIO defined by equation (13). One possible arrangement

[1] As described in section 2.3, the total pool of the DAU funds has been set at 26% and more of net national domestic revenue since 2008. With $\alpha$ = 0.5, total necessary DAU funds would be 27.7% of net national domestic revenue, *ceteris paribus*.

would be

$$\alpha = \begin{cases} 0 & \text{if} \quad 0 < \text{RATIO} \leq 0.3 \\ 0.3 & \text{if} \quad 0.3 < \text{RATIO} \leq 0.6 \\ 0.6 & \text{if} \quad 0.6 < \text{RATIO} \leq 0.9 \\ 1 & \text{if} \quad 0.9 < \text{RATIO} \leq 1 \end{cases}$$

With this arrangement, resource-poorer districts will add a larger proportion of PAD to total fiscal revenue. By the Gini coefficient, fiscal disparity will decline to 0.439 in 2012.

## 6. Conclusions

This study analyzed the level and trend of fiscal disparity across districts and explored the determinants of fiscal disparity by two inequality decomposition methods: decomposition by revenue sources and decomposition by population subgroups. The following summarizes major findings. First, disparity in per capita fiscal revenue across districts (fiscal disparity) was very high and appears to have been increasing since the decentralization laws were implemented in 2001. Second, among four revenue sources, disparity in per capita shared revenue (DBH) has been the highest since 2003 due to the very uneven spatial distribution of natural resources and tax bases. DBH is unambiguously an inequality-increasing fiscal transfer. Third, disparity in per capita general allocation grant (DAU) was much smaller; but it exhibited an increasing trend. While DAU has served as an inequality-decreasing fiscal transfer, its inequality-reducing effect has been weakened since 2006. Fourth, Eastern Indonesia appears to have been responsible for the rise in disparity in per capita DAU, as its within-region disparity and mean per capita DAU relative to Indonesian average have risen prominently since 2006. Fifth, whether Eastern Indonesia is excluded or not, disparity in per capita special allocation grant (DAK) has been declining gradually with the expansion of DAK.

While DAU has served to equalize fiscal revenue across districts, fiscal disparity is still very high. Whether Eastern Indonesia is excluded or not, it is around 0.4 by the Gini

coefficient. To further reduce the disparity, it may be necessary to modify the DAU allocation formula. This study proposed a new allocation formula, under which fiscal disparity was found to decline to a certain extent. Though the reduction in fiscal disparity is not substantial in the short run, the new formula would encourage resource-poorer districts to raise own source revenue (PAD). This could create a virtuous cycle, since the rise in PAD would enable the district governments to promote their economy through further development of human resources and infrastructure and this would in turn raise PAD. Another option to reduce fiscal disparity would be the further expansion of DAK, as the expansion of DAK appears to have lowered disparity in per capita DAK. If the government allocates the DAK funds effectively across districts, then it could make DAK an inequality-decreasing fiscal transfer.

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Table 1. Decomposition of Fiscal Disparity among Districts by Revenue Sources

| | % Share | Gini Coefficient | | | Coefficient of Variation | | |
|---|---|---|---|---|---|---|---|
| | | Gk | % Contrib. | gk | CVk | % Contribu. | sk |
| 2001 | | | | | | | |
| PAD | 6 | 0.50 | 4 | 0.75 | 1.94 | 3 | 0.62 |
| DBH | 23 | 0.74 | 39 | 1.70 | 2.55 | 50 | 2.19 |
| DAU | 70 | 0.33 | 54 | 0.78 | 0.77 | 44 | 0.62 |
| DAK | 2 | 0.86 | 3 | 1.68 | 3.19 | 3 | 1.92 |
| Total revenue | | 0.40 | | | 0.98 | | |
| 2003 | | | | | | | |
| PAD | 6 | 0.43 | 4 | 0.67 | 1.00 | 4 | 0.58 |
| DBH | 22 | 0.68 | 35 | 1.63 | 2.21 | 43 | 1.97 |
| DAU | 66 | 0.32 | 52 | 0.78 | 0.73 | 45 | 0.68 |
| DAK | 5 | 0.66 | 8 | 1.56 | 2.04 | 8 | 1.50 |
| Total revenue | | 0.37 | | | 0.86 | | |
| 2005 | | | | | | | |
| PAD | 6 | 0.43 | 3 | 0.48 | 1.06 | 2 | 0.32 |
| DBH | 29 | 0.72 | 45 | 1.59 | 2.48 | 59 | 2.08 |
| DAU | 60 | 0.35 | 45 | 0.75 | 0.76 | 33 | 0.54 |
| DAK | 6 | 0.61 | 7 | 1.24 | 1.91 | 6 | 1.07 |
| Total revenue | | 0.42 | | | 1.02 | | |
| 2007 | | | | | | | |
| PAD | 4 | 0.43 | 2 | 0.46 | 1.08 | 1 | 0.31 |
| DBH | 19 | 0.75 | 26 | 1.41 | 2.57 | 27 | 1.42 |
| DAU | 67 | 0.45 | 61 | 0.91 | 1.16 | 61 | 0.91 |
| DAK | 10 | 0.56 | 11 | 1.09 | 1.52 | 12 | 1.11 |
| Total revenue | | 0.46 | | | 1.16 | | |
| 2009 | | | | | | | |
| PAD | 5 | 0.45 | 3 | 0.62 | 1.16 | 2 | 0.36 |
| DBH | 20 | 0.71 | 27 | 1.37 | 2.36 | 25 | 1.25 |
| DAU | 64 | 0.45 | 58 | 0.91 | 1.27 | 63 | 0.99 |
| DAK | 11 | 0.52 | 11 | 1.02 | 1.25 | 10 | 0.90 |
| Total revenue | | 0.45 | | | 1.16 | | |
| 2012 | | | | | | | |
| PAD | 6 | 0.45 | 3 | 0.45 | 1.15 | 2 | 0.27 |
| DBH | 17 | 0.74 | 24 | 1.42 | 3.45 | 27 | 1.57 |
| DAU | 69 | 0.45 | 65 | 0.93 | 1.39 | 62 | 0.89 |
| DAK | 8 | 0.55 | 9 | 1.05 | 2.11 | 10 | 1.23 |
| Total revenue | | 0.45 | | | 1.41 | | |

(Source) Ministry of Finance

Figure 1. Fiscal Revenues of Districts by Revenue Sources in Indonesia (Shares of PAD, DBH, DAU and DAK)

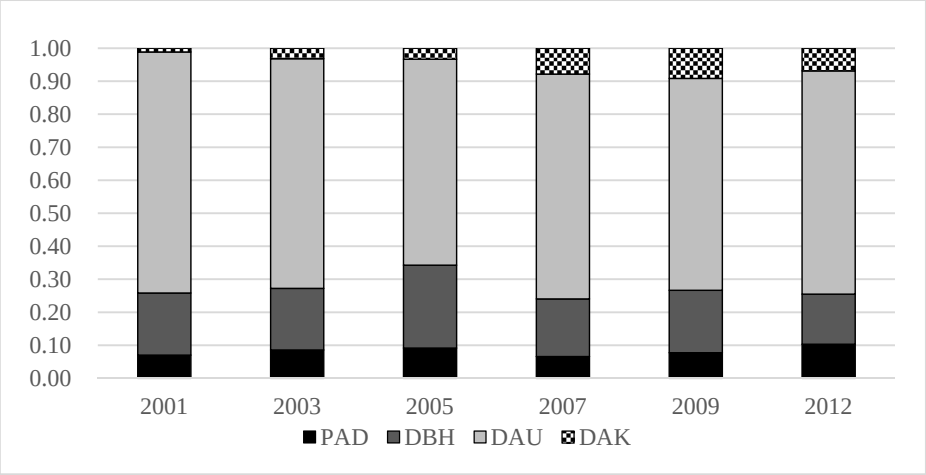



Figure 2. Fiscal Revenue of Districts as % of GRDP

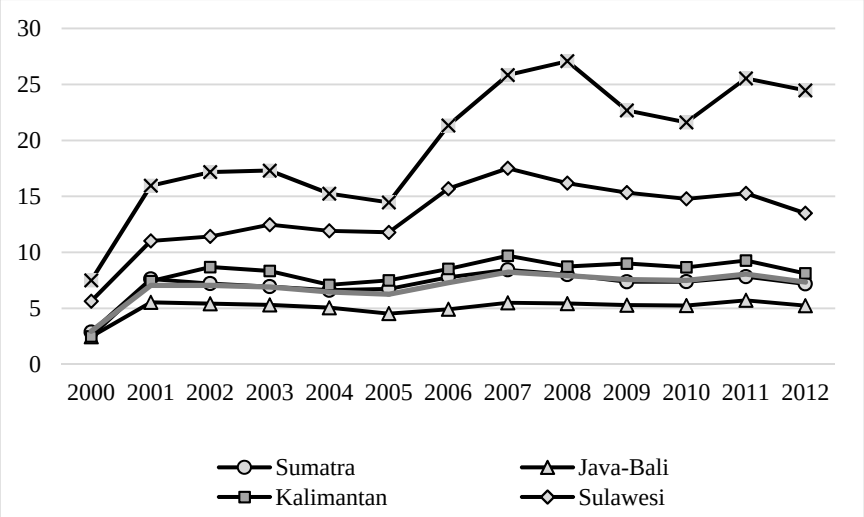



Figure 3. Fiscal Disparity by the Gini Coefficient and the Theil index T

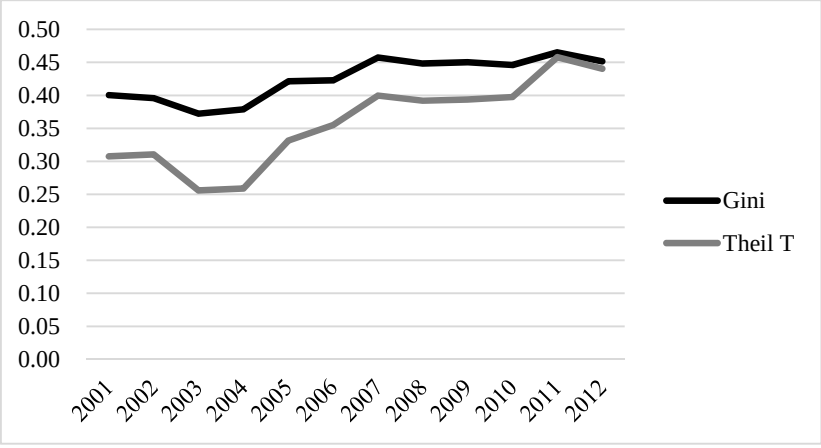
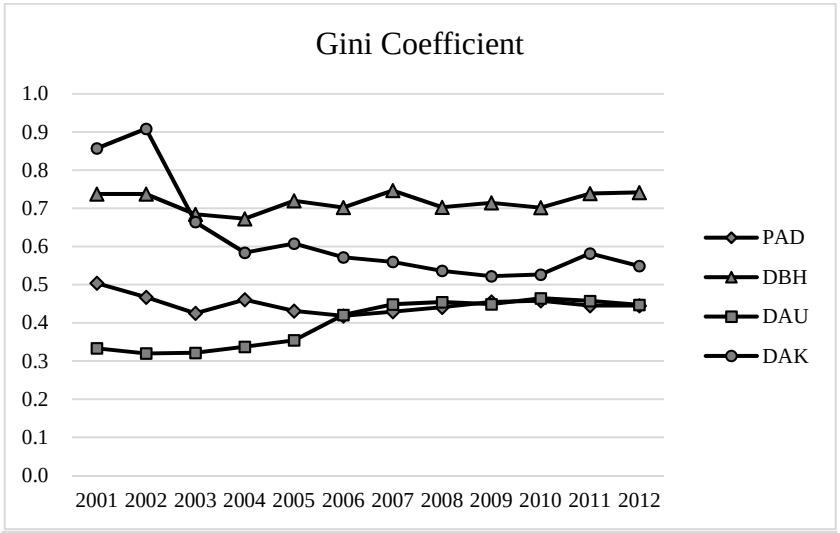



Figure 4. Fiscal Disparities by the Gini Coefficient and the Coefficient of Variation


Gini Coefficient
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
PAD
DBH
DAU
DAK

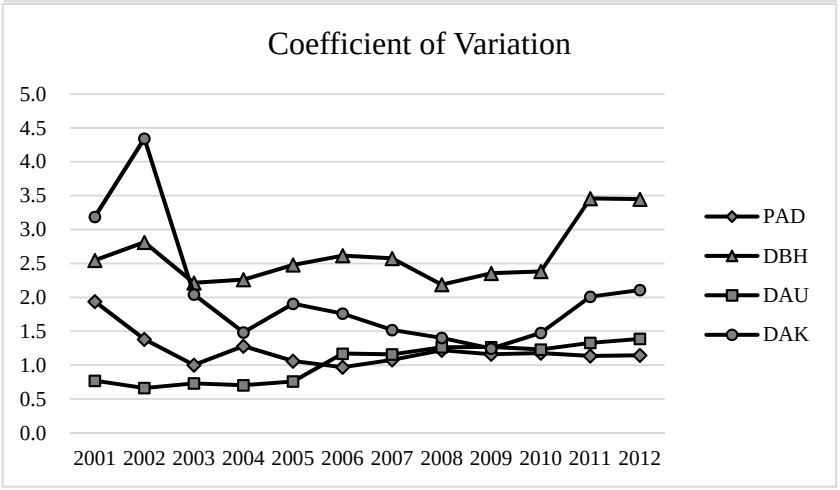
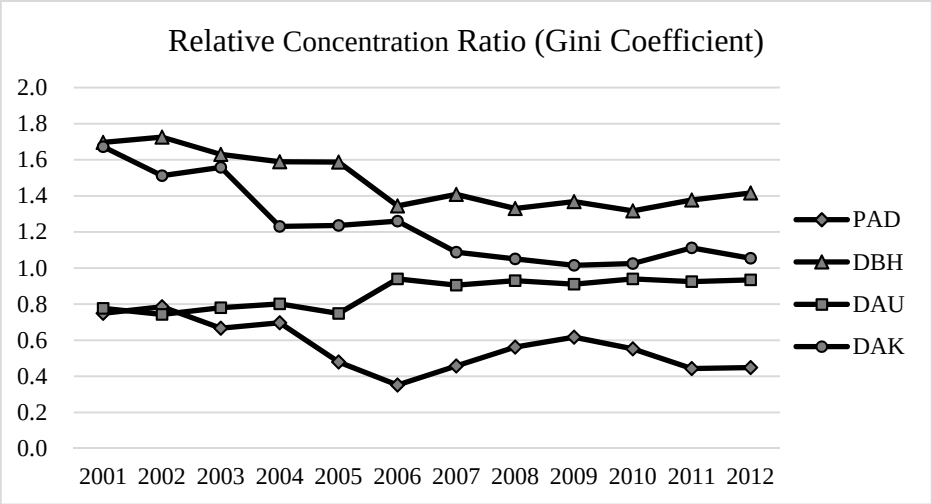

Coefficient of Variation
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
PAD
DBH
DAU
DAK

Figure 5. Relative Concentration Ratio for Fiscal Transfers (DBH, DAU and DAK)



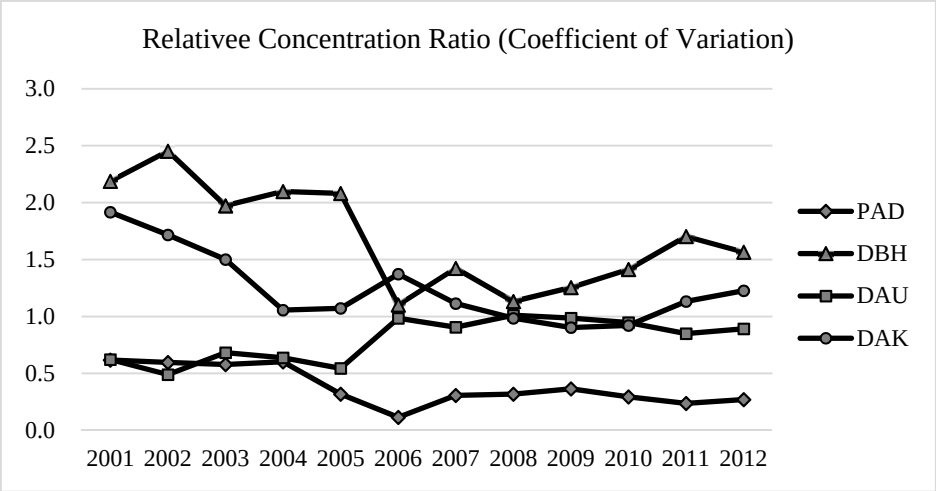



Figure 6. Changes in Fiscal Disparity by the Gini Coefficient

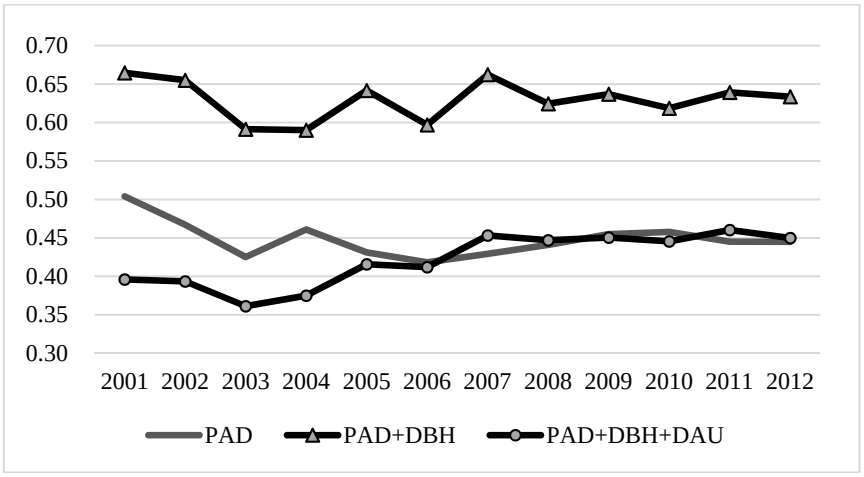
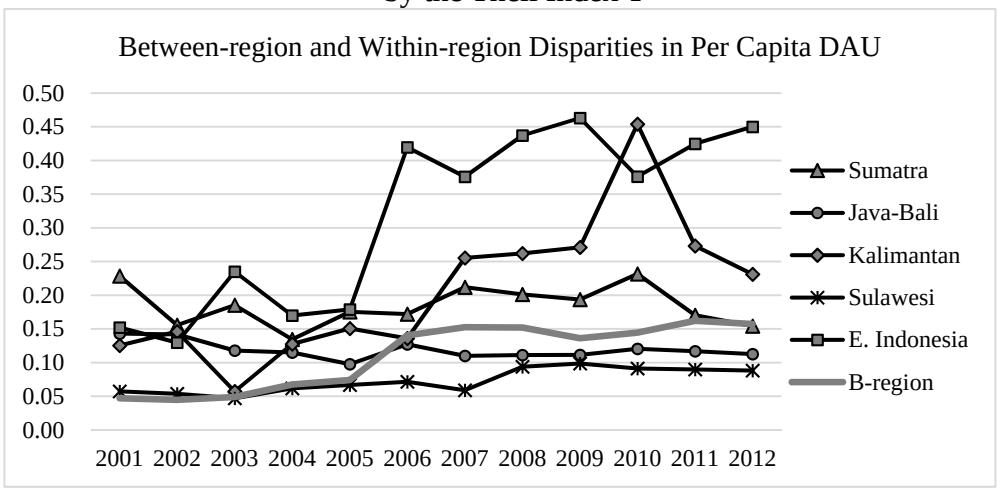



Figure 7. Decomposition of Disparity in Per Capita DAU by Regions by the Theil Index T



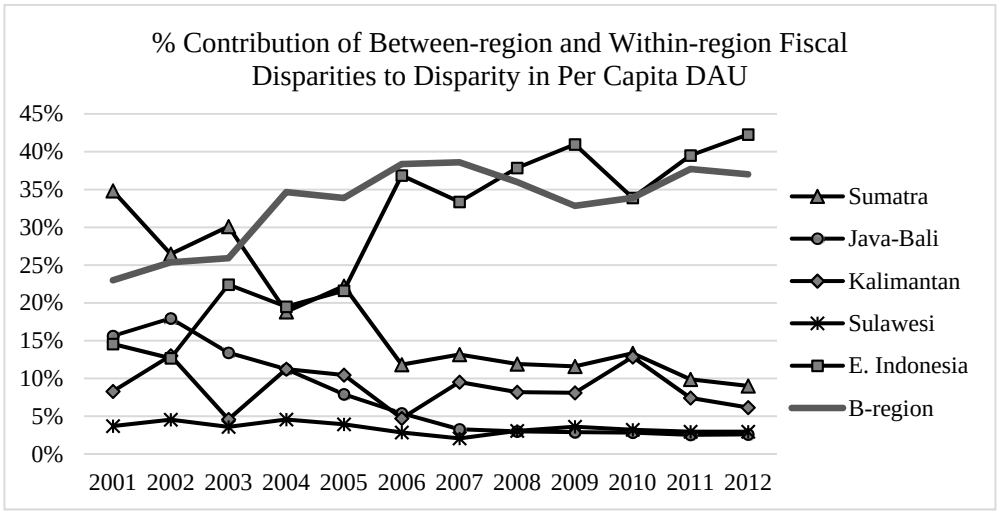




Figure 8. Mean Per Capita DAU by Region (Indonesia = 1.0)

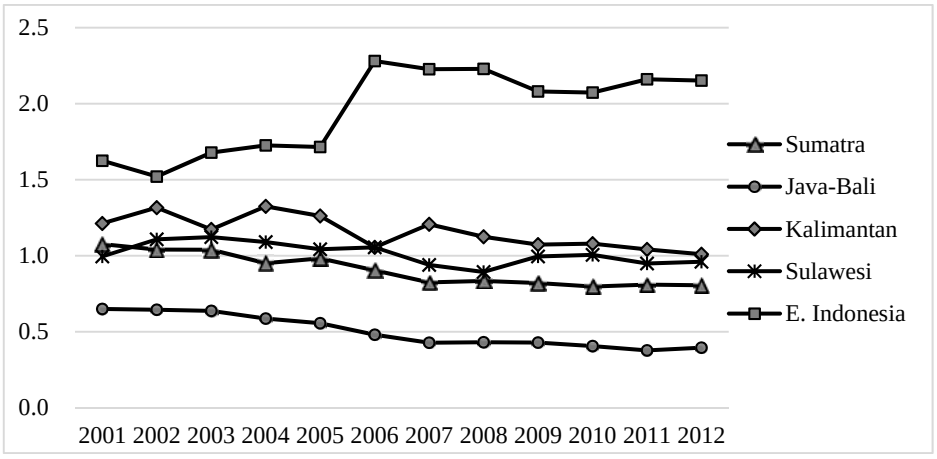
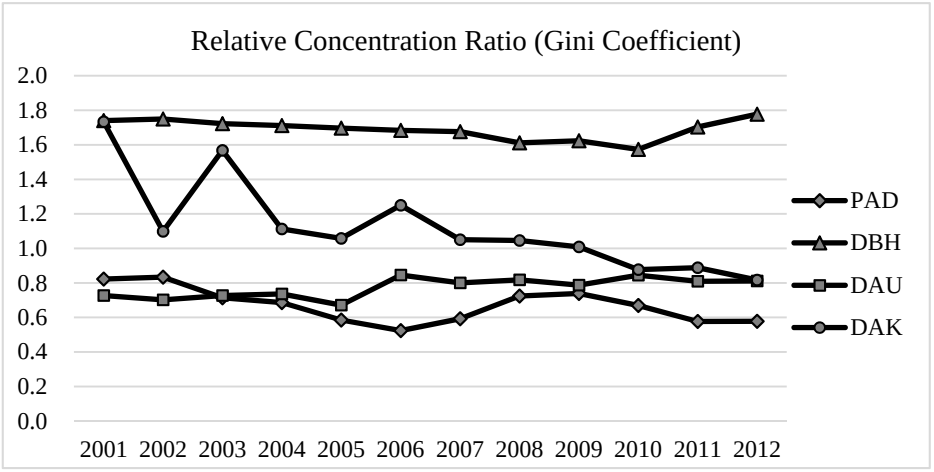



Figure 9. Relative Concentration Ratio for Fiscal Transfers (DBH, DAU and DAK) Excluding Eastern Indonesia



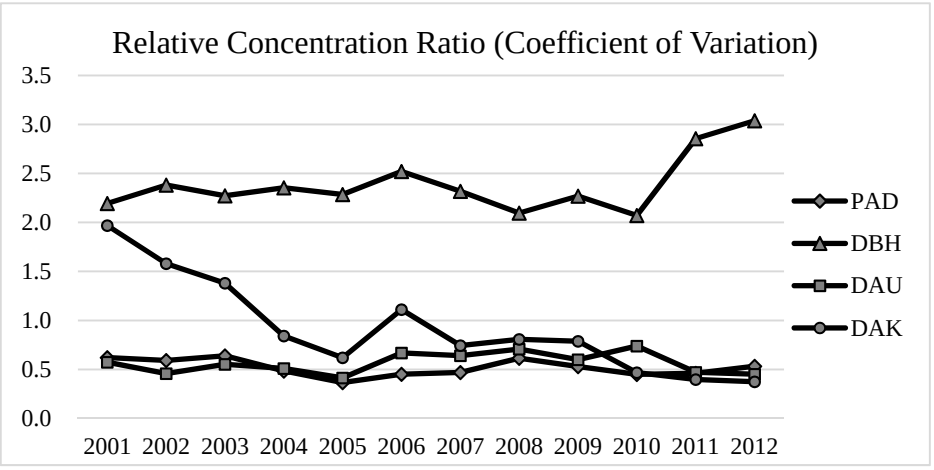




Figure 10. Changes in Fiscal Disparity by the Gini Coefficient Excluding Eastern Indonesia

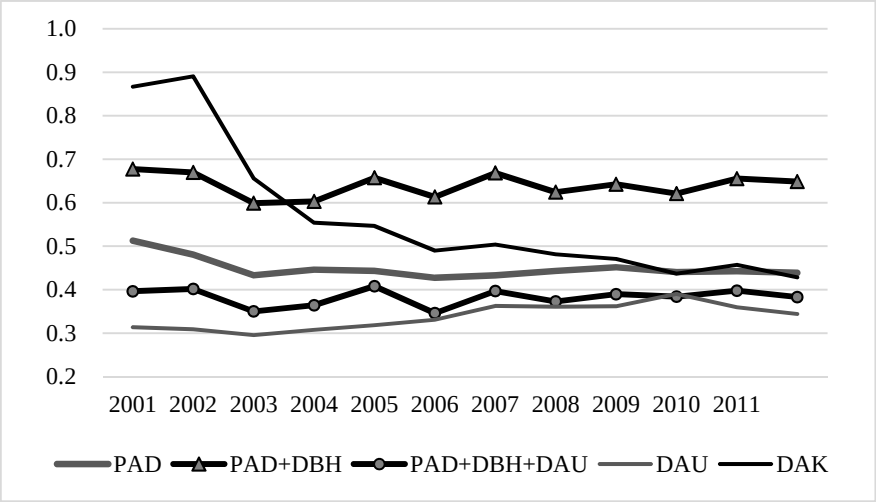

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
PAD
PAD+DBH
PAD+DBH+DAU
DAU
DAK

Figure 11. Total Fiscal Revenue