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The role of automatic stabilizers in business cycle: the case of Indonesia

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Abstract. The use of large fiscal stimulus packages to dampen the impact of Covid-19 recently has raised concerns about the effectiveness of the discretionary fiscal policy. This paper aims at analysing the feasibility of automatic fiscal stabilisers to mitigate economic fluctuations in the case of Indonesia. Using the IMF standard model for quarterly data over the period of 2001(1) to 2019(4), we find that the role of automatic fiscal stabilisers is getting greater both in revenue and spending. This implies that the automatic fiscal stabilisers are feasible as the main fiscal policy instrument for economic stability goals in the future. However, given the existing circumstances, Indonesia has to reform economic, regulatory, and institutional ecosystems in adopting the automatic fiscal stabilisers.

Keywords. automatic stabilisers; business cycle; discretionary fiscal policy; government spending; taxes.

JEL Codes. E32; E62; H61; H62.

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1. Introduction

Following the Coronavirus disease (Covid-19) outbreak around the world in late 2019, fiscal policy has received much attention. Many advanced countries adopt the fiscal stimulus packages relative to monetary policy to survive the adverse impacts emerging from Covid-19. For example, as of October 2020, member countries of G-20 announced that the fiscal stimulus packages ranged from 7 percent of GDP in China to 13 percent of GDP in the US, and more than 21 percent of GDP in Japan (Szmigiera, 2020).

While in developed countries, the role of automatic fiscal stabilisers is very important, it is likely less prominent in developing countries (Debrun and Kapoor, 2010). To mitigate the negative impacts of the Covid-19 pandemic, emerging market countries rely on the fiscal stimulus packages only. The main cause is the revenue to GDP and expenditure to GDP ratios are far smaller than that in advanced countries. On the revenue side, the tax base is smaller so that the share of income-elastic taxes is smaller. On the expenditure side, there are few automatic stabilisers in developing countries (Cornia, 2006).

For academic circumstances, the above phenomena are interesting. The main question here is whether fiscal stimulus packages are really effective to stabilise macroeconomic conditions. Despite the lag length to affect, such discretionary fiscal policies potentially lead to procyclical. On the one hand, the discretionary fiscal policies which originally are subject to stabilisation can

destabilise (Gnip, 2011). Hence, there is considerable debate in the literature about the efficacy of discretionary fiscal policy in developing countries (see: Doraisami, 2013). On the other hand, the automatic stabilisers -- programs that automatically scale up in recessions and drawdown during booms to stabilise the economy -- play a critical role in fighting every recession (Leiserson, 2020).

For policymakers, understanding the size and the role of automatic stabilisers is crucial. While automatic stabilisers are a fairly established concept in the fiscal policy literature, there is still no consensus about their actual nature and their effectiveness (Veld, Larch, and Vandeweyer, 2012). This leaves no room for discretionary fiscal policy and highlights the importance of knowing whether automatic stabilisers alone can deliver sufficient stabilisation. Reconsidering issues arising from discretionary fiscal policies will also help the authority in emerging markets to avoid output fluctuation better by using a passive fiscal policy (Vera, 2016).

Indonesia is not an exception. Since the government officially announced Covid-19 for the first time on March 2, 2020, Indonesia launched the first two fiscal packages amounting to IDR 33.2 trillion (0.2 percent of GDP), the government announced an additional package of IDR 405 trillion (2.6 percent of GDP) on March 31, 2020. They were further expanded to IDR 677.2 trillion (4.2 percent of GDP) on June 4, 2020, as part of a national economic recovery program. The national economic recovery program has been continuously refined and currently stands at IDR 695.2 trillion (UNDDR, 2020).

At present, Indonesia only has automatic stabilisers in its taxation through progressive income tax. The country's corporate income tax, however, is no longer progressive from 2020 with a single rate of 22 percent. On the spending side, the country does not have automatic stabilisers yet, as typically the case in developing economies. The inadequate fiscal space, relatively high population, and low share of public spending as a share of GDP need more time to implement in Indonesia at least within the medium term (Trihartanto, 2019).

The local governments are still heavily reliant on central government fiscal transfer that covers around two-thirds of their budget. Their current aggregate own-source revenue merely stands at 2.4 percent of GDP. As such, this time seems to be not the perfect time yet for Indonesia to provide such benefits or the time being, Indonesia's fiscal stabilisers still rely on discretionary fiscal measures due to its still limited automatic stabilisers. Accordingly, countries with weak automatic stabilisers have enacted larger fiscal stimulus programs (Dolls, Fuest, and Peichl, 2012).

Regardless of the absence of automatic fiscal stabilisers, Indonesia also has fiscal rules discipline (most notably capping fiscal deficit to 3 percent of GDP and debt ratio to 60 percent of GDP adopted from Maastricht Pact since 2004). It is unallowed to rely heavily on fiscal expansion during the bad times, where unemployment benefits and other social transfers work as automatic stabilisers. However, such a fiscal discipline still effectively proves to make Indonesia's fiscal sound so far.

This paper enriches the literature on fiscal policy in developing countries with a focus on Indonesia. We measure the automatic fiscal stabiliser and relate it to the discretionary fiscal

policy. Then, we attempt to estimate their role and assess their feasibility in managing the economic impact of Covid-19. The lessons learnt from Indonesia would be useful for other emerging countries to achieve price stabilisation as well as to promote economic growth. The article is organised as follows. In the next section, we briefly present the literature and previous empirical researches both in developed countries and developing countries, including Indonesia. The third section describes the dataset and empirical techniques used. The results of the empirical tests are presented in the results and discussion section. In the end, we summarise arguments and key findings in the conclusion section.

2. Literature review

Basically, a country's fiscal policy has three major economic functions, namely allocation, distribution and stabilisation (Musgrave and Musgrave, 1989). The allocation function is carried out through the state expenditures side, while the distribution and stabilisation functions are mostly executed through taxes and expenditures. In principle, the fiscal policy will transfer resources from the public to the government and then redistribute them to the public with certain considerations (Arestis, 1985).

At the most basic technical level, the fiscal policy can be categorised into three groups, namely automatic fiscal stabilisation, systematic fiscal discretion, and non-systematic fiscal discretion (see: Surjaningsih, Utari, and Trisnanto, 2012; Kuncoro, 2017). While automatic fiscal stabilisation policies and systematic fiscal discretion are aimed at dampening business cycle fluctuations, the non-systematic fiscal discretion is related to changes in government revenues and/or expenditures due to apart from the changes in the economic cycle (Fatas and Mihov, 2003).

Empirical studies regarding the three types of fiscal policy, primarily automatic fiscal stabilisers, provide diverging results. On the revenue side, Mabbett and Schelkle (2007) assessed the stabilisation effect of the tax system. They found that various tax-benefit instruments vary across countries in the EU. However, Suescún (2007) finds that the degree of smoothing provided by the automatic revenue stabilisers -- described by various properties of the tax system -- is negligible in Latin America.

Looking at the type of tax revenue, Buettner and Fuest (2010) analysed the effectiveness of the corporate income tax as an automatic fiscal stabiliser. By employing a unique firm-level data set of German manufacturers, they found that the stabilisation effect varies over the business cycle and tends to increase during cyclical downturns. In contrast, Sen (2013), using Granger causality test, shows that in the case of Turkey, personal income tax is the most effective tax in stabilising business cycle fluctuations. The effectiveness of personal income tax as an automatic stabiliser is not because of the progressivity of tax, but due to the sensitivity of employment and average wages to GDP fluctuations (Krajewsky and Pilat, 2017).

Besides income tax, value-added tax (VAT) could be an instrument of automatic fiscal stabiliser. The VAT would be more progressive than the payroll tax it replaces because there is no 'taxable maximum' on a VAT that slashes the effective rate paid by high earners (Ritz, 2020).

A VAT is also neutral to the treatment of capital and labour, which means that employers will be based on economic benefits for their investment decisions, rather than solely on favourable tax treatment (Nunns and Rosenberg, 2016). Hence, the VAT affects indirectly the employed labour' income.

By comparing US to the EU, Dolls, Fuest, and Peichl (2012) found that, in US, tax-benefit systems absorb a greater proportion of income variation generated by income shock than the unemployment shock. The difference is largely explained by the coverage and generosity of unemployment benefits. Automatic stabilisers in the case of an unemployment shock are basically replacement rates for a transition from employment to non-work. Rather than work incentives, they reflect how much the tax-benefit system absorbs market income losses due to becoming unemployed or exiting the labour market altogether. As a result, the tax-benefit system reduced inequality of net incomes, and so helped offset the inequality-increasing impact of growing disparities in gross market incomes (Paulus and Tasseva, 2020).

On the expenditure side, government size -- measured by the GDP ratio of government spending -- plays the role of an automatic stabiliser in developing countries such as Latin America, subject to weak smoothing effect (Suescún, 2007). In terms of expenditure type, Darby and Melitz (2008) argue that age- and health-related social expenditures react to the cycle in a stabilising manner. In contrast, Granado, Gupta, and Hajdenberg (2013) concluded that social spending in developed countries is acyclical, implying the ineffectiveness of social spending as automatic fiscal stabilisers. In the US, the stabilisers affect welfare significantly through the provision of social insurance (McKay and Reis, 2016).

The macroeconomic literature on automatic fiscal stabilisation tends to focus on taxes and dismiss the relevance of government expenditure except for unemployment compensation. For instance, Salgado *et al.* (2014) analysed the distribution of replacement rates when simulating the unemployment shock in six EU countries due to the Great Recession. They distinguish between short- and long-term unemployment, and their findings confirmed that higher replacement rates in the short term could lead to serious challenges for minimum income schemes with the consequences of the crisis in the longer term.

Moreover, Poghosyan, Senhadji, and Cottarelli (2016) found that fiscal transfers smooth regional shocks in three large federation countries: the U.S., Canada, and Australia. They find that fiscal transfers offset 4-11 percent of idiosyncratic shocks (risk-sharing) and 13-24 percent of permanent shocks (redistribution). This fiscal insurance largely operates through automatic stabilisers embedded in a central budget, primarily through federal taxes and transfers to individuals, rather than transfers from the central government to state budgets.

The analysis of the role of automatic fiscal stabilisation in the various forms of social protection in reducing economic shocks has been discussed by Estep, Ajilore, and Madowitz (2019). Caldara *et al.* (2020) also concluded that various social protection programs in the US are effective in reducing the impact of an economic recession. However, the adoption of those various social protection programs for the case of developing countries such as Indonesia needs further adjustments due to differences in terms of economic, regulatory, and institutional ecosystems.

Hence, there is a need for further research on this issue, especially from Indonesian case. Whereas, Indonesian fiscal policy tends to be more a-cyclical or even procyclical. The a-cyclicity of fiscal policy leads to the presumption of the role of automatic fiscal stabilisers, while the procyclicality of fiscal policy further leads to the role of fiscal discretion, due to the fact that scholars found that there was no counter-cyclicity in fiscal policy (Baldacci, 2009; Akitoby *et al.*, 2004).

In terms of discretionary fiscal policy, Simorangkir and Adamanti (2010) evaluated the effectiveness of fiscal stimulus in accordance with the global financial crisis. Using a financial computable general equilibrium approach, they revealed the combination of fiscal expansion without monetary policy expansion and monetary expansion without fiscal expansion. They infer that the combination of fiscal and monetary expansion has a large multiplier effect, which increases aggregate demand.

On the other hand, Surjaningsih, Utari, and Trisnanto (2012) indicated the absence of discretionary fiscal policy made by the government of Indonesia. Their study also concluded that short-term adjustment suggests that an increase in government spending has a positive effect on output, while a tax increase has a negative effect. There is a greater influence of government spending on output compared to taxation policies in the short term. Therefore, government spending is more effective to stimulate economic growth, especially in times of recession, compared to taxation policies.

Furthermore, Hur, Mallick, and Park, (2014) found similar results. The fiscal stimulus programs have contributed substantially to developing Asia's countries (including Indonesia) faster and stronger than expected recovery from the global financial crisis. Basri and Raharja (2011) suggest improving the quality of spending in controlling fiscal deficits. To contribute greatly in economic stabilisation, fiscal space can be maintained by converting unproductive spending into productive spending. Abdurrohman and Resosudarmo (2017) investigated the practical behaviour of fiscal policy in Indonesia in response to economic cycles. They showed that fiscal policy in Indonesia tends to be procyclical.

Recently, Resosudarmo *et al.* (2020) discovered that fiscal stimulus packages during the global financial crisis had a positive impact on aggregate demand and on poverty prevention, principally via stimulating private consumption. Corporate income tax cuts have the largest economic impact in the long run, and cash transfers are the most useful policy tool for alleviating poverty. However, a fiscal stimulus package could have an uneven spatial distributional effect on output across regions, particularly in the short term.

According to prior literature, Indonesia tends to support discretionary fiscal policy instead of automatic fiscal stabilisers to overcome economic turbulence. In addition, most of the studies above are done in various circumstances. Therefore, there is no general conclusion, which requires further investigations. The procyclicality of fiscal policy in Indonesia opens room to implement automatic stabilisers alongside fiscal discretion. In particular, designing better automatic stabilisers is one of the most promising routes for better macroeconomic policy (Blanchard, Dell'Ariccia, and Mauro, 2010).

3. Analytical model and data

The purpose of this section is to develop an analytical framework within which this can be clearly stated as a set of formal propositions. The notion of government budget constraint proposes that the total government spending (Exp) should be sufficiently financed by the total domestic revenues (Rev). If Rev is inadequate to cover Exp , the available financing option is debt, resulting in interest payment (IRP) in the next period.

The overall fiscal balance (i.e. deficits or surpluses) is the difference between Rev and Exp :

$$OB = Rev - Exp \quad [1]$$

When IRP is excluded from the total government expenditure, we get the primary fiscal balance (PB):

$$PB = Rev - (Exp - IRP). \quad [2a]$$

Then,

$$OB = PB - IRP \quad [2b]$$

Looking solely at changes in the fiscal balance can thus be misleading: these movements may give an impression of expansionary (or contractionary) discretionary policy actions, even though the changes are driven by cyclical factors. This is why cyclical adjustment is applied, to filter the impact of cyclical movements on fiscal variables and assess the 'underlying' fiscal stance.

Following the OECD methodology (Giorno *et al.*, 1995), the primary fiscal balance may be decomposed into the cyclically adjusted primary balance ($CAPB$) and the cyclical primary balance (CPB):

$$PB = CAPB + CPB \quad [3]$$

The CPB is the part of the primary balance that automatically reacts to the cycle. Interest payments are often kept separate because of their movements, while 'automatic' in the sense of not generally reflecting discretionary fiscal policy actions. They may not be necessarily correlated with cyclical output changes.

From [2b] and [3], changes in the OB can be decomposed into: (i) the automatic response of fiscal variables to changes in output; (ii) the response of fiscal variables to changes in discretionary policy; and (iii) changes in interest payments, as follows:

$$\Delta OB = \Delta CAPB + \Delta CPB - \Delta IRP \quad [4]$$

where Δ is the difference between two consecutive years, t and $t+1$ (or the difference relative to a reference year).

Eventually, the automatic stabilisers (AS) are defined as the change in the cyclical primary balance:

$$AS = \Delta CPB = \Delta OB - \Delta CAPB + \Delta IRP \quad [5]$$

The change in the cyclically adjusted primary balance can be derived from cyclically adjusted revenue and expenditure. In particular, the cyclically adjusted component of revenue Rev^{CA} is defined as

$$Rev^{CA} = R \left(\frac{Y^p}{Y} \right)^{\varepsilon_R} \quad [6]$$

where Y^p is potential output (that is, the maximum output compatible, at any given time, with the absence of unexpected inflation), Y is actual output, and ε_R is the elasticity of revenue with respect to the output gap.

Similarly, the cyclically adjusted component of expenditure Exp^{CA} is defined as

$$Exp^{CA} = E \left(\frac{Y^p}{Y} \right)^{\varepsilon_E} \quad [7]$$

where ε_E is the elasticity of expenditure with respect to the output gap.

$$gap = \left(\frac{Y - Y^p}{Y^p} \right) \quad [8]$$

Subtracting [6] and [7], we obtain the cyclically adjusted primary balance

$$CAPB = Rev \left(\frac{Y^p}{Y} \right)^{\varepsilon_R} - Exp \left(\frac{Y^p}{Y} \right)^{\varepsilon_E} \quad [9]$$

The cyclically adjusted primary balance is often measured in relation to potential output – the “natural” scaling variable since cyclically adjusted balances measure what the fiscal balance would have been if the output had been at its potential level – as follows:

$$capb = \frac{Rev^{CA}}{Y^p} - \frac{Exp^{CA}}{Y^p} = \frac{Rev}{Y} \left(\frac{Y^p}{Y} \right)^{\varepsilon_R - 1} - \frac{Exp}{Y} \left(\frac{Y^p}{Y} \right)^{\varepsilon_E - 1} \quad [10a]$$

where gap is the output gap and small letters r and g denote ratios of revenue and expenditure to GDP while small letter for $capb$ denotes the ratio of cyclically adjusted primary balance to potential GDP

$$capb = r(1 + gap)^{-(\varepsilon_R - 1)} - e(1 + gap)^{-(\varepsilon_E - 1)} \quad [10b]$$

This expression captures the “structural” primary balance i.e. primary balance not affected by cyclical fluctuations. Changes in the *capb* are often used to estimate the size/cost of discretionary policy.

$$cpb = \frac{CPB}{Y} = \frac{PB}{Y} - \frac{CAPB}{Y^p} = pb - capb \quad [11a]$$

$$cpb = r(\varepsilon_R - 1)gap - e(\varepsilon_E - 1)gap \quad [11b]$$

where *pb* and *cpb* are the primary balance and the cyclical primary balance in percent of actual GDP. The contribution from automatic stabilisers to changes in the overall balance is then given by the change in [11] between two periods.

$$as = \frac{\Delta S}{Y} = \Delta cpb = cpb_t - cpb_{t-1} \quad [12]$$

To identify potential output, we adopt Hodrick-Prescott (HP) filtering method. This method is widely used among macroeconomists to obtain a smooth estimate of the long-term trend component of a series. The method was first used in a working paper (circulated in the early 1980's and published in 1997) by Hodrick and Prescott (1997) to analyse postwar US business cycles.

Technically, the HP filter is a two-sided linear filter that computes the smoothed series τ of y by minimising the variance of y around τ_t , subject to a penalty that constrains the second difference of τ . The HP filter then chooses s to minimise:

$$\sum_1^T (y_t - \tau_t)^2 + \lambda \sum_2^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2 \quad [13]$$

The penalty parameter λ controls the smoothness of the series τ . The larger the λ , the smoother the τ . As $\lambda = \infty$, τ approaches a linear trend. The default value of λ in Eviews is set to be 1,600 for quarterly data.

For this empirical study, we define $Rev \in \{IT, VAT, Others\}$ and $Exp \in \{CEX, REX, IRP\}$. *IT* is income tax, *VAT* is value added tax, and *Others* is other government revenues. *CEX* is central government expenditures, *REX* is government transfers to lower-layer governments, and *IRP* is interest payments, respectively.

The government revenue is divided into two grand categories, taxes and non-taxes received excluded grants. The term ‘government expenditure’ used in this study is central government general consumption or recurrent expenditure realisation (mostly allocated onto wage/salary and goods/services purchase) and capital expenditure. Inclusively, we also assess the spending of transfer to regions. Deficits are the difference between government spending and government revenues. The fiscal data are taken from the Ministry of Finance.

The selected key macroeconomic variable is GDP. The GDP is used as the main factor for the government to set the state budget projection for the next year. The GDP data is available on a

quarter-basis. Those variables are presented at the 2010 constant price. Price levels are derived from the GDP in current price divided by GDP in constant prices (2010=1). The deflator index is also used to convert all variables into real values. The sample periods chosen for this study extend from 2001(1) to 2019(4). The total observation is 76 sample points. The year 2001 is set as the starting observation related to the implementation of fiscal decentralisation. All of the data are taken from the Central Bank of Indonesia and the Central Board of Statistics. Most of the results are calculated in the econometric program Eviews 9. Price levels are derived from the GDP in current price divided by GDP in constant prices (2010=1). The deflator index is also used to convert all variables into real values.

4. Results and discussion

Table 1 provides descriptive statistics covering mean, median, and extreme (maximum and minimum) values for each variable of interest. The average shares of income tax and other revenue are not far from each other. Nevertheless, other revenue is more volatile compared to income tax as presented by the higher standard deviation as well as the range of two extreme values. The share of value-added tax to total revenue is relatively low but stable indicated by the lowest standard of deviation. The highest kurtosis and the negative sign of skewness suggest that value-added tax has a big potential to be the main automatic fiscal stabiliser tool.

Central government spending absorbs almost half of total expenditure. This is followed by transfer to regions which takes 37 percent. The rest of total expenditure is allocated to interest payment. Special attention should be paid more to the interest payment since this outlay tends to remarkably increase in recent years. While most of the central government expenditure is mandatory spending, the tight fiscal space (represented by an increase in primary balance deficits) is primarily due to the increase in interest payment.

Table 1. Descriptive Statistics.

	Revenue			Expenditure			OB Ratio
	IT	VAT	Others	CEX	REX	IRP	
Mean	0.3794	0.2418	0.3787	0.4959	0.3676	0.1366	-0.2695
Median	0.3856	0.2499	0.3582	0.4939	0.3716	0.1169	-0.2328
Maximum	0.5206	0.2999	0.6121	0.6824	0.5356	0.3600	0.5744
Minimum	0.1883	0.1142	0.2347	0.2533	0.1962	0.0609	-1.0479
Std. Dev.	0.0679	0.0350	0.0906	0.1048	0.0813	0.0665	0.0351
Skewness	-0.3207	-0.9323	0.5231	-0.2041	0.0753	1.6285	-0.3571
Kurtosis	2.6405	4.2651	2.4385	2.2779	2.4025	5.3280	2.6592

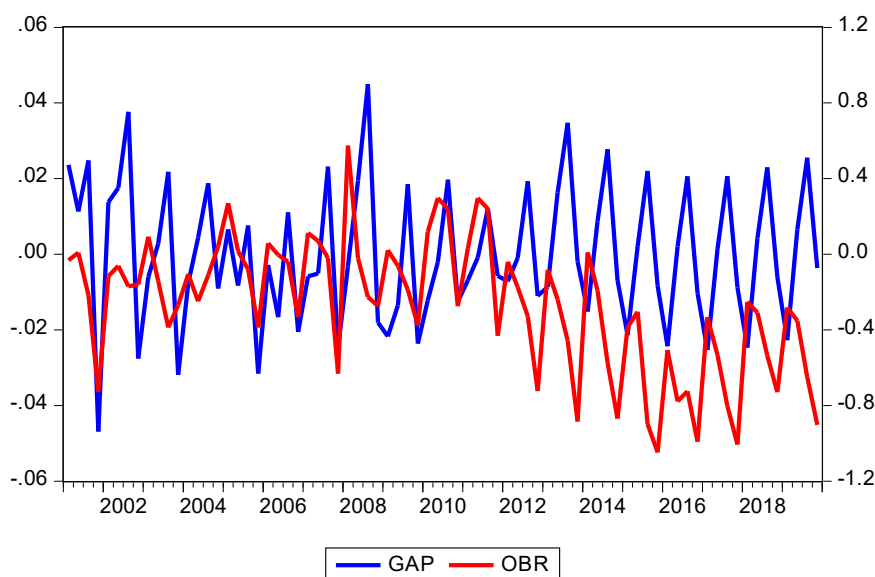


Figure 1. Output Gap and Overall Balance Ratio.

Figure 1 presents the dynamics of the output gap and overall balance deficit ratio. Output gap was low in the early 2000s, associated with the diminishing impacts of the 1997/1998 Asian monetary crisis. Output gap tended to be high, approximately 4 percent, in accordance with the 2009 global financial crisis. Figure 1 shows that fiscal policy in Indonesia during the sample observation periods is typically a-cyclical, as found by Akitoby *et al.* (2004) and Baldacci (2009). This figure will be confirmed by the statistical result.

The overall balance budget ranges from (deficit) -1.05 to (surplus) 0.6 percent of GDP. The lowest deficit ratio took place in 2012 when the commodity boom began. The highest overall deficit ratio occurred in the mid-2010s when the commodity boom ended. It seems that the government revenue is strongly dependent on some external factors. Therefore, implementing pro-growth, pro-job, and pro-poor fiscal measures is likely to require an increase in the size of the government revenue.

The above results implicitly offer some fundamental implications. The government can use the output gap of plus/minus 5 percent as the preliminary reference for carrying out the active fiscal policy. The active fiscal policy might be conducted through either fiscal discretion or automatic fiscal stabilisers. Each of these policies will be described further in the next section.

According to Sen (2013), Granger causality can be explored to test the ability of a particular revenue to be an automatic fiscal stabiliser. Table 2 reports the standard Granger causality test results for the three types of revenues. Since the Granger causality test is very sensitive to the selection of lag lengths, the lag lengths are determined by Akaike Information Criteria (AIC). Standard Granger causality test results show that there is a bi-directional causality in all three revenue categories. It means that all revenues prospectively could be an automatic fiscal stabiliser instrument in the future.

Table 2. Causality Test of Revenue and Expenditure to GDP.

Null Hypothesis:	Obs	F-Stat	Prob.
D(Log(Y)) does not Granger Cause D(Log(IT))	73	10.1578	0.0001
D(Log(IT)) does not Granger Cause D(Log(Y))		8.1725	0.0007
D(Log(Y)) does not Granger Cause D(Log(VAT))	73	24.7563	0.0000
D(Log(VAT)) does not Granger Cause D(Log(Y))		19.5834	0.0000
D(Log(Y)) does not Granger Cause D(Log(Others))	73	56.5161	0.0000
D(Log(Others)) does not Granger Cause D(Log(Y))		44.0929	0.0000
D(Log(Y)) does not Granger Cause D(Log(CEX))	73	59.6569	0.0000
D(Log(CEX)) does not Granger Cause D(Log(Y))		46.3288	0.0000
D(Log(Y)) does not Granger Cause D(Log(REX))	73	15.8953	0.0000
D(Log(REX)) does not Granger Cause D(Log(Y))		17.5873	0.0000
D(Log(Y)) does not Granger Cause D(Log(IRP))	73	16.2580	0.0000
D(Log(IRP)) does not Granger Cause D(Log(Y))		14.8332	0.0000

Similar results are found in the context of spending. There is a bi-directional Granger causality between GDP and all of the three types of expenditure. The larger spending exerted by the government, the higher the GDP. The higher GDP requires the government to spend more to facilitate economic activities. They imply further that inducing the government spending can act as an automatic fiscal stabiliser, particularly in the time of recessions since Granger Causality test runs from government spending to GDP, which are considered in this study.

The first estimation of equations (6) and (7) using the log-linear model, unfortunately, did not yield fiscal variables elasticity with respect to output gap as expected by the results of previous studies. The NLLS (nonlinear least squares) model approach also produces similar results. The elasticity of the fiscal variable with respect to output gap even gives a negative sign and insignificant coefficient. For this reason, equations (6) and (7) are modified by assuming the elasticity of the fiscal variable to actual output is equal to unity. Within this assumption, the elasticity of the fiscal variable is calculated with respect to potential output, instead of the output gap.

Table 3 provides elasticity of fiscal variables with respect to potential output. The parameter estimates indicate that value-added tax (0.98) is the most effective tax in stabilising business cycle fluctuations. The second most effective tax is the income tax (0.94). In line with the prior researches, we expect that income tax should be the most effective tax and has a positive effect on the business cycle fluctuations. It seems that in the case of Indonesia, income tax (consisting of corporate and personal) could act as an automatic fiscal stabiliser mostly due not to the progressive tax rates, but because of the sensitivity of employment to GDP fluctuations. This confirms Krajewsky and Pilat (2017).

Table 3. Potential Output Elasticity.

Revenue	Elasticity	Expenditure	Elasticity
IT	0.9393	CEX	0.9065
VAT	0.9809	REX	1.1907
Others	0.2769	IRP	0.1546
Total	0.6695	Total	0.8457

On the spending side, transfer to regions is the most effective expenditure (1.2) in stabilising the business cycle fluctuations. The second most effective spending is the central government expenditures (0.91). Those results make sense. Since 2001, fiscal responsibilities between central and local governments have been more clearly defined. The fiscal decentralisation and regional autonomy turned into an additional source of central government expenditure to fulfil the vertical and horizontal fiscal imbalances. These imply that various compensations and social protection programs can be well distributed either through central government spending or transfer to regions.

Figure 2 explains further the magnitude of automatic fiscal stabilisers and fiscal discretion policy which are derived from Table 3 and Figure 1. The automatic fiscal stabilisers appeared to be very high in 2005 in relation to the changes in budgetary regulation. After that, the size of automatic fiscal stabilisers is relatively stable, which rises and falls within the plus/minus 0.4 percent of the overall balance budget deficit. The same pattern is found in systematic fiscal discretion.

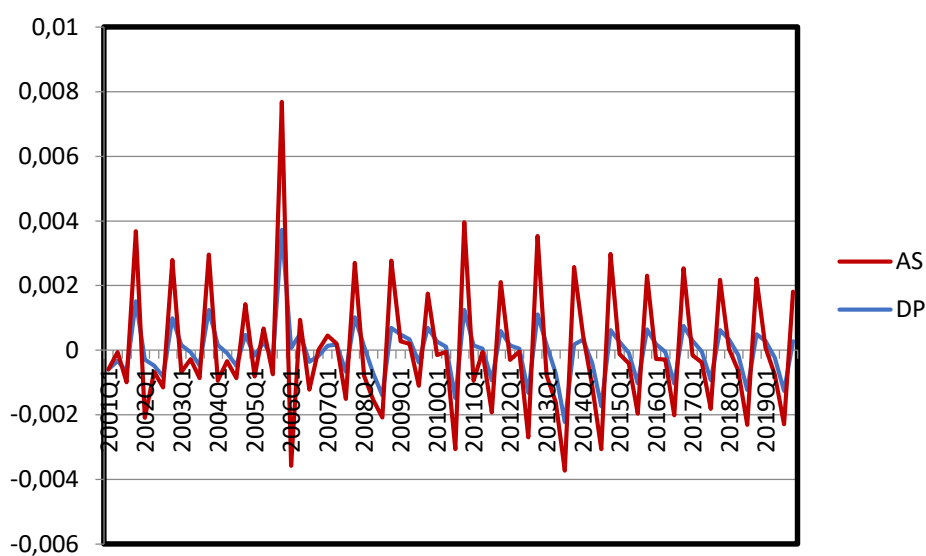


Figure 2. Automatic Fiscal Stabilisers (AS) and Discretionary Fiscal Policy (DP).

The magnitude of systematic fiscal discretion was notably very high in 2005 and during the 2009 global financial crisis. The release of the new Taxation Law in 2008 has triggered the size of systematic fiscal discretion largely. Overall, the size of automatic fiscal stabilisers is greater than that of systematic fiscal discretion. However, the government consistently uses both automatic fiscal stabilisers and systematic fiscal discretion to manage macroeconomic performance through the state budget deficit.

When we break it down into two sub-periods of observation, the conclusion does not change. Table 4 summarises the automatic fiscal stabilisers contribution of each revenue side and expenditure side derived from equation (12). The contribution of automatic fiscal stabilisers from the revenue side reached 0.21, with automatic stabilisers of income tax having the largest contribution (0.11). Meanwhile, the automatic fiscal stabilisers contribution from the spending side reached 0.31. The contribution of automatic fiscal stabilisers in terms of central government and transfer to regions expenditures are almost the same, for about 0.17.

In general, the contribution of automatic fiscal stabilisers is getting bigger. This conclusion is in contrast to Boone and Buti (2019), who obtained empirical evidence that automatic fiscal stabilisers in developed countries are economically weak. The increase in contribution indicates that automatic fiscal stabilisers have a big potential to be the main fiscal weapon for economic stability goals. This finding is in accordance with the IMF's suggestion (Baunsgaard and Symansky, 2009; Spilimbergo *et al.*, 2010). Based on those results, we conclude that automatic fiscal stabilisers are potentially implemented to fight the current economic fluctuations induced by Covid-19.

Table 4 Contribution of Automatic Fiscal Stabilisers.

Period	Revenue				Expenditure			
	Total	IT	VAT	Others	Total	CEX	REX	IRP
2001-09	0.1178	0.0560	0.0372	0.0217	0.1580	0.0939	0.0694	0.0039
2010-19	0.2154	0.1195	0.0826	0.0305	0.3118	0.1737	0.1657	0.0059
2001-19	0.1950	0.1063	0.0731	0.0287	0.2797	0.1571	0.1456	0.0054

Note. Processed from Table 1 and 3.

The following sections focus more on automatic fiscal stabilisers. The comparison of the effectiveness between automatic fiscal stabilisers and fiscal discretion policy is summarised in Table 5. The automatic fiscal stabilisers are negatively related to the primary balance budget deficit and the overall balance budget deficit ratios. Since both the primary balance and the overall balance are deficits (have minus signs), the correlation should be understood in the opposite direction. This is consistent with the theoretical prediction that automatic stabilisers will increase the deficit during the downturns, and, vice versa, they narrow the budget deficit during the upswings (Trihartanto, 2019). Meanwhile, automatic fiscal stabilisers have a negative correlation with the output gap. This means that the automatic stabilisers component can be properly operated if the potential output is greater than the actual output.

The discretionary fiscal component, as found in the automatic fiscal stabilisers, is positively correlated to the primary balance budget deficit and the overall balance budget deficit, and negatively to the output gaps. These support the above analysis that the government uses both automatic fiscal stabilisers and systematic fiscal discretion to manage macroeconomic performance. However, since the correlation of automatic fiscal stabilisers to GDP is greater than that of discretionary fiscal components, we find that automatic fiscal stabilisers are more effective to overcome recessions.

Furthermore, the primary balance budget deficit and the overall balance budget deficit are associated with output gaps in the same direction. Since they represent the fiscal stance, this study discovers that the Indonesian fiscal policy is characterised by procyclical or even a-cyclical. The procyclicality of fiscal policy tends to induce deficit bias which demands non-systematic discretionary fiscal policy instead of automatic fiscal stabilisers or systematic discretionary fiscal policy. Eventually, the relatively low stabilisation component of fiscal policy is claimed to be the main cause of fiscal stimulus policies to be large and expensive (Dolls, Fuest, and Peichl, 2012).

Table 5 Correlation Matrix, 2001-2019.

	AS	DP	PBR	OBR	GAP
AS	1.0000	0.7553	-0.4431	-0.5183	-0.6159
DP	0.7553	1.0000	-0.3032	-0.3356	-0.8305
PBR	-0.4431	-0.3032	1.0000	0.8637	0.2916
OBR	-0.5183	-0.3356	0.8637	1.0000	0.2821
GAP	-0.6159	-0.8305	0.2916	0.2821	1.0000

Note. AS = automatic fiscal stabilizer
 DP = Discretionary fiscal policy
 PBR = Primary balance to GDP ratio
 OBR = Overall balance to GDP ratio
 GAP = Output gap between actual to potential output

5. Conclusions

The use of large fiscal stimulus packages to dampen the impact of Covid-19 recently has raised concerns about the effectiveness of the discretionary fiscal policy. While the role of automatic fiscal stabilisers is very important in developed countries, it is likely less prominent in developing countries. Automatic fiscal stabilisers – which can be described as a built-in response of public finance by scaling up and drawing down automatically to economic fluctuations – play a critical role in fighting every recession.

This paper aims at analysing the feasibility of automatic fiscal stabilisers to mitigate economic fluctuations in the case of Indonesia. Using the IMF standard model for quarterly data over the period of 2001(1) to 2019(4), we find that the role of automatic fiscal stabilisers is getting greater

both in the revenues and spendings. Compared to systematic fiscal discretion, the automatic fiscal stabiliser is more effective to overcome business cycles. In other words, the automatic fiscal stabiliser is feasible as the main fiscal policy instrument for economic stability goals in the future, including the current economic fluctuations induced by Covid-19.

Eventually, this research suggests that Indonesia's government should immediately install automatic fiscal stabilisers in its long-term grand fiscal policy. However, given the existing circumstances, Indonesia should reform its economic, regulatory, and institutional ecosystems in adopting completely automatic fiscal stabilisers. Without initiating the use of automatic fiscal stabilisers permanently, Indonesia will always tend to rely on the non-systematic discretionary fiscal policy in the form of fiscal stimulus in anticipating any unexpected recessions.

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