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Does Democracy Affect Cyclical Fiscal Policy? Evidence From Developing Countries

by

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Abstract

Macroeconomics usually prescribes counter-cyclical fiscal policies to stabilise the economy: government spending should increase above trend in the economic downturns, and decrease below trend during booms. Yet, empirical research has documented pro-cyclical fiscal policy in several democratic developing countries. This article uses updated data to analyse 63 developing countries from 1980 to 2013 and robustly shows that pro-cyclical fiscal policy does exist in both democratic and non-democratic developing countries. The essence of this paper is controlling endogeneity issue by the instrumental variable method and investigating the interaction between democracy, its maturity and quality of institutions in affecting fiscal policy cyclical. We provide 3 main findings. Firstly, an improvement in the level of institutions quality plays an important role to restrain pro-cyclical fiscal policy and these effects are larger in democratic countries than non-democratic ones. Additionally, more mature and stable democratic countries tend to implement less pro-cyclical fiscal policy.

Keywords: Cyclical Fiscal Policy; Democracy; Corruption; Institutional Quality; Instrumental Variables Estimation.
JEL Classification: D72; D73; E32; E62.

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1 Introduction

A large body of existing research points to the tendency of many developing economies implement procyclical fiscal policies. That is, that governments reduce spending and increase taxation during an economic downturn, and increase spending and reduce taxation during an economic boom. The fiscal policy procyclicality is considered to be sub-optimal for the countries in both good and bad states. During the downturn, private consumption and investments are plunged due to less demand and they are more deteriorated if governments implement contraction policies. The same logic applies during booms, procyclical fiscal policy is harmful to the economy by overheating it. Cutting taxes and increasing government spending, together with the higher aggregate demand from the private sector, push the economy towards a too optimistic state. Although the implementation of the procyclical fiscal policy is sub-optimal one, many evidence point to the procyclical fiscal policy in developing countries.

The previous research attempt to explain why countries, especially, developing ones chose to implement procyclical fiscal policy. There are two main strands explaining this issue: firstly, procyclical fiscal policy is caused by an imperfection and credit constraints in the international credit market [see, for example, Gavin and Perotti, 1997; Kaminsky et al., 2005; Caballero and Krishnamurthy, 2004; Calderón et al., 2010; Aghion et al., 2014 and etc]. Second standpoint sees the political factors, e.g. the distortion of the political regime, the quality of political institution or the political polarisation as the root causes of the procyclical fiscal policy [see, e.g. Tornell and Lane, 1998; Talvi and Vegh, 2005; Manasse, 2006; Alesina et al., 2008; Calderón and Hebbel, 2008 and etc].

This chapter takes the standing point of the political factors as a root cause of the procyclical fiscal policy in developing countries. However, instead of using either the quality of political institutional or the political regime in explaining the cyclical pattern of fiscal policy, this chapter points out the interaction effects of the political regime and an institutional quality in affecting the cyclical behaviour of fiscal policy.

The main contributions of this chapter are two folds: firstly, we use instrumental variable approach (IV) to control the endogeneity problem since previous literature barely show the causal inference between the cyclical component of government spending and the output level. Secondly, this chapter considers more aspects of the political economy factors, e.g. political regime, quality of the institutions, the maturity of political regime, in affecting

cyclical behaviour of fiscal policy. The reason behind this is that developing countries usually faced a political regime breakdown or reversals during their transition towards democracy. For example, a revival of an authoritarian or semi-authoritarian system for some period of time in Bangladesh in 2007, Nigeria in 2000-2001 or regime breakdown in Thailand during 2006-2010 and 2013 onwards and etc.

Our findings suggest that both democratic and non-democratic developing countries implement procyclical fiscal policy, but the higher the level of institutional quality is, the less procyclical public spending will be. Better institutional quality, therefore, acts as a tool to prevent a severe procyclical fiscal policy. Moreover, the effects of an improving level of institutional quality on restraining procyclical fiscal policy are larger in democratic countries than non-democratic ones. Lastly, more mature and stable democratic countries tend to implement less procyclical fiscal policy.

The remaining of this chapter is organised as follows: Section 1.2 provides a brief theoretical background and previous empirical evidence of this literature. Section 1.3 introduces the data used in this chapter. Section 1.4 sets up the empirical strategy used for the analysis. The results produced by various econometric methods are discussed in Section 1.5. Section 1.6 performs a robustness check by allowing democracy to be instrumented by the former colony and the choices of setting an institution of settlers data. Section 1.7 concludes the main findings.

2 Cyclical Pattern of Fiscal Policy: Theory and Evidence

According to the Neoclassical and Keynesian views, fiscal policy is considered to be one of the efficient tools to stabilise the short-run economic fluctuations and promote the long-run economic growth. It works through the use of taxation and government spending.[1] To stabilise the output fluctuations, a decent fiscal policy should be able to prevent the overheating economy during booms and boosting economy during recessions; this is called "countercyclical fiscal policy". The countercyclical pattern of fiscal policy helps the economy to avoid recession due to its reciprocal processes. This means that during a recession government injects some liquidity into the economy since private consumptions and invest-

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[1]Note that fiscal policy, we mean in this chapter, is considered to be discretionary fiscal policies since most of our sample countries are developing countries, which have a lower proportion of income tax and social transfer in comparison to developed countries. The automatic stabilisation policy would not play a significant role to smooth the economy during the fluctuations.

ments are contracted. An increase in the productions due to higher demands from public sector creates more job for the workers, which helps to reduce the unemployment rate, and generates income for the households. The households, therefore, can increase their consumptions and the demand for goods. This process helps to pull the economy out of recession.

Instead of implementing countercyclical fiscal policy, many researchers document that developing countries usually follow procyclical fiscal policy. Governments raise their spendings and cut taxes during booms and decrease their spendings in recession.[2] The sub-optimal procyclical fiscal policy is harmful to long-term economic growth (Woo, 2009; McManus and Ozkan, 2012; Frankel et al., 2013).

In the empirical perspective, Gavin and Perotti (1997) were the first to study the fiscal policy cyclicality. They find that Latin American countries tend to implement procyclical fiscal policy, while developed countries mostly follow a countercyclical pattern. They suggest that the imperfection of the international credit markets is a root cause of procyclical fiscal policy in Latin America. The imperfection of the international credit markets impedes access to sources of funds during economic downturns. Thus, countries are not able to boost the economy during recessions and procyclical fiscal policy is the only choice for the government [See, for example, Caballero and Krishnamurthy, 2004; Kaminsky et al., 2005; Aghion et al., 2014and Suzuki, 2015.]. The paper by Caballero and Krishnamurthy (2004) points out that procyclical fiscal policy happens mostly in the developing countries due to the lack of financial depth or supply of funds from both the private and public sectors. As a consequence of that, there will be no enough funds injecting to boost the economy during the recession, while during the booms, governments crowd-out the investments due to slow fiscal adjustments. Not only in the countries level that imperfection in credit markets causes procyclical spendings. The paper by Aghion et al. (2014) studies the firm level and documents that firms in the sector which can access to the external credit tend to have countercyclical spending implementation. This affects their growth in the long-run through enhancing productivity and R&D projects. Suzuki (2015) uses the model which fiscal policy entirely depends on the default option and finds that procyclical fiscal policy exists due to the imperfection of credit markets. However, her model does not allow

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[2]Tax policies are not widely used as discretionary fiscal policy responding to short-run economic fluctuation since it has already embedded into automatic fiscal stabilisation. Moreover, changing tax policies is quite difficult in practice due to the lag of implementation. Therefore, our analysis here intends to use only government spending as a fiscal policy indicator.

the government to make political distortion or any irrational decisions. If this assumption is relaxed, we may find that the reason behind the procyclical fiscal policy can also be explained by political economy factors.

Political factors become a popular explanation to procyclical behaviour of fiscal policy and have been studied by many researchers. For example, the paper by Talvi and Vegh (2005) documents the implementation of procyclical fiscal policy in developing countries which mainly is explained by the political distortion. In their model, the implementation of a budget surplus, using full tax smoothing, is too costly for the developing countries because the tax base in moany developing countries are quite volatile. The optimal choice for the government is, therefore, implementing procyclical fiscal policy. However, for G7 countries, they document acyclical fiscal policy. Alesina et al. (2008) agree that countries which have credit constraints may lead to fiscal policy procyclicality, but having credit constraints show a sign of weak political institutions. Constrained budget during economic recessions equally signals corruptible tendencies to the market, thereby impairing the country's ability to obtain funding on the market. Even if governments are able to access sources of funds, their costs of borrowing will be sustainably high which hamper governments ability to generate economic stimuli when needed most. The seminal paper by Alesina et al. (2008) constructs the model to est empirically 83 countries from 1960 to 2003. They conclude that the democratic countries with higher corruption induce the implementation of fiscal policy procyclicality. This is because the voters may exert political pressure on their government and demand more spendings when they observe fiscal surplus since they know that the government engages in the political agency problem.

Other explanations of procyclical fiscal policy are voracity effects[3] and variety of social polarisations like income, education or political power inequality. Lane (2003) tests the OECD countries cyclical behaviour of fiscal policy and suggests that procyclical fiscal policy will be more pronounced in the countries where there is a separation of political power. Woo (2009) studies the social polarisation in income, educational distribution and cyclical fiscal policy. He finds that the more polarisation in income, the more volatile fiscal spendings are. Moreover, if the policymakers have less patient, fiscal policy tends to also be procyclical. The paper by Abbott and Jones (2011) studies cyclical of social protections' spendings of the OECD countries as a fiscal policy proxy. They suggest that cyclical behaviour of the

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[3]See, e.g. Tornell and Lane (1998), Lane and Tornell (1998) and Lane (2003) for more explanation.

social protections depends on the degree of political polarisation and the public borrowing constraint. They also find that procyclicality does not exist only in the total consumption of the central government. The sub-central government spendings and intergovernmental transfers are likely to be more procyclical than the central government spending due to political pressure within the distribution of political power (Abbott and Jones, 2013).

Apart from political issues, series of work by Calderón et al. (2004b), Calderón et al. (2004a), Calderón and Hebbel (2008), Calderón et al. (2010), Calderón et al. (2016) explain the procyclical pattern of fiscal policy mainly by the quality of institutions. Calderón et al. (2010) argue that both advanced and developing economies with stronger political institution tend to implement countercyclical macroeconomic policies rather than the procyclical ones. Similar to Ilzetzki and Végh (2008), Ilzetzki (2011), and Halland and Bleaney (2011), they find that a higher quality of political institution have a positive effect towards implementation of the countercyclical fiscal policy. More recent paper by Céspedes and Velasco (2014) finds that an improvement in the institutional quality helps to reduce procyclical fiscal policy, though they focus the study on the commodities rich developing countries.

After reviewing the previous literature, the political factors and the quality of political institution seem to be the main factors related to the fiscal policy procyclicality in developing countries. Many previous studies point out the importance of having a good quality of a political institution and democracy, few focus their studies on the interactions between the political factors like the political regime and the quality of political institution in affecting the fiscal policy cycle. This chapter, therefore, focuses the analysis on an interaction between the institutional quality and the political regime, especially democratic regime, in affecting the procyclical fiscal policy in developing countries.

3 Data

We use the unbalanced panel data of developing countries from 1980 to 2013 for our empirical study. We do not include countries which have changed their economic status from developing to developed income over the study period, e.g. South Korea and Chile. The small island countries and some developing countries which have a huge break in their data are also excluded from the analysis. In total, we have 63 developing countries as a sample and their economic status do not change during the period of study even though

the countries reach higher GDP per capita.[4] The summary statistic of key variables is displayed in Table 1. [5]

The main dependent variable for the analysis is **fiscal policy cycle** which is measured by Government Spending Gap. We use the difference between real final government consumption and its trend since we would like to capture the cyclical behaviour of the fiscal policy. The main independent variables are **business cycle** and **interaction effects terms between democracy and business cycle**. Output Gap is used as an indicator for the business cycle which captures the variation of the real GDP from its trend. Both real GDP per capita and real government final consumption per capita are obtained from the World Development Indicators (WDI). We transform them into logarithmic form before calculating their trend and their cyclical components, respectively.

Democracy, in this study, is defined by the minimalistic definition: the countries which hold fair and free elections are considered to be in the democratic regime. It measured by the Democracy Index from the POLITY IV project. The Democracy Index ranges from -10 to 10. -10 to -6 indicates "Autocracy", whereas a score between +6 and +10 indicates "Democracy". Countries score between -5 and +5 are measured as "Anocracy", i.e. neither democratic nor autocratic political systems or it is a loose definition of a regime which mixes both democratic and autocratic features. We also revalue the Democracy Index to be 0-6 for Autocracy, 7-15 for Anocracy and 16-20 for Democracy in order to simplify the interpretation. Therefore, the dummy variable for democracy is equal to 1 if the score is higher than or equal to 16, otherwise, it is classified into a non-democratic regime.

Other independent variables are **institutional quality** and **maturity of democracy**. The definition of institutional quality is widely discussed among social scientists. However, there is no clear cut what exactly the meaning of institutional quality. This chapter follows the definition of institutional quality from Kaufmann et al. (2009) and adopt the institutional quality indicators from the Worldwide Governance Indicators (WGI). The indices are provided in percentile rank from 0 to 100. Higher percentile rank indicates better quality of the institutions. The indices are provided for the years 1996, 1998, 2000 and 2002-2013. The maturity of democracy is constructed firstly by calculating a number of year in democracy, which we also show in Table 1. We use the democracy indices and

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[4]We present the map of sample countries and their GDP per capita in the year 1990, 2000 and 2013 in appendix A.

[5]See more details on the data description in the appendix A

the Legislative and Executive Indices of Electoral Competition dataset (LIEC and EIEC). LIEC and EIEC are obtained from the Political Institutions Database (Beck et al., 2001; Keefer, 2007). The LIEC and EIEC range from 1 to 7. The higher the score is, the more presences of competitive elections are. If the democracy indices score ≥ 16 and LIEC and EIEC score > 4, then we will count as 1 year of being in democracy and continue counting if these criteria are met. When the countries lose either democracy indices score ≥ 16 or LIEC and EIEC score > 4, then the number of year in democracy goes back to 0 and start counting at 1 once both criteria are met. The dummy variable for maturity of democracy is equal to 1 if number of year in democracy ranges between 1 and 10 consecutive years (for 10 years dummy), between 11 and 20 consecutive years (for 20 years dummy), more than 21 consecutive years (for 30 years dummy), respectively, otherwise, it equals zero.

Table 1
Summary Statistics of Key Variables

Variable	Mean	Std. Dev.	Min.	Max.	N
Output Gap	-0.001	0.026	-0.193	0.206	1900
Government Spending Gap	-0.004	0.08	-1.405	0.598	1900
Trade Openness	1.821	0.244	1.045	2.343	1899
Financial Openness	0.373	0.317	0	1	1725
Total Factor Productivity Growth	0.877	2.18	-25.97	18.938	1135
Air Temperature (Celsius)	20.129	6.047	4.776	29.583	1393
Air Precipitation (100 s mm / year)	11.374	7.943	0.066	48.348	1393
Democracy Index	11.812	6.592	0	20	1900
Legislative Indices of Electoral Competition (LIEC)	5.97	1.745	1	7	1872
Executive Indices of Electoral Competition (EIEC)	5.524	1.981	1	7	1870
Number of Year in Democracy	5.754	8.431	0	35	1900
Control of Corruption	1.495	0.301	0.165	1.947	976
Government Effectiveness	1.57	0.239	0.591	1.939	976
Political Stability and Absence of Violence and Terrorism	1.426	0.362	-0.326	1.981	976
Regulatory	1.555	0.288	0.458	1.907	976
Rule of Law	1.493	0.265	0.379	1.92	976
Voice and Accountability	1.478	0.32	0.284	1.94	976
Average 6 Institutional Quality	1.503	0.23	0.603	1.884	976
Dummy_Asian	0.362	0.481	0	1	1900
Dummy_Subsaharan	0.369	0.483	0	1	1900
Dummy_LatinAmerica	0.269	0.444	0	1	1900

Source: Author's own calculation.
Notes: Table presents summary of key statistic using for the empirical analysis. The Average 6 institutional quality is the average value of 6 institutional quality indices: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence and Terrorism, Regulatory Quality, Rule of Law and Voice and Accountability.

Some others control variables like Trade Openness and the degree of Financial Openness are transformed into logarithmic form. Trade openness is measured by the ratio of exports

plus imports of goods and services as a share of GDP. The data is taken from the World Development Indicators (WDI). Financial openness index is adopted from Chinn and Ito (2008).[6] These indices consider the extent of cross-border financial transactions and lie between 0 and 1. Score 0 means that financial markets are completely closed and 1 is the highest degree of financial openness.

For instrumental variables data, the **Total Factor Productivity growth** data is provided for 38 developing countries from 1980 to 2010 by World Productivity Database. The Total Factor Productivity is calculated by using the Dynamic Growth Accounting-Harrod neutral with the Cobb-Douglas production function with an assumption of a constant return to scale. The capital stock is based on the perpetual inventory method (PIM) with an annual depreciation rate of 6 per cent and the initial capital stock includes 10 years of investment. The labour input is based on the Labour Force (LF) and is derived from Penn World Table 6.1 (Isaksson, 2007). **Mean of yearly air temperature and air precipitation** dataset are taken from the Terrestrial Air Temperature and Precipitation: 1900-2006 Gridded Monthly Time Series, Version 1.01, constructed by Willmott et al. (2007) as suggested in Dell et al. (2012).[7]

Table 1 illustrates the summary statistics of the key variables of 63 countries from 1980 to 2013. In total, we have about 1900 observations. The average output gap and government spending gap are equal to -0.001 and -0.004, respectively. Financial openness index of our selected developing countries is about 0.373 on average, while the highest degree of financial openness is represented by a score of 1. Financial markets in developing countries are still considered not freely open. On average, the total factor productivity growth of our sample is 0.877, with large variation between 18.938 and -25.97. The democracy indices are varied across countries although the average score is 11.812, which indicates anocracy. For example, the democracy indices for the countries like Costa Rica and Mauritius score 20, while the countries like Gabon or Swaziland score 1. The last panel of Table 1 shows political institutions descriptive statistics. On average, political institutions variables of this region are 1.503 which could be interpreted as having credible political institutions.

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[6]The indices are constructed based on the binary dummy variables coded by the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). The binary dummy variables cover 4 main restrictions on the external accounts as follows: the presence of multiple exchange rates, the restrictions on current account transactions, the restrictions on capital account transactions and the requirement of the surrender of export proceeds.

[7]For more detail on Air Temperature and Air Precipitation data, see Dell et al. (2012).

However, the scores are quite different across countries.

4 Identification Strategy

The baseline model specification for unbalanced panel data with cross-sectional units $N = 1, 2, ..., 63$ and periods $T = 1, 2, ..., 33$ in order to explain a change in the cyclical component of government total spending is as follows:

$$G_{i,t} = \beta_1 OutputGap_{i,t} + \beta_2 G_{i,t-1} + \beta_3 Democracy_{i,t} + \beta_4 InstQual_{i,t} \tag{1}$$
$$+ \beta_5 X'_{i,t} + \mu_i + \lambda_t + u_{i,t}$$
$$i = 1, 2, ..., 63 \ t = 1, 2, ..., 33$$

where $G_{i,t}$ denotes the government spending gap of country i at time t (percentage deviation of government spending per capita from its trend) as a proxy of fiscal policy cycle. $OutputGap_{i,t}$ represents the output gap (percentage deviation of output per capita from its trend) as a proxy of the business cycle. We include $G_{i,t-1}$ (lagged government spending gap) into our model follow the usual literature of the dynamic model. Other independent variables are democracy dummy $Democracy_{i,t}$ and institutional quality $InstQual_{i,t}$. Matrix $X'_{i,t}$ contains other observable factors e.g. the imperfection of an international credit market, trade openness and other control variables.

Country-specific effect μ_i is added to control unobserved heterogeneity of country. λ_t is a time dummy. $u_{i,t}$ is an error term followed an i.i.d. process. For the Ordinary Least Squared with Fixed Effects (OLE-FE) estimations, we assume that $u_{i,t}$ is not correlated with other independent variables on the right-hand side equation. So that the estimators from OLS-FE are unbiased and consistency.

For this specification, we interest in the coefficient β_1 which capture the cyclical behaviour of fiscal policy. It measures in what percentage deviation of output from its trend affects the percentage deviation of public spending from its trend. In the next part, we relax the restriction on $u_{i,t}$ and allow it to correlate with other control variables.

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4.1 Endogeneity Issues

Although we might be able to eliminate time-invariant unobserved heterogeneity by introducing countries specific effect into our model specification, there still be a possibility that we omitted some unobserved variables. These omitted variables will stay in the error term and once we relax the assumption $Cov(u_{i,t}, X'_{i,t}) \neq 0$, our specification is suffered by endogeneity issues. This means that the error term is correlated to the independent variables on the right-hand side of the equation, in this case, it is the output gap. Another concerning issue is that causality might run simultaneously on both sides of the equation. That is β_1 capture not only the fiscal policy cycle but also the fiscal multiplier. These also raise the endogeneity problem which makes our estimators biased and inconsistency.

To overcome the endogeneity problem, one could set up the quasi-random experiment to obtain the causal effect of interested estimators. However, in reality, it is difficult to set a randomly assigned experiment for macroeconomics dataset. We adopt the Instrumental Variable(IV) approach to overcome the endogeneity issue.

The Dynamic Panel Data Model approach is used for *Internal* IV[8]. For an *External* IV[9], we employ the Total Factor Productivity Growth (TFP) as an instrumental variable for the endogenous output gap.

Some previous literature on fiscal policy cycle, e.g. Alesina et al. (2008) and Ilzetzki and Végh (2008), have already mentioned the possibility of having endogeneity problem. The paper by Alesina et al. (2008) use the level of the output gap of the region i except the country i itself for controlling the endogenous output gap of country i. This instrumental variable may neglect the spillover effect within the region, which in turn make an IV correlated to the error term of the structural model. Other related paper on using an IV for output level are Brückner et al. (2012), Brückner (2012) and Brückner and Gradstein (2014). They use the level of rainfall, oil price multiply by a term of trade as instrumental variables for endogenous output level. We cast doubt on the endogeneity of rainfall since it may induce the level of public spending or our fiscal indicator e.g. variation of rainfall level could cause flood or drought in a country which may be correlated directly to the government spendings. For oil price as an instrumental variable, it may fit only some specific group of countries, i.e. heavy oil exporting countries.

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[8]Using differencing of lagged dependent variables as a set of the instrumental variable for the endogenous independent variable in the level equation.

[9]Using exogenous instrumental variables from outside of the model.

This chapter explores the alternative instrumental variables to mitigate the endogeneity issue. Economists have long seen the TFP as one source of growth generators. According to macroeconomics theory, change in TFP is interwoven to the output level through many channels. Galí (2004) and Basu et al. (2006) show that technology shocks appear directly to change in the permanent level of output. In order to get an unbiased and consistent estimator by using IV approach, two conditions need to be satisfied: no direct effect of the instrument on the outcome variable (exclusion restriction) and the instrument must have a non-zero effect on the treatment variable (validity).

To test the validity of the TFP growth as an instrumental variable for the output gap, we then regress the endogenous independent variables, the output gap, on the TFP growth and the control variables to obtain the estimations of the first stage. The estimator of the first-stage shows positively significant. An increase in the TFP growth increases the potential output; the gap between actual and potential output normally gets bigger. We conclude that the TFP growth may be a **valid instrument**: $Cov(OutputGap, TFPgrowth) \neq 0$ for an endogenous output gap.

Another point is that we expect the TFP growth to be uncorrelated to the error term in the structural equation. That is $Cov(u, TFPgrowth) = 0$. although the **exclusion restriction** is quite difficult to test, we check the correlation between government spending gap and the TFP growth by regressing the government spending gap on the TFP growth. The estimation shows that these two variables are not directly correlated to each other. Moreover, the TFP growth usually affects the supply side of the economy (trend part of the output gap), while the government spending affects the demand side (the actual part of output gap). Therefore, we would neither expect the TFP growth to be correlated to some unobserved variables nor will affect directly to the government spending gap through this channel. The first stage of the IV approach is given by the following equations:

$$OutputGap_{i,t} = \pi_0 + \pi_1 TFPgrowth_{i,t} + \pi_4 X'_{i,t} \tag{2}$$
$$+ \mu_i + \lambda_t + \varepsilon_{i,t}$$
$$i = 1, 2, ..., 38 \quad t = 1, 2, ..., 33$$

where $OutputGap_{i,t}$ denotes the output gap of country i in year t. $TFPgrowth_{i,t}$ is TFP

growth of country i in year t which we computed from dynamic growth accounting method and $X_{i,t}$ is the set of other exogenous variables. For the second-stage, we regress the government spending gap on the fitted values from the first-stage and get the reduced form as follows:

$$G_{i,t} = \beta_1 Outp\hat{u}tGap_{i,t} + \beta_2 G_{i,t-1} + \beta_3 Democracy_{i,t} \tag{3}$$
$$+ \beta_4 InstQual_{i,t} + \beta_5 X'_{i,t} + u_{i,t}$$
$$u_{i,t} = \mu_i + \lambda_t + \varepsilon_{i,t}$$
$$i = 1, 2, ..., 38 \quad t = 1, 2, ..., 33$$

where $Outp\hat{u}tGap_{i,t}$ is the fitted value from the first-stage regression and β_1 is the parameter which measures the cyclical pattern of fiscal policy.

4.2   Lagged Dependent Variable Issues

We also perform the model specification with other econometric approaches, namely the Dynamic Panel Data Analysis using the General Methods of Moment (GMM) and the System General Methods of Moment (SYS-GMM). Since the model specification is dynamics, we include the lagged dependent variable as a regressor into the model. This may lead to a serial correlation problem by their structure. We follow the approaches from the Dynamic Panel Data and use the set of instrumented lagged-dependent variable from the difference-equation to instrument the endogenous regressor in the level equation (Arellano and Bover, 1995; Blundell and Bond, 1998).[10] The transformed Difference equation used in the GMM approached is written by the following equation:

$$\Delta G_{i,t} = \beta_1 \Delta OutputGap_{i,t} + \beta_2 \Delta G_{i,t-1} + \beta_3 \Delta Democracy_{i,t} \tag{4}$$
$$+ \beta_4 \Delta InstQual_{i,t} + \beta_5 \Delta X'_{i,t} + \Delta u_{i,t}$$
$$u_{i,t} = \mu_i + \lambda_t + v_{i,t}$$
$$i = 1, 2, ..., 63 \quad t = 1, 2, ..., 33$$

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[10]See more detail of Dynamic Panel Data model in appendix B.

where $X'_{i,t}$ is the set of control variables. The coefficient β_1 measures the fiscal policy cycle of the country i at time t. It is expected to be positive when the country implements procyclical fiscal policy and to be negative when the country implements the countercyclical fiscal policy.

5   Results and Discussion

Fig. 1. The Cyclical Patterns of Fiscal Policy by Countries Political Regimes
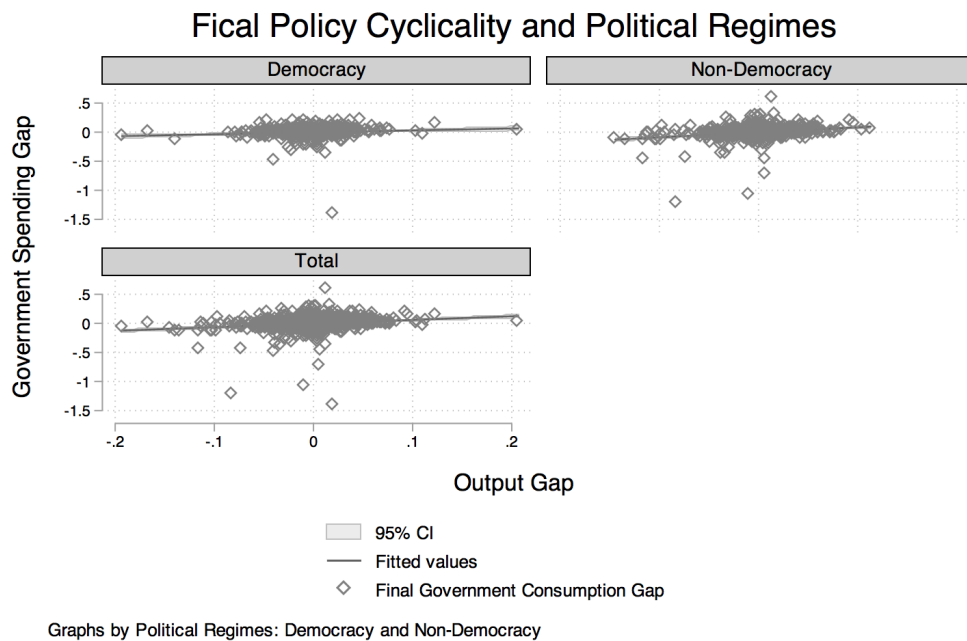
Source: Author's own calculation.
Notes: The figure illustrates the positive relationship between the government spending gap and the output gap of the developing countries by their political regimes. The government spending gap, on the y-axis, is the percentage difference of the actual real government final consumption per capita from its trend. On the x-axis, the output gap is calculated by the cyclical component of the output per capita. This figure also shows the fitted value with 95 per cent of the confidential interval.

This section presents the results from various methods and discusses the main and marginal effects of democracy and the quality of political institution on the fiscal policy cyclicality.

Figure 1 depicts the relationship between government spending gap and output gap (grey diamond) by countries political regimes: democracy and non-democracy, and their fitted values (grey line). The fitted values are the product from OLS-FE model specification and the estimates are significant at 1 per cent level. The y-axis represents the government spending gap and the x-axis shows the output gap. Each diamond represents the output gap and government spending gap of our sample countries from 1980 to 2013.

Positive slopes of the fitted values in Figure 1 imply that the percentage deviation of output from its trend induces public spending to deviate from its trend in the same direction. This effect has been observed in both non-democratic and democratic developing countries, top-left and top-right panels, respectively. This implies that public spending in both democratic and non-democratic developing countries are procyclical. The bottom-left panel illustrates the positive relationship between the percentage change of output from its trend and public spending gap for overall samples. This figure shows that the procyclical public spending is implemented by the sample countries no matter what their political regimes are. To quantitatively test the relationship between the public spending cyclicality and the institutional quality in the democratic environment, we perform various specifications and provide the results and discussions in the following section.

5.1 Procyclical Fiscal Policy in Developing Countries

Baseline Model

We regress the government spending gap on the output gap and control variables of developing countries over 1980 to 2013 using the specifications of the model from the previous section. The analysis is performed in various approaches, for example, the ordinary least squared (OLS), Fixed Effect (FE), Instrumental Variable Approach with 2 Stage Least Squared (IV-2SLS), Dynamic Panel Data Analysis (GMM and SYS-GMM).

Table 2 presents the fiscal policy procyclicality in the developing countries sample. The coefficients of the output gap show positively significantly different from zero in all approaches. The columns 3 and 4 show the analysis using the IV approach, which allows a reduction in the standard error, and an increase in the positive effects of the output deviation on the government spending gap. This mean that for each one percentage change in the deviation of the output from its trend, the government spending tends to deviate from its trend in the same direction. This results robustly indicate the procyclical fiscal policy

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in developing countries.

Table 2

The Fiscal Policy Cyclicality in Developing Countries (Baseline Model)

	(1) (OLS)	(2) (FE)	(3) (IV-FE)	(4) (IV-2SLS)	(5) (LD-GMM)	(6) (LD-SYSGMM)	(7) (DY-GMM)	(8) (DY-SYSGMM)
Output Gap	0.841***	0.827***	14.89*	11.40*	1.306***	1.900***	1.034***	0.503**
	(5.73)	(5.47)	(2.00)	(2.48)	(7.13)	(9.94)	(19.32)	(2.89)
L.Gov Gap	0.244***	0.228***	0.705*	0.616***	0.0866*	0.253***	0.0628***	0.0389
	(6.43)	(5.77)	(2.56)	(3.38)	(2.47)	(8.65)	(10.78)	(1.35)
Trade Openness	-0.0146	-0.0351	0.515	0.0238	-0.122*	0.0929*	-0.156***	-0.167**
	(-1.06)	(-0.79)	(1.31)	(0.47)	(-2.33)	(1.99)	(-9.25)	(-2.67)
Financial Openness	0.00324	-0.0156	-0.106	0.0132	0.0108	-0.0455	0.00928	0.0142
	(0.36)	(-0.72)	(-0.89)	(0.45)	(0.37)	(-1.52)	(0.96)	(0.47)
Control of Corruption	0.0226*	0.0421*	-0.0845	0.00141	0.150***	0.107***	0.157***	0.0810***
	(2.37)	(2.02)	(-0.70)	(0.04)	(5.70)	(4.41)	(13.22)	(7.81)
Dummy_Democracy	-0.00845	-0.0482**	-0.130*	-0.00664	-0.00664	-0.0371*	0.00535	0.0141
	(-1.38)	(-3.27)	(-2.01)	(-0.33)	(-0.33)	(-1.97)	(0.77)	(1.23)
First-stage								
TFP Growth			0.0006*	0.0006*				
			(0.0003)	(0.0002)				
N	883	883	456	456	883	883	652	652
FE	No	Yes	Yes	No	No	No	No	No
R-squared	0.11	0.11	0.09	-	-	-	-	-

Source: Author's own calculation.
Notes: Table estimates the fiscal policy cyclicality of developing countries using various econometric methods: OLS(Ordinary Least Squared), FE(Ordinary Least Squared with Fixed Effects), IV-FE(Instrumental Variable with Fixed Effect), IV-2SLS(Instrumental Variable with 2 Stages Least Squared), LD-GMM (Linear Dynamic Panel Data Estimations), LD-SYSGMM(System Linear Dynamic Panel Data Estimations), DY-GMM(Dynamic Generalised Method of Moments or Difference Generalised Method of Moments) and DY-SYSGMM(Dynamic System Generalised Method of Moments or System Difference Generalised Method of Moments). The Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In the columns 5 and 6, we perform the analysis using the GMM and System GMM approaches, respectively. They also show the procyclical fiscal policy although the standard errors from both models are increased. Columns 7 and 8, we perform the analysis using the Dynamic GMM (or Difference-GMM in Arellano and Bond (1991)) and Dynamic System GMM (or Difference System GMM) which give us the consistent results to other approaches. The standard error in Dynamic System GMM is lower than the normal OLS model with a lagged of the dependent variable. The estimators of the Dynamic System GMM approach show us the consistent and unbiased estimators than the OLS one in this case.

Turning to look at the political variables, an increase in the level of control of corruption induces higher government spending. That is there is costs of implementation and improving the institutional quality which raise higher public spending. The coefficients for the control of corruption are positive and significantly different from zero in all approaches except for the IV. The coefficients for the democracy dummy show significantly negative towards the

fiscal policy cycle in the FE, IV-FE and System GMM approaches. This implies that the developing countries with democracy tend to implement less procyclical fiscal policy than the non-democratic ones.

In summary, Table 2 presents the incidences of fiscal policy procyclical in developing countries. A political regime which coincides with a lower procyclical fiscal policy is a democratic regime. The democratic regime creates a supportive environment for the government to implement countercyclical fiscal policy. Another point is that an improvement in the institutional quality, e.g. more restrictions or monitoring governments' corrupted behaviour, leads to a higher public spending. As a robustness checks, we also replicate the baseline model with an average value of 6 institutional quality instead of using only the control of corruption as a proxy for institutional quality, the results are in line with the results presented on the Table2.

5.2 An Interaction between Democracy and Institutional Quality in Affecting Fiscal Policy Cyclicality

In this part, we introduce the interaction effects terms to our analysis. This helps to expand the understanding of the relationship among political variables in affecting government spending behaviours. Table 3, 4 and 5 present the results of our specifications with the interaction effects terms between the output gap, the political regime (democracy) and the proxy of the institutional quality (the control of corruption and the average 6 indices of the institutional quality) in various approaches, i.e. OLS, FE, IV-2SLS, GMM and Dynamic GMM.

The main results from Table 3 simply suggest that the developing countries show a sign of implementing the procyclical fiscal policy. However, as the level of control of corruption is higher, the countries implement less procyclical fiscal policy. The effects of an improving institutional quality are also larger in the democratic nations than the non-democratic ones.

Firstly, the coefficients for the output gap in all models both OLS-FE and IV-2SLS approaches are positive and significantly different from zero at either 0.1 or 1 per cent level. This implies that each percentage change of the actual output deviating from its trend induces the government spending to deviate from its trend more than 1 per cent, except for the columns 3 and 7 which there are no output gap in the interaction effects terms. Columns

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1 and 5 show that the estimates of interaction effects terms (*output gap ∗ democracy*) are significantly negative at 0.1 per cent level which implies that democracy helps to restrain an implementation of the procyclical fiscal policy in the developing countries.

Secondly, we further analyse the fiscal policy cyclicality of the democratic and the non-democratic countries by using the marginal effects approach, partial derivative of the model with respect to the interested independent variables, in this case, we mean the output gap. The results suggest that the democratic countries with a stronger institutional quality tend to implement less procyclical fiscal policy. Moreover, the effects of an improvement in the control of corruption or institutional quality in containing the procyclical fiscal policy are more pronounced in the democratic countries than thenon-democratic ones.

In the column 1, it shows that an increase in one percentage point of the output gap in the democratic nations leads to a higher government spending gap about 0.15 percentage points ($1.54 − 1.39 = 0.15$), while in the non-democratic countries, the government spending gap tends to increase about 1.54 points as the output deviates 1 percentage from its trend. The marginal effects of fiscal policy cycle in column 5 present that the non-democratic countries tend to implement more procyclical fiscal policy than the democratic countries. For the democratic countries, the marginal effects show that as the output deviates from its trend 1 per cent, the government spending will deviate from its trend $4.42 − 6.02 = −0.6$ per cent, which implies the countercyclical fiscal policy, while the non-democratic countries show the procyclical fiscal policy (4.42) instead.

Columns 2 and 6 add the interaction effects terms (*output gap ∗ control of corruption*) into the model. The estimates confirm that developing countries implement procyclical fiscal policy as expected. Additionally, as the quality of the control of corruption becomes higher, the procyclical fiscal policy is then less pronounced. The marginal effects are analysed by using the coefficients and the value of the control of corruption from the descriptive statistics in the Table 1.

As expected, we document that the magnitudes of the quality of institution can contain the fiscal policy procyclicality. For example, using the estimated coefficients of the interaction effects terms from the column 2 in Table 3 and the value of the control of corruption from Table 1. We show that if the control of corruption, as a proxy for institutional quality, is high enough, the country would implement the countercyclical fiscal policy. The effects of the improvements of institutional quality are more pronounced especially in the democratic

environment $4.5 - 0.05 - (2.67 * 1.947) = -0.74$.[11] These results show that with the better institutional quality, the government spending tend to be less procyclical.

Coefficients of the output gap from columns 3 and 7 also show the significant positive signs which present the fiscal policy procyclicality, although, some of them are not significant. This confirms the main results that developing countries implement the procyclical fiscal policy. Moreover, as the quality of institution increases, the procyclical fiscal policy is less implemented as we can see from the negative sign of the interaction effects terms.

Table 3
An Interaction between Political Regimes and Corruption in Affecting Fiscal Policy Cyclicality (the OLS-FE and the IV-2SLS)

	OLS-FE				IV-2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output Gap	1.54***	4.50***	0.82***	1.45***	4.42**	8.76***	0.35	3.65**
	(7.53)	(8.13)	(5.45)	(7.17)	(3.25)	(6.96)	(0.72)	(2.82)
L.Gov Gap	0.236***	0.242***	0.228***	0.234***	0.393***	0.360***	0.257***	0.369***
	(6.06)	(6.31)	(5.77)	(5.99)	(5.40)	(6.28)	(4.26)	(5.18)
Trade Openness	-0.0289	-0.0257	-0.0338	-0.0316	-0.0171	-0.0207	-0.0318	-0.0206
	(-0.66)	(-0.60)	(-0.76)	(-0.72)	(-0.70)	(-0.92)	(-1.33)	(-0.86)
Financial Openness	-0.0173	-0.0123	-0.0156	-0.0169	0.00312	0.00836	0.00517	0.00391
	(-0.81)	(-0.58)	(-0.71)	(-0.78)	(0.20)	(0.57)	(0.33)	(0.25)
Dummy_Democracy	-0.05**	-0.05***	-0.03	-0.05**	-0.007	-0.01	0.03	-0.007
	(-3.22)	(-3.61)	(-0.68)	(-3.23)	(-0.66)	(-1.35)	(0.55)	(-0.71)
Control of Corruption	0.04	0.02	0.05	0.04	0.02	0.008	0.05*	0.02
	(1.92)	(0.98)	(1.64)	(1.80)	(1.38)	(0.48)	(2.02)	(1.32)
Output Gap*Dummy_Democracy	-1.39***				-6.02**			
	(-5.10)				(-3.05)			
Output Gap*Control of Corruption		-2.67***				-5.82***		
		(-6.89)				(-6.50)		
Control of Corruption*Dummy_Democracy			-0.009				-0.03	
			(-0.27)				(-0.77)	
Output Gap*Control of Corruption*Dummy_Democracy				-0.79***				-3.02*
				(-4.57)				(-2.56)
First-stage								
TFP Growth					0.0007*	0.003***	0.0004	0.0007*
					(0.0003)	(0.0007)	(0.0003)	(0.0003)
TFP Growth*Dummy_Democracy					-0.0004			
					(0.0007)			
TFP Growth*Control of Corruption						-0.002***		
						(.0005)		
TFP Growth*Control of Corruption*Dummy_Democracy								-0.026
								(.034)
N. Observations	883	883	883	883	456	456	456	456
R-squared	0.13	0.16	0.11	0.13	0.08	0.19	0.07	0.1

Source: Author's own calculation.
Notes: Table estimates an interaction between political regimes and the control of corruption, as a proxy for the institutional quality, in affecting the fiscal policy cycle using the OLS-FE and the IV-2SLS approaches. The Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

[11] We use the partial derivative and the values of the control of corruption, which ranges between 0.165 to 1.947, from the descriptive statistics in Table 1 to check the marginal effects on the fiscal policy cycle. In this case, the marginal effects of a stronger institutional quality in non-democratic countries equal to $4.5 - (2.67 * control\ of\ corruption) = 4.5 - (2.67 * 1.947) = -0.69$. If the quality of controlling corruption is lower (assumed to be minimum value 0.165 from the Table 1), the marginal effects will then be $4.5 - (2.67 * control\ of\ corruption) = 4.5 - (2.67 * 0.165) = 4.05$ which implies procyclical fiscal policy.

Next, we use the interaction effects terms ($output\,gap * control\,of\,corruption * democracy$) for the analysis of the columns 4 and 8. The estimates document that although the democratic governments have a low level of the institutional quality (it is assumed to be 0.165 from the descriptive statistic in the Table 1), the fiscal policy still tends to be less procyclical than the non-democratic countries about 10 to 13.6 per cent. For example, from column 8, the marginal effects of democratic countries are calculated by $3.65 - (3.02 * 1 * control\,of\,corruption)$. Using the minimum value of institutional quality value, we get $3.65 - (3.02 * 1 * 0.165) = 3.15$, while the marginal effect for the non-democratic one will be 3.65. This implies that if both democratic and non-democratic countries have fairly weak institutional quality, the democratic countries tend to implement less procyclical fiscal policy than the non-democratic one about 13.6 per cent.

In summary, we can conclude the main results from the analysis as follows: firstly, the fiscal policy in developing countries are procyclical. However, a democratic environment and a stronger institutional quality are keys to ease the procyclical fiscal policy. Secondly, we also find that the magnitudes of an improvement in the institutional quality in affecting the fiscal policy cycle are more pronounced in the democratic environments than the non-democratic ones.

In order to check the robustness, we replicate the analysis as in Table 3 using other econometric methods: the GMM and the Dynamic GMM. The results are presented in the Table 4 and the Table 5. The main results are quite similar to the previous exercises. That is the procyclical fiscal policy robustly exists in the developing countries. Additionally, an improvement in the institutional quality leads to less procyclical fiscal policy implementation, and the effects are more effective in the democratic nations than the non-democratic ones.

Table 4 also shows that the democratic environment encourages the countries to implement less procyclical fiscal policy, but the countries also have to bear the costs of setting those regime up. One big different of using the GMM estimators and the OLS-FE or IV-2SLS is that the control of corruption's coefficients show the significantly positive sign in all models using the GMM approach. This only happens in some models using the OLS-FE or IV-2SLS approaches. The results highlight the fact that an improvement in the institutional quality inevitably increases the public spending in both democratic and non-democratic developing countries. However, once the institutions are strong enough to battle the rent-seeking behaviour or corrupted government, the fiscal policy becomes less procyclical. For

another robustness check, we also test this specification in various econometric approaches and also other instrumental variables which can be access through the Appendix C.[12]

Table 4

An Interaction between Political Regimes and Corruption in Affecting Fiscal Policy Cyclicality (the GMM and the System GMM)

	GMM				SYS-GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output Gap	1.88***	5.98***	1.28***	1.83***	2.65***	7.55***	1.90***	2.56***
	(8.52)	(10.64)	(6.98)	(8.39)	(11.97)	(14.13)	(9.95)	(11.71)
L.Gov Gap	0.099**	0.12***	0.075*	0.096**	0.26***	0.29***	0.25***	0.26***
	(2.90)	(3.57)	(2.14)	(2.80)	(9.44)	(10.35)	(8.58)	(9.31)
Trade Openness	-0.113*	-0.0928	-0.120*	-0.117*	0.102*	0.0861	0.0936*	0.100*
	(-2.23)	(-1.84)	(-2.30)	(-2.29)	(2.29)	(1.95)	(2.01)	(2.23)
Financial Openness	0.0199	0.0160	0.00579	0.0180	-0.0271	-0.0103	-0.0479	-0.0287
	(0.70)	(0.57)	(0.20)	(0.63)	(-0.94)	(-0.36)	(-1.60)	(-1.00)
Dummy_Democracy	-0.005	-0.005	0.25***	-0.005	-0.03	-0.027	0.02	-0.03
	(-0.25)	(-0.28)	(4.15)	(-0.27)	(-1.85)	(-1.51)	(0.30)	(-1.79)
Control of Corruption	0.16***	0.1***	0.23***	0.15***	0.12***	0.06**	0.12***	0.12***
	(6.21)	(3.86)	(7.23)	(6.05)	(5.18)	(2.81)	(4.23)	(5.04)
Output Gap*Dummy_Democracy	-1.59***				-2.26***			
	(-5.78)				(-7.96)			
Output Gap*Control of Corruption		-3.70***				-4.69***		
		(-9.28)				(-12.05)		
Control of Corruption*Dummy_Democracy			-0.18***				-0.04	
			(-4.52)				(-1.00)	
Output Gap*Control of Corruption*Dummy_Democracy				-0.96***				-1.36***
				(-5.50)				(-7.50)
N. Observations	883	883	883	883	883	883	883	883

Source: Author's own calculation.
Notes: Table estimates an interaction between the political regimes and the control of corruption, as a proxy for the institutional quality, in affecting the fiscal policy cycle using the GMM and the SYS-GMM approaches. The Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5 replicates the previous model from Table 3 with the interaction effects terms and Table 4 using the Dynamic GMM and System Dynamic GMM approaches. These methods allow a set of lagged dependent variable to become regressor under the condition of no serial-correlation across the error terms. The results document similar aspects to the other approaches. It confirms that the developing countries both democratic and non-democratic ones implement the procyclical fiscal policy. Moreover, an improvement in the institutional quality helps democratic countries to implement less procyclical fiscal policy.

Table 6 estimates an interaction between the political regimes and the institutional quality in affecting the fiscal policy cycle using the OLS-FE and IV-2SLS approaches but we use the average of 6 indices of the institutional quality as a proxy for institutional quality instead

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[12]We also try other instrumental variables, e.g. Air Temperature and Air Precipitation as instrumental variables for the output gap, the results are consistent in term of sign although some estimates are not significant. The analysis is presented in the appendix C.

of using only the control of corruption. The results suggest quite similar propositions as the previous exercises. That is that the procyclical fiscal policy is broadly implemented in the developing countries both democratic and non-democratic ones. However, the democratisation and an improving institutional quality help to reduce the procyclical fiscal policy. The effects of the improvements in the institutional quality are also more pronounced in the democratic nations than the non-democratic ones.

Table 5

An Interaction between Political Regimes and Corruption in Affecting Fiscal Policy Cyclicality (the Dynamic GMM and the System Dynamic GMM)

	DY_GMM				DY_SYS-GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output Gap	1.72***	5.58***	0.90***	1.69***	1.40***	3.74***	0.58**	1.12***
	(17.06)	(17.45)	(11.59)	(24.25)	(5.48)	(6.78)	(3.19)	(6.41)
L.Gov Gap	0.0774***	0.0992***	0.0477***	0.0727***	0.0953***	0.0655	0.0414	0.00948
	(18.56)	(28.42)	(9.22)	(14.39)	(9.10)	(1.57)	(1.08)	(0.34)
Trade Openness	-0.134***	-0.124***	-0.147***	-0.131***	-0.165*	-0.233**	-0.241**	-0.128
	(-9.16)	(-6.87)	(-8.27)	(-8.67)	(-2.04)	(-2.81)	(-2.99)	(-1.86)
Financial Openness	0.0127	0.0131	0.00943	0.0102	-0.0257	-0.00806	0.00432	0.00839
	(1.55)	(1.20)	(1.34)	(1.00)	(-1.00)	(-0.26)	(0.55)	(0.80)
Dummy_Democracy	0.002	0.0009	0.25***	0.004	0.009*	-0.009	0.08	0.01
	(0.21)	(0.09)	(9.43)	(0.59)	(2.36)	(-0.61)	(1.03)	(0.81)
Control of Corruption	0.17***	0.11***	0.24***	0.16***	0.07***	0.051*	0.12***	0.07***
	(16.49)	(13.35)	(23.13)	(24.39)	(6.61)	(2.20)	(4.59)	(5.16)
Output Gap*Dummy_Democracy	-1.42***				-0.83**			
	(-10.59)				(-2.61)			
Output Gap*Control of Corruption		-3.37***				-2.24***		
		(-14.83)				(-5.89)		
Control of Corruption*Dummy_Democracy			-0.17***				-0.06	
			(-10.31)				(-1.42)	
Output Gap*Control of Corruption*Dummy_Democracy				-0.84***				-0.4**
				(-15.36)				(-2.69)
N. Observations	652	652	652	652	652	652	652	652

Source: Author's own calculation.
Notes: Table estimates an interaction between the political regimes and the control of corruption, as a proxy for the institutional quality, in affecting the fiscal policy cycle using the Dynamic GMM and the Dynamic SYS-GMM approaches. The Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In summary, by using various econometric methods, we find that the procyclical fiscal policy robustly exists in the developing countries. To reduce the fiscal policy procyclicality, the countries need to improve their institutional quality, e.g., the higher standard of control of corruption, improvements in the regulatory, the effectiveness of government policy and etc. Moreover, the political regime, especially democratic regime, also acts as a complement to the improvements in the institutional quality.

Table 6

An Interaction between Political Regimes and Average Institutional Quality in Affecting Fiscal Policy Cyclicality

	OLS-FE				IV-2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output Gap	1.56***	6.43***	0.84***	1.50***	4.64***	18.13***	0.44	4.14**
	(7.64)	(7.76)	(5.61)	(7.39)	(3.42)	(6.54)	(0.91)	(3.11)
L.Gov Gap	0.237***	0.256***	0.226***	0.235***	0.396***	0.447***	0.268***	0.381***
	(6.06)	(6.62)	(5.73)	(6.02)	(5.43)	(7.00)	(4.45)	(5.26)
Trade Openness	-0.0288	-0.0263	-0.0414	-0.0304	-0.0225	-0.0270	-0.0389	-0.0258
	(-0.66)	(-0.61)	(-0.94)	(-0.69)	(-0.88)	(-1.12)	(-1.57)	(-1.03)
Financial Openness	-0.0179	-0.0137	-0.0149	-0.0176	0.00215	0.00725	0.00904	0.00297
	(-0.83)	(-0.64)	(-0.68)	(-0.82)	(0.14)	(0.48)	(0.58)	(0.19)
Dummy_Democracy	-0.049***	-0.052***	-0.32***	-0.049***	-0.01	-0.015	-0.12	-0.01
	(-3.38)	(-3.65)	(-3.97)	(-3.38)	(-0.95)	(-1.44)	(-1.68)	(-1.00)
Average	0.037	0.018	-0.06	0.034	0.04	0.03	0.02	0.04
	(0.95)	(0.47)	(-1.35)	(0.89)	(1.56)	(1.41)	(0.52)	(1.56)
Output Gap*Dummy_Democracy	-1.4***				-6.3**			
	(-5.14)				(-3.22)			
Output Gap*Average		-3.83***				-11.8***		
		(-6.85)				(-6.26)		
Average*Dummy_Democracy			0.18***				0.07	
			(3.41)				(1.49)	
Output Gap*Average*Dummy_Democracy				-0.8***				-3.48**
				(-4.79)				(-2.87)
First-stage								
TFP Growth					0.0007*	0.004***	0.0006*	0.0007*
					(0.0003)	(0.001)	(0.0003)	(0.0003)
TFP Growth*Dummy_Democracy					0.0002			
					(0.0005)			
TFP Growth*Average						-0.003***		
						(0.001)		
TFP Growth*Average*Dummy_Democracy								0.00003
								(0.0005)
N. Observations	883	883	883	883	456	456	456	456
R-squared	0.14	0.16	0.12	0.13	0.06	0.14	0.08	0.08

Source: Author's own calculation.

Notes: Table estimates an interaction between political regimes and the average 6 indices of institutional quality in affecting the fiscal policy cycle using the OLS-FE and IV-2SLS approached. **Average** is the average value of six institution indices: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence and Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. The Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.3   Fiscal Policy Cyclicality in The Mature Democratic Nations

In this part, we explore further whether the maturity of democracy would affect countries public spending cyclicality. The seminal paper by Keefer (2007) points out the credibility in pursuing the good public provision of government in young democracies. Most young democracies' governments tend to be more corrupt and having a poor quality of political institutions. This increases more wasteful public spendings than the mature ones. To further analyse this issue, we introduce the maturity of democracy dummy variables. The variables are measured by matching the number of consecutive years that countries are in the democratic regime and their electoral competition score (LIEC and EIEC). The Maturity of democracy dummy variables equal 1 if both conditions are satisfied: democracy index is higher than 16 and LIEC and EIEC score is higher than 4 out of 7 as we discussed in the data section. If there is a reversal in countries political regime, we count the number of years in democracy again from 0. With this method, we expect to capture the political transition effects on government spending cyclical.

Table 7

The Effects of Maturity of Democracy and Control of Corruption in Affecting Fiscal Policy Cyclicality

	10 Years Old		20 Years Old		30 Years Old	
	(OLS)	(IV-2SLS)	(OLS)	(IV-2SLS)	(OLS)	(IV-2SLS)
Output Gap	0.568	0.198	0.12	-0.002	-0.17	-0.42*
	(0.36)	(0.43)	(0.20)	(0.18)	(0.17)	(0.16)
Control of Corruption	0.09	-0.02	0.01	-0.03	0.07	-0.01
	(0.04)	(0.01)	(0.02)	(0.009)	(0.05)	(0.01)
N. Observations	146	86	180	106	119	61
FE	Yes	No	Yes	No	Yes	No
R-squared	0.27	0.19	0.14	0.02	0.18	0.33

Source: Author's own calculation.

Notes: Table estimates the effects of the maturity of democracy and the control of corruption, as proxy for the institutional quality, in affecting the fiscal policy cycle using the OLS and the IV-2SLS approaches. The Government Spending Gap is a dependent variable. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. "FE" represents the question whether the model includes countries fixed effect. With-in R-squared are presented at the bottom of this table.

Table 7 presents the effects of maturity of democracy on fiscal policy cycle. We classified the maturity of democracy into 3 groups: 10 years old, 20 years old and 30 years old. Columns 1, 3 and 5 are conducted by the OLS approach, while columns 2, 4 and 6 are

performed by using IV-2SLS. With the OLS approach, countries which stayed consecutively under the democratic regime for 10 and 20 years still implement procyclical fiscal policies. However, the degree of procyclical reduces from 0.56 for 10 years old to 0.12 for 20 years old. Columns 5 and 6 of Table 7 show that fiscal policies of the countries, which stay firmly in the democratic regime for 30 years or above, are countercyclical fiscal policy.

Turning to analyse the results from IV-2SLS approach in columns 2, 4 and 6. The same patterns are observed. The more mature democratic environment encourages countries to implement less fiscal policy procyclicality. The fiscal policy in countries with 20 and 30 years of democracy are likely to be less procyclical than the 10 years ones. Although the estimators for 10 and 20 years are not significant, they show the reduction in the fiscal policy procyclicality. The coefficient for the output gap of 30 years dummy in column 6 turns to be negative which implies that more mature democratic countries tends to implement less fiscal policy procyclicality.

Table 8
The Effects of Maturity of Democracy and Institutional Quality on Fiscal Policy Cyclicality

	10 Years Old		20 Years Old		30 Years Old	
	(OLS)	(IV-2SLS)	(OLS)	(IV-2SLS)	(OLS)	(IV-2SLS)
Output Gap	0.57	0.20	0.11	-0.004	-0.15	-0.42*
	(0.31)	(0.43)	(0.19)	(0.18)	(0.16)	(0.16)
Average	0.09	- 0.02	0.08	-0.009	0.14*	-0.01
	(0.09)	(0.02)	(0.06)	(0.002)	(0.06)	(0.01)
N. Observations	146	86	180	106	119	61
FE	Yes	No	Yes	No	Yes	No
R-squared	0.28	0.33	0.15	0.02	0.21	0.65

Source: Author's own calculation.
Notes: Table estimates the effects of the maturity of democracy and the average of 6 indices of institutional quality, in affecting the fiscal policy cycle using the OLS and the IV-2SLS approaches. **Average** is the average value of six institution indices: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence and Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. The Government Spending Gap is a dependent variable. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. "FE" represents the question whether the model includes countries fixed effect. With-in R-squared are presented at the bottom of this table.

Table 8 performs the same analysis as in the Table 7, but using an average of 6 political institutions indices as a proxy for institutional quality in stead of using only the control of corruption. The estimates suggest that countries with more mature democracy implement

less procyclical fiscal policy than the younger ones. The coefficients of the output gap reduce gradually from 0.57 in column 1 to 0.11 and -0.15 in columns 3 and 5, respectively. The results with an IV-2SLS approach in columns 2, 4 and 6 propose the same implication. The more mature of the democratic system, the government spending tends to be less procyclical. The fiscal policy turns to be countercyclical for the countries grouped with 30 years or above in democratic regime. The analyses in this section imply that more mature democratic countries tend to implement less procyclical fiscal policies compared to the younger ones.

6 Robustness Checks

6.1 Instrumented The Democracy

In this section, we exploit the type of colonial origins of the developing countries during the European colonial period to estimate the effects of an interaction between democracy and the institutional quality in affecting the fiscal policy cyclicality. The colony countries are classified into two types according to the mortality rate of the European settlers and their average protection against expropriation risk from 1985 to 1995 (Acemoglu et al., 2002, 2000).

That is the country which the settler will set up a good institution usually have a higher average protection against expropriation risk and a lower rate of the settler mortality. On the other way around, the colony countries with a lower average protection against expropriation risk and a higher rate of the settler mortality is usually set up with a worse institution (extractive resource) by the colonial countries. The seminal paper by Acemoglu et al. (2000) suggests that these settlement choices of the colonial rulers influence the colony countries' current political regime and their current economic performance.

This chapter uses the average protection against expropriation risk from 1985 to 1995 data from Acemoglu et al. (2000) and the estimated settlers mortality data from Curtin (1965, 1968); Curtin et al. (1978); Curtin (1989, 1998) to classify which of the former colony countries are chosen by the settlers to set a good institution or just for an extractive resource regime.[13]

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[13]For more detail on the data explanation, see Acemoglu et al. (2000). The summary statistics of key variables used for endogenised democracy are provided in appendix A.

The idea is that if the former colony countries have an average protection against expropriation risk during 1985 to 1995 higher than the average value of all other former colony countries in the observations and the lower estimated settlers mortality data than the average of all other former colony countries, then, the colonial ruler may choose to settle a good institution there. This means that better institution in the past may affect the stability of setting democratic regime at the present day.[14]

Therefore, we construct the interaction effects term between $Former\ Colony_{i,t} * Setting\ Institution_{i,t}$ to use as an instrument for the democratic regime of the colony countries. The following equation shows the first-stage specification when we allow the democracy of the former colony countries to be instrumented by the historical colonial data and the institutional setting choices of the colonial rulers.

$$Democracy_{i,t} = \rho_1 + \rho_2(FormerColony_{i,t} * SettingInstitution_{i,t}) \tag{5}$$
$$+ \rho_4 X'_{i,t} + \mu_i + \lambda_t + u_{i,t}$$
$$i = 1, 2, ..., 63\ t = 1, 2, ..., 33$$

where $FormerColony_{i,t}$ is the dummy variable which equals to 1 if the country has been colonised before, otherwise equals to 0. The $SettingInstitution_{i,t}$ is the dummy variable which proxies the political regime of the colony countries at the present day. It equals to 1 if the colony country has a higher value of Average Protection against Expropriation Risk during 1985-1995 than the average colony countries and lower estimated mortality rate of the settlers than the average colony countries, otherwise, it equals to 0. The protection against expropriation proxy for the current institutions and is measured on a scale of 1 to 10 (10 indicating the lowest risk of expropriation). $SettingInstitution_{i,t}$ equals to 1 meaning that those countries are chosen by the settlers to set a good institution instead of applying the extractive resource regime. For the second-stage, we regress the government spending gap on the fitted values of democracy from the first-stage and get the reduced form as follows:

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[14]See more discussion on this topic in Cervellati et al. (2006), Gradstein (2007) and Knutsen (2011).

$$G_{i,t} = \beta_1 Outp\hat{u}tGap_{i,t} + \beta_2 G_{i,t-1} + \beta_3 Dem\hat{o}cracy_{i,t} \qquad (6)$$
$$+ \beta_4 InstQual_{i,t} + \beta_5 X'_{i,t} + u_{i,t}$$
$$u_{i,t} = \mu_i + \lambda_t + \varepsilon_{i,t}$$
$$i = 1, 2, ..., 38 \quad t = 1, 2, ..., 33$$

where $Outp\hat{u}tGap_{i,t}$ is the fitted value of the output gap by the TFP from the first-stage regression and $Dem\hat{o}cracy_{i,t}$ is the fitted value of democracy by the interaction effects between the former colony and setting a good institution from the first-stage regression. β_1 is the parameter which measures the cyclical pattern of fiscal policy. Our interests are on whether democracy does affect the fiscal policy cycle (β_3) and whether there is an interaction effect between democracy and the institutional quality in affecting the fiscal policy cycle of the developing countries.

Table 9 presents the results of the effects between the political regime (democracy) and the institutional quality in affecting the fiscal policy cyclicality in the case which we instrumented the political regime by countries historical colonial data.

The results in columns 1, 2, 3 and 4 are performed by using the OLS approach, while we use the IV-2SLS approach for the results in columns 5, 6, 7 and 8. As we expected, the main results robustly show the fiscal policy procyclicality in the developing countries with all positively significant estimators. In columns 1, 3, 5 and 7, the control of corruption is used as a proxy of the institutional quality, while we use the average value of 6 institutional indices for the columns 2, 4, 6 and 8.

We introduce the interaction effects term between democracy (instrumented by *settinginsti tution * colony*) and the output gap into the model in columns 1, 2, 5, and 6. Both approaches, the OLS-FE and IV-2SLS, provide a negative sign for the interaction effects term's estimators, although, they are not significant for the OLS-FE method. This implies that the former colony countries where the settlers set a good institution tends to perform the countercyclical fiscal policy; the countries with democratic regime tend to implement countercyclical fiscal policy. For example, the marginal effects of the model in columns 5 and 6 are $4.175 - 5.416 = -1.241$ and $4.368 - 5.726 = -1.358$, respectively. Without the effects of the democratic regime, the countries implement the procyclical fiscal policy 4.175

and 4.368, respectively.

Table 9

An Interaction between Democracy and Average Institutional Quality in Affecting Fiscal Policy Cyclicality (Instrumented The Democracy)

	OLS-FE				IV-2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Output Gap	0.905***	0.925***	0.928***	0.931***	4.175**	4.368***	3.813**	4.112**
	(5.75)	(5.86)	(5.90)	(5.91)	(3.21)	(3.38)	(3.03)	(3.21)
Control of Corruption	0.0483*				0.0241		0.0216	
	(2.32)				(1.41)		(1.23)	
Average		0.0402				0.0343		0.0334
		(1.03)				(1.39)		(1.34)
Settinginstitution*Colony*OutputGap	-0.768	-0.783						
	(-1.79)	(-1.82)						
Settinginstitution*Colony*OutputGap*CoC			-0.436					
			(-1.69)					
Settinginstitution*Colony*OutputGap*Average				-0.452				
				(-1.73)				
OutputGap*Democracy					-5.416**	-5.726**		
					(-2.85)	(-3.02)		
OutputGap*CoC*Democracy							-3.056**	
							(-2.64)	
OutputGap*Average*Democracy								-3.337**
								(-2.84)
N	883	883	883	883	456	456	456	456
R-squared	0.103	0.098	0.093	0.097	0.109	0.096	0.102	0.089

Source: Author's own calculation.
Notes: Table estimates an interaction between democracy and the average institutional quality in affecting the fiscal policy cycle using the OLS-FE and the IV-2SLS approaches. The Government Spending Gap is a dependent variable. We instrumented the Output Gap by the Total Factor Productivity Growth for the Instrumental Variable approach. The TFP growth is computed by the Dynamic Growth Accounting - Harrod Neutral model with the Cobb-Douglas production function and assumed to be constant return to scale. We instrumented the Democracy by the Historical Colony and the Type of Institutional Setting by the Settlers. **Average** is the average value of six institution indices: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence and Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. **CoC** stands for the Control of Corruption. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In the columns 3 and 7, we add the interaction effects term between democracy (instrumented by the *setting institution * colony*), the institutional quality proxy (the control of corruption) and the output gap to test the relationship between the political regime and the institutional quality in affecting the fiscal policy cyclicality. The results from the model suggest that as the quality of the political institution increases, the country tends to implement less procyclical fiscal policy; the marginal effects of the fiscal policy cyclicality are $0.928 - (0.436 * CoC)$ for the model in column 3 and $3.813 - (3.056 * CoC)$ for the model in column 7. As there is more control of the corruption (the CoC value increases), the marginal effects of the fiscal policy cyclicality turn negative which imply the countercyclical fiscal policy.

Instead of analysing only the control of corruption as a proxy of the institutional quality, we perform the same model specification as in the columns 3 and 7 using the average value of 6 political institutional quality indices for the model in columns 4 and 8. The

results are in line with the model in columns 3 and 7. Both the model in columns 3 and 8 show that the democratic countries tend to implement less procyclical fiscal policy than the countries in non-democratic environment. This implies that under the democratic regime, procyclical fiscal policy is less pronounced than under the non-democratic regime. Moreover, as the quality of the political institution has been developed, the magnitudes of procyclical fiscal policy are restrained. We conclude these findings that the democratic regime and a better quality of the political institution act complement to one another in restraining the procyclical fiscal policy implementation.

7   Conclusion

According to the macroeconomic policy prescription, the countries could do better during the economic fluctuations by implementing the countercyclical fiscal policy. However, previous existing research underlines the tendency of many developing economies to implement procyclical fiscal policy. That is the government reduces the spending and increase the taxation during an economic downturn and increases the spending and reduces the taxation during an economic boom. The empirical evidence points out that the quality of the political institutions and the democratic regime are key factors in affecting the fiscal policy cyclicality. However, the interaction between these two factors has not yet been extensively explored. Moreover, the analysis of other political factors such as the maturity of political regime is still lack in this literature.

This chapter, therefore, aims to investigate the effects of the political regime, especially democracy, and an institutional quality in affecting fiscal policy cyclicality in developing countries. Our main contributions are two folds: Firstly, we focus the analysis on an interaction between the democratic regime and the quality of institutions in affecting the fiscal policy cyclicality. Furthermore, we examine the effects of the maturity of democracy on a cyclical pattern of fiscal policy. Using an updated dataset of 63 developing economies from 1980 to 2013, we conduct various econometric approaches such as the OLS-FE, IV-2SLS, GMM and System GMM to explore these research questions and deal with the endogeneity problem.

Our main results confirm that both democratic and non-democratic developing countries implement the procyclical fiscal policy. However, in the democratic environments with a better institutional quality are keys for the countries to restrain the procyclical fiscal policy.

Secondly, the results suggest that as the institutional quality becomes more effective, the countries tend to follow less procyclical fiscal policy. Additionally, the magnitudes of an improvement in the institutional quality in affecting the fiscal policy cyclicality are larger in the democratic environment than the non-democratic ones. Although the democratic governments have a low level of institutional quality, they still tend to implement less procyclical fiscal policy than non-democratic governments by about 13.6 per cent. Lastly, this chapter suggests also that the maturity and stability of the democratic regime help the countries to implement less procyclical public spending than the young democratic countries. According to the results suggested in this chapter, the policy makers simply cannot deny the interwoven between the politics and the economic. An improvement in the political institutional quality and a stability in the political regime are key factors for both democratic and non-democratic developing countries to escape from procyclical fiscal policy implementations.

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Appendices

A   Data Description

We use unbalanced panel data of 63 developing countries from 1980 to 2013 for our empirical study. Developing countries in our sample are low and medium income countries classified by the World Development Indicator.[1]

Cyclical of Fiscal Policy

The main dependent variable is cyclical of fiscal policy which is measured by Government Spending Gap. Government spending gap is the percentage difference of actual real government final consumption per capita from its trend component which we calculate by using Hodrick-Prescott filtered with $\lambda = 1600$.

Business Cycle

Our main independent variables are **business cycle**. We use Output Gap as an indicator for the business cycle and it is calculated by the cyclical component of the output per capita. Its trend component is calculated by using Hodrick-Prescott filtered with $\lambda = 1600$. Both real GDP per capita and real government final consumption per capita dataset are provided by the World Development Indicators (WDI) and we transform it into logarithmic form before calculating trend and a cyclical component, respectively.

Democracy Index

Democracy is defined by minimalistic definition: countries which hold fair and free elections are considered to be the democratic regime. It measured by Democracy index from the POLITY IV project. It ranges from -10 to 10. -10 to -6 indicates "Autocracy", whereas a score between +6 and +10 indicates "Democracy". Countries score between -5 and +5 are measured as "Anocracy", i.e. neither democratic nor autocratic political systems. These political system indices are supported by key measurements of the quality of executive recruitment, the constraints on executive authority, political competition, and the institutionalised qualities of governing authority (Marshall and Jaggers, 2002). We add 10 to all democracy values for easier interpretation. So, the democracy scores currently lie between 0 to 20. The dummy variable for democracy is equal to 1 if the score is higher than or

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[1]The term "developing countries" are mostly replaced by "developing economies" since many indicators of developing countries which related to well being, e.g. birth rate, mortality rate, life expectancy and etc, have been well developed over the past few decades. This chapter uses the term developing country as it means developing economies.

equal to 16, otherwise, it is classified into the non-democratic regime.

Institutional Quality

An institutional quality definition is widely discussed among social scientists; however, there is no clear cut what exactly the meaning of institutional quality. This article follows the definition of institutional quality or governance from (Kaufmann et al., 2009) and adopt the institutional quality indicators from the Worldwide Governance Indicators (WGI). Institutional quality is defined as "the traditions and institutions by which authorities in countries are exercise'": Firstly, the process by which government are selected, monitored and replaced (Voice and accountability and Political stability indices). Secondly, the capacity of the government to effectively formulate and implement sound policies (Government effectiveness and Regulatory quality indices). Thirdly, the respect of citizens and the state for institutions that govern economic and social interactions among them (Rule of law and Control of Corruption indices). The indices reflect 6 dimensions of institutional quality and capture 3 mains points as explained above. They are constructed by surveying the perception towards an institutional quality of related groups from all household, business, public sector, non-profit organisations worldwide. The indices are provided in percentile rank from 0 to 100. Higher percentile rank indicates better institutions. We transform it into logarithmic form to capture institutions quality of the countries at the same level. The indices are provided for the years 1996, 1998, 2000 and 2002-2013.

Maturity of Democracy

The maturity of democracy is constructed by using democracy indices and the Legislative and Executive Indices of Electoral Competition dataset (LIEC and EIEC) from the Political Institutions Database, as it was suggested by Keefer (2007) and Beck et al. (2001). The Legislative and Executive Indices of Electoral Competition range between 1 to 7. The higher the score is, the more the presence of competitive elections. For example, the countries which have more than one party in the central election, but only one party can win would be scored 4. Then, we match these indices to the democracy indices from POLITY IV project. The dummy variable for maturity of democracy is equal to 1 if their democracy indices score higher than or equal to 16 and LIEC and EIEC score more than 4 for 1-10 (for 10 years dummy), 11-20 (for 20 years dummy), more than 21 (for 30 years dummy) consecutive years, respectively, otherwise, it equals zero.

Trade Openness

Trade openness is measured by the ratio of exports plus imports of goods and services as

a share of GDP, a standard measure of the degree of trade openness of each country. The data is taken from the World Development Indicators (WDI).

Financial Openness

We adopt the Chinn and Ito (2008) financial openness indices. The indices are constructed based on the binary dummy variables coded by the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). The binary dummy variables cover 4 main restrictions on the external accounts which indicate the presence of multiple exchange rates, the restrictions on current account transactions, the restrictions on capital account transactions and the requirement of the surrender of export proceeds. These indices consider the extent of cross-border financial transactions. they lie between 0 and 1, score 0 means completely closed financial markets and 1 is the highest degree of financial openness.

List of Sample Countries

Our data used for the analysis is unbalanced panel data of 63 developing countries during 1980 to 2014 as it is presented in the Table 10.

Table 10
List of Sample Countries

Country Name	Year Begin	Year End
Albania	1996	2014
Algeria	1980	2014
Armenia	1991	2014
Bangladesh	1980	2014
Belarus	1991	2014
Azerbaijan	1992	2012
Bhutan	2000	2014
Bolivia	1980	2014
Botswana	1980	2014
Bulgaria	1980	2014
Brazil	1980	2014
Cameroon	1980	2014
Colombia	1980	2014
China	1980	2014
Congo	1980	2014

Costa Rica	1980	2014
Dominican Republic	1980	2014
Cuba	1980	2013
Ecuador	1980	2014
Egypt	1980	2014
El Salvador	1980	2014
Gabon	1980	2014
Georgia	1994	2014
Guatemala	1980	2014
Honduras	1980	2014
Indonesia	1980	2014
India	1980	2014
Iran	1980	2014
Jordan	1980	2014
Kazakhstan	1992	2014
Kenya	1980	2014
Kyrgyz Republic	1992	2014
Lao PDR	2000	2014
Lesotho	1980	2013
Lebanon	1994	2014
Macedonia	1990	2014
Malaysia	1980	2014
Mauritania	1980	2014
Mauritius	1980	2014
Mexico	1980	2014
Moldova	1992	2014
Montenegro	2006	2014
Morocco	1980	2014
Namibia	1990	2014
Nicaragua	1980	2014
Pakistan	1980	2014
Nigeria	1981	2014
Panama	1980	2014

Paraguay	1991	2014
Philippines	1980	2014
Peru	1980	2014
Romania	1990	2014
Serbia	2006	2014
South Africa	1980	2014
Sudan	1980	2011
Swaziland	1980	2011
Tajikistan	1993	2013
Thailand	1980	2014
Tunisia	1980	2013
Turkey	1987	2014
Ukraine	1991	2014
Vietnam	1994	2014

Source: Author's calculation

Notes: Table shows the list of countries and range of year of the observations. In total, there are 63 countries from 1980 to 2013.

Table 11 presents the summary statistic of key variables used for the analysis of the effects of maturity of democracy regime on fiscal policy cyclicality and also for the analysis when we allow democracy to be endogenoised.

Figure 2 illustrates the map of our sample countries which is classified by their income per capita in the year 1990, 2000 and 2013. The country which has GDP per capita higher than 12,476 USD constant to the year 2010 is considered to be advanced economies. According to Figure 2, our sample countries have not changed their economic status from developing to advanced economies over time, although their GDP per capita has been improved gradually.

Table 11

Summary Statistics of Key Variables for Endogenised Democracy

Variable	Mean	Std. Dev.	Min.	Max.	N
Output Gap	-0.001	0.026	-0.193	0.206	1900
Government Spending Gap	-0.004	0.08	-1.405	0.598	1900
Trade Openness	1.821	0.244	1.045	2.343	1899
Financial Openness	0.373	0.317	0	1	1725
Total Factor Productivity Growth	0.877	2.18	-25.97	18.938	1135
Air Temperature (Celsius)	20.129	6.047	4.776	29.583	1393
Air Precipitation (100 s mm / year)	11.374	7.943	0.066	48.348	1393
Democracy Index	11.812	6.592	0	20	1900
Legislative Indices of Electoral Competition (LIEC)	5.97	1.745	1	7	1872
Executive Indices of Electoral Competition (EIEC)	5.524	1.981	1	7	1870
Number of Year in Democracy	5.754	8.431	0	35	1900
Control of Corruption	1.495	0.301	0.165	1.947	976
Government Effectiveness	1.57	0.239	0.591	1.939	976
Political Stability and Absence of Violence and Terrorism	1.426	0.362	-0.326	1.981	976
Regulatory	1.555	0.288	0.458	1.907	976
Rule of Law	1.493	0.265	0.379	1.92	976
Voice and Accountability	1.478	0.32	0.284	1.94	976
Average 6 Institutional Quality	1.503	0.23	0.603	1.884	976
Dummy_Asian	0.362	0.481	0	1	1900
Dummy_Subsaharan	0.369	0.483	0	1	1900
Dummy_LatinAmerica	0.269	0.444	0	1	1900
Dummy_YoungDemocracy	0.222	0.415	0	1	1900
Dummy_MiddleDemocracy	0.154	0.361	0	1	1900
Dummy_OldDemocracy	0.089	0.285	0	1	1900
Dummy_Colony	0.93	0.255	0	1	1900
Dummy_Settinginstitution	0.226	0.418	0	1	1900
Dummy_colonial_france	0.166	0.372	0	1	1900
Dummy_colonial_spain	0.269	0.444	0	1	1900
Dummy_colonial_uk	0.202	0.401	0	1	1900
Dummy_colonial_others	0.275	0.447	0	1	1900

Source: Author's own calculation.

Notes: The Average 6 institutional quality is the average value of 6 institutional quality indices: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence and Terrorism, Regulatory Quality, Rule of Law and Voice and Accountability.

B   Methodology: Dynamic GMM Estimator

As we have already mentioned before that the OLS estimators raise up some econometric issues. This chapter thus adopts Panel data with Fixed Effect, Instrumental variable approach and the Dynamic GMM estimators as empirical strategies for our empirical analysis. This part will explain briefly the development of Dynamic GMM estimators which the author summarised from Baltagi (2008).[2]

Dynamic GMM was developed by Arellano and Bond (1991). Their Dynamic GMM contains 2 stages of estimation: First-stage uses GLS (General Least Square) on First-differencing equation which are developed by Anderson and Hsiao (1981).[3] Then, they use the preliminary results from the first step to get consistent estimators in the second-stage (Baltagi, 2008).

Firstly, Anderson and Hsiao (1981) suggested to first-difference the model in order to get rid of time and country specific characteristic (μ_i and λ_t), and use $\Delta y_{i,t-2} = (y_{i,t-2} - y_{i,t-1})$ or $y_{i,t-2}$ as an IV for $\Delta y_{i,t-1} = (y_{i,t-1} - y_{i,t-2})$. This would be a good instrumental variable since it is not correlated to the difference of error term, $\Delta v_{i,t} = (v_{i,t} - v_{i,t-1})$, as long as $v_{i,t}$ does not have serial correlation with error term in other period.

However, although this method help reducing unbiased and inconsistency since we sweep the fixed effect and find IV for our lagged dependent variable, it is not efficiency. This is because there is no use of all available information of moment condition and the difference of the error term.

Arellano and Bond (1991) therefore additionally developed the two stages GMM estimators which performs GLS (General Least Square) on differencing equation developed first by Anderson and Hsiao (1981) and use the preliminary results from the first step to getting consistent estimators in the second stage as follows;

$$y_{i,t} = \delta_1 y_{i,t-1} + u_{i,t} \quad u_{i,t} = \mu_i + \lambda_t + v_{i,t}$$

While, $v_{i,t}$ and $\mu_i \sim iid(0, \sigma v^2$ and $\sigma \mu^2)$. Then, take the difference of the equation above and one will get,

$$y_{i,t-3} - y_{i,t-2} = (y_{i,t-2} - y_{i,t-1}) + (v_{i,t-3} - v_{i,t-2})$$

We could use $y_{i,t-1}$ as an IV for equation above. The information will be lost for two periods since it begins on a period of $T = 3$.

$$y_{i,t-4} - y_{i,t-3} = (y_{i,t-3} - y_{i,t-2}) + (v_{i,t-4} - v_{i,t-3})$$

Then, once again we could address $y_{i,t-2}$ as an IV for $(y_{i,t-3} - y_{i,t-2})$. When we continue doing this process, one would get the set of IV as follows;

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[2]For more detail, please find out in Baltagi, Badi. Econometric analysis of panel data. Vol. 1. John Wiley and Sons, 2008.

[3]They do first-differencing to the model in order to get rid of time and country specific characteristics (μ_i and λ_t), and use lagged level of dependent variable with first-differencing $\Delta y_{i,t-1}$ as an IV for $\Delta y_{i,t-2} = (y_{i,t-2} - y_{i,t-1})$. Lagged dependent variable with first-differencing is considered to be a good instrumental variable since it is correlated to the first-difference of dependent variable, but it is not correlated to the first-difference of the error term, $\Delta v_{i,t} = (v_{i,t} - v_{i,t-1})$. As long as $v_{i,t}$ follows independent and identically distributed process (i.i.d.) in both cross-sectional i and time period t, which means that the error term is not serial correlated, then $\Delta y_{i,t-1}$ is good IV.

$$\text{Set of instrumental Variable} = (y_{i,t-1}, y_{i,t-2}, ..., y_{i,T-2}); \quad t = 1, 2, ..., T$$

These set of IV will be included when performing first-stage GLS and get the unbiased and consistent estimator $\hat{\delta_1}$.

$$W'\Delta y = W'(\Delta y_{i,-1})\delta + W'\Delta V$$

$$\hat{\delta_1} = [(\Delta y_{i,-1})'W(W'(I_n \otimes G)W)^{-1}W'(\Delta y_{i,-1})]^{-1}$$
$$[(\Delta y_{i,-1})'W(W'(I_n \otimes G)W)^{-1}W'(\Delta y)]$$

While W is the matrix of a set of IV. V represents a matrix of the error term. In order to optimise this estimator δ_1, Δv or $(I_n \otimes G)$ is replaced by differencing residuals obtained from the earlier stage $E[\Delta v, (\Delta v)']\sigma^2$. This part proofs that GMM estimator developed by Arellano and Bond (1991) has already used the information from differencing error term in the period before. This calculation of second-stage GMM estimators has been shown as follows;

$$\hat{\delta_2} = [(\Delta y_{i,-1})'W\hat{V}N^{-1}(W'\Delta y_{i,-1})]^{-1}[(\Delta y_{i,-1})'W\hat{V}N^{-1}(W'\Delta y)]$$

Where $V_N = \sum_{i=1}^{N} W_i'(\Delta v_i)(\Delta v_i)'W_i$. Even though our sample does not contain large N as usual panel data, this method still gives us a consistency estimator. Besides, GMM also designed for the situation when one has large N and fixed T data. The problem of large N and a few periods of T will be solved as N reaches ∞. Therefore, the GMM estimator is efficient, unbiased, and requires no knowledge concerning the initial condition or the distribution of v_i μ_i or λ_t.

In case there are some exogenous variables in the model, the difference model will also provide us with a set of IV of exogenous variables. Then, the set of IV (W) will be included when performing first-stage GLS and get the unbiased and consistent estimator $\hat{\delta_1}$ as follow.

$$W'\Delta y = W'(\Delta y_{i,-1})\delta + W'(\Delta X)\beta + W'\Delta V$$

While X denotes the matrix of all exogenous variables in this model, and V is the matrix of the error term. We will then obtain the first stage estimator $\hat{\delta_1}$ and $\hat{\beta_1}$.

$$\begin{pmatrix} \hat{\delta_1} \\ \hat{\beta_1} \end{pmatrix}$$

$$= [(\Delta y_{i,-1}, \Delta X)'W\hat{V}N^{-1}(W'(I_n \otimes G)W)^{-1}W'(\Delta y_{i,-1}\Delta X)]^{-1}$$
$$[(\Delta y_{i,-1}, \Delta X)'W\hat{V}N^{-1}(W'(I_n \otimes G)W)^{-1}W'(\Delta y)]$$

Where, ΔX is the matrix of exogenous variables with $N(T-2)K$ dimension on $\Delta x_{i,t}$. Following equation illustrates the second-stage GMM estimators $\hat{\delta_2}$ and $\hat{\beta_2}$.

$$\begin{pmatrix} \hat{\delta_2} \\ \hat{\beta_2} \end{pmatrix}$$

$$= [(\Delta y_{i,-1}, \Delta X)'W(W'(I_n \otimes G)W)^{-1}W'(\Delta y_{i,-1}\Delta X)]^{-1}$$
$$[(\Delta y_{i,-1}, \Delta X)'W(W'(I_n \otimes G)W)^{-1}W'(\Delta y)]$$

Then, we obtain unbiased, consistent, and efficient estimators. We adapt Dynamic GMM to our model specification as it is presented by the following equation;

$$\Delta G_{i,t} = \alpha + \beta_1 \Delta OutputGap_{i,t} + \beta_2 \Delta G_{i,t-1} + \beta_3 \Delta X'_{i,t} + u_{i,t}$$
$$u_{i,t} = \mu_i + \lambda_t + v_{i,t}$$
$$i = 1, 2, ..., 63 \quad t = 1, 2, ..., 33$$

Where $X'_{i,t}$ is the set of control variables. Coefficient β_1 measures the fiscal policy cyclicality of country i. It is expected to be positive when the country implements procyclical fiscal policy and to be negative when there is a presence of countercyclical fiscal policy.

C   Additional Instrumental Variables: Air temperature and Air Precipitation

For robustness checks, we try other external instrumental variables such as Air temperature and Air Precipitation as instrumental variables for output gap. First, we consider the relationships between the output gap and air temperature and air precipitation, respectively, as they are presented by Figure 3.

There is a bunch of previous literature suggest strong relationship between temperature and economic performance e.g. Dell et al. (2012), Nordhaus (2006), Sachs (2003), Dell et al. (2009), Dell et al. (2014) and etc. Dell et al. (2012) study the relationship between historical air temperature and precipitation and economic growth. They document that an increase in 1 degree Celsius of air temperature reduces economic growth by 1.3 percentage point on average. Their results are quite strong, especially in low-income countries. We, therefore, adopt average air temperature and air precipitation dataset to implement in the model as IV for endogenous output gap.

Figures 3a and 3b illustrate the relationship between endogenous independent variable, output gap, and other two instrumental variables, yearly average air temperature and yearly average air precipitation (grey squares) by countries political regimes: democracy and non-democracy, and their fitted values (grey line). Figure 3a depicts the relationship between endogenous independent variable, output gap, and yearly average air temperature. Although we can see positively relationship between the output gap and average air temperature, the estimation is not significant. Average air temperature has no strong effect on the level of output, thus the output gap. We doubt on using average temperature as an IV for output gap since it may lead to a weak instrumental variable issue.

We further check validation of IV by investigating first-stage results. First-stage results in Table 12 suggest that Air temperature may not be a proper IV for output gap although the estimates of a reduced-form present similar sign which shows procyclical fiscal policy in developing countries. All estimates with inter-action effects terms suggest that improving institutional quality reduces fiscal policy procyclicality in our sample and still confirm procyclicality in developing countries even though they are not significant except the estimates of the coefficient of output gap from the model 2 in column 4.

Table 12
Regression Results: Additional IV (Air Temperature)

	Baseline Model		Interaction Effects Terms (IV-2SLS)			
	(IV-FE)	(IV-2SLS)	(1)	(2)	(3)	(4)
Output Gap	1.479	1.253	1.055	5.746**	0.865	1.053
	(0.24)	(0.06)	(1.24)	(2.65)	(1.51)	(1.22)
L.Gov Gap	0.233*	0.274	0.275***	0.294***	0.271***	0.274***
	(2.40)	(1.08)	(5.06)	(5.64)	(5.04)	(5.01)
Trade Openness	-0.0297	-0.0228	-0.0232	-0.0243	-0.0245	-0.0224
	(-0.09)	(-0.16)	(-1.01)	(-1.10)	(-1.05)	(-0.97)
Financial Openness	-0.0380	0.0111	0.0103	0.0125	0.0119	0.0121
	(-0.79)	(0.20)	(0.60)	(0.80)	(0.73)	(0.70)
Democracy	-0.101**	-0.0138	-0.0149	-0.0158	0.0184	-0.0143
	(-3.18)	(-0.55)	(-1.42)	(-1.58)	(0.40)	(-1.36)
Control of Corruption	0.0338	0.0298	0.0303*	0.00942	0.0422	0.0296
	(0.31)	(0.28)	(1.96)	(0.54)	(1.88)	(1.86)
Output Gap*Democracy			-0.600			
			(-0.36)			
Output Gap*Control of Corruption				-3.627*		
				(-2.33)		
Control of Corruption*Democracy					-0.0222	
					(-0.73)	
Output Gap*Control of Corruption*Democracy						-0.155
						(-0.14)
First-stage						
Air Temperature	0.002	0.00003	0.001	0.003	0.002	0.002
	(0.002)	(0.00001)	(0.002)	(0.002)	(0.002)	(0.002)
Air Temperature*Dummy_Democracy			0.0004			
			(0.0005)			
Air Temperature*Control of Corruption				-0.002		
				(0.001)		
Air Temperature*Control of Corruption*Dummy_Democracy						(-0.00008)
						(0.0004)
R-squared	0.13	0.13	0.13	0.19	0.11	0.12
N	463	463	463	463	463	463

Notes: Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by Yearly Average Air Temperature for the Instrumental Variable approach. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

From Figure 3b we can see that the correlation between average air precipitation and the output gap is not significantly different from zero for all democratic and non-democratic samples. It turns out that air participation has no strong correlation to the output gap. Table 13 repeats the estimations of baseline model with and without interaction effects terms. The first-stage results suggest no strong correlation between our endogenous independent variable and its instrument and the estimates show no significant in all models, although the sign of estimators in all model are consistent to the results in Table 2.

Since both Air temperature and Air precipitation have no strong correlation to the output gap, we presume that they might be weak instrumental variables, and it could lead to strong biased and inconsistent esti-

Table 13

Regression Results: Additional IV (Air Precipitation)

	Baseline Model		Interaction Effects Terms (IV-2SLS)			
	(IV-FE)	(IV-2SLS)	(1)	(2)	(3)	(4)
Output Gap	-6.619	20.69	1.330	4.684	0.817	1.544
	(-0.48)	(0.16)	(1.56)	(1.86)	(1.42)	(1.85)
L.Gov Gap	0.133	0.520	0.279***	0.289***	0.270***	0.282***
	(0.66)	(0.31)	(5.17)	(5.49)	(5.03)	(5.21)
Trade Openness	-0.448	0.115	-0.0219	-0.0239	-0.0249	-0.0200
	(-0.61)	(0.12)	(-0.95)	(-1.08)	(-1.07)	(-0.87)
Financial Openness	-0.0592	0.0628	0.00909	0.0126	0.0117	0.0101
	(-0.67)	(0.17)	(0.54)	(0.81)	(0.72)	(0.60)
Democracy	-0.118*	0.00855	-0.0153	-0.0154	0.0188	-0.0147
	(-1.98)	(0.05)	(-1.47)	(-1.54)	(0.41)	(-1.41)
Control of Corruption	0.169	-0.0730	0.0294	0.0140	0.0427	0.0267
	(0.70)	(-0.10)	(1.91)	(0.76)	(1.90)	(1.70)
Output Gap*Democracy			-1.080			
			(-0.67)			
Output Gap*Control of Corruption				-2.819		
				(-1.54)		
Control of Corruption*Democracy					-0.0225	
					(-0.74)	
Output Gap*Control of Corruption*Democracy						-0.679
						(-0.65)
First-stage						
Air Precipitation	-0.0003	0.00001	-0.0005	-0.0005	-0.0003	0.0005
	(0.0005)	(0.0001)	(0.002)	(0.001)	(0.0005)	(0.0008)
Air Precipitation*Dummy_Democracy			0.0003			
			(0.0006)			
Air Precipitation*Control of Corruption				-0.0001		
				(0.0001)		
Air Precipitation*Control of Corruption*Dummy_Democracy						(-0.00001)
						(0.0005)
R-squared	-	-	0.14	0.18	0.11	0.13
N	463	463	463	463	463	463

Notes: Government Spending Gap is a dependent variable. L.Gov Gap represents Lagged Government Spending Gap. This table is omitted the estimator results of constant term and all estimators for time dummy. We instrumented the Output Gap by Yearly Average Air Precipitation for the Instrumental Variable approach. t statistics are in parentheses and * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

mators since significance test and confidential interval may have incorrect size. In summary, this section is built to show the concern on using Instrumental Variable Approach and test others instrumental variables. We investigate others two potential instrumental variables for output gap; Air Temperature and Air Precipitation. Both provide the same sign in all estimators as the results in Table 2, although the significance of estimators are absent.

Fig. 2. Economic Status Defined by GDP per Capita of Selected Sample Countries in Year 1990, 2000 and 2013
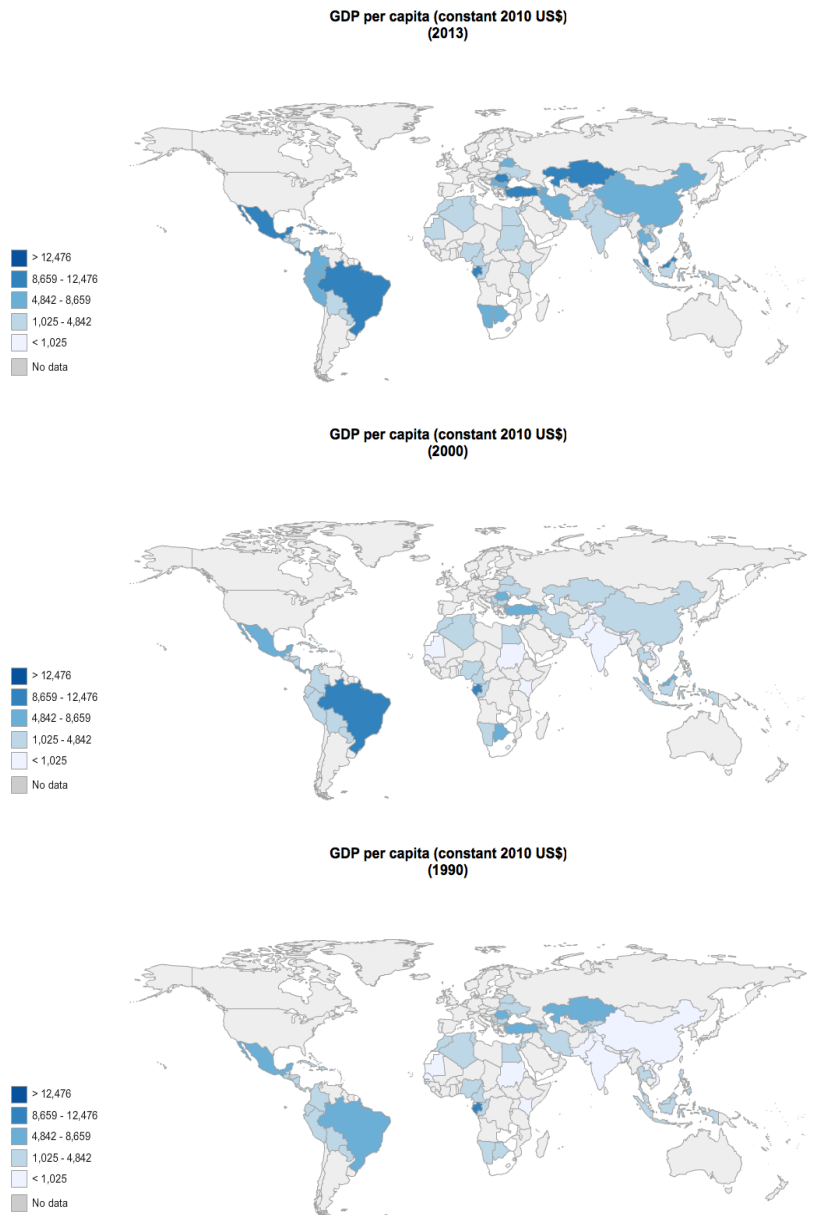
Source: Author's calculation
Notes: Graphics illustrate the GDP per capita of selected countries in year 1990, 2000 and 2013. The shades of blue colour represents how high level of income of the countries are. Our sample focuses on the developing economies by the definition of the World Bank.
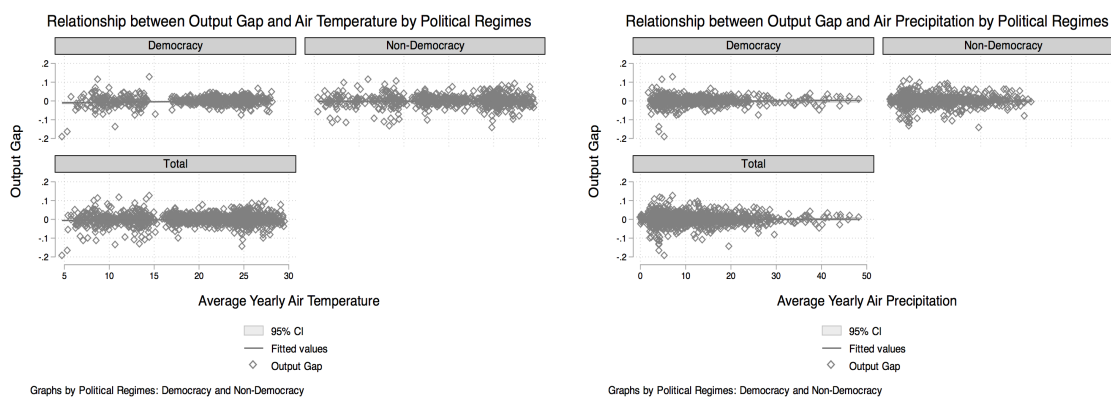
(a) Average Yearly Air Temperature   **(b)** Average Yearly Air Precipitation

Fig. 3. The Relationship between Output Gap and Air Temperature/ Air Precipitation by Countries Political Regimes

Source: Author's calculation. The figures illustrate the relationship between air temperature/ air precipitation and output gap by political regimes. On the y-axis, it is the percentage difference of actual output per capita from its trend component. On the x-axis, they show air temperature and air precipitation in panel (a) and (b), respectively. These figures also show the fitted values with 95% of the confidential interval.