

WHY IS FISCAL POLICY OFTEN PROCYCLICAL?

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INTRODUCTION

Generally the pattern of fiscal policy is **COUNTERCYCLICAL**

■ DEFINITION

When government applies a tax-smoothing principle according to which tax rates and government spending ought to remain **CONSTANT** over the business cycle

■ ECONOMIC IMPLICATIONS

- **Boom:**

- **total government spending** as a share of GDP should **go down** because of **automatic stabilizers**
- with constant tax rates and some degree of progressivity, **total government revenues** as a share of GDP should **go up**
- as a result, **budget surpluses** as a share of GDP should **increase**

■ WHERE

OECD Countries

INTRODUCTION

PROCYCLICAL fiscal policy

- **Boom** : total government spending as a share of GDP go up and tax rates go down → government deficits increases
- **Recession**: total government spending as a share of GDP go down and tax rates go up → government deficits decreases

CAUSES

A procyclicality fiscal policy contribute to macroeconomic instability

WHY many countries follow this pattern of fiscal policy?

The typical reason lies on **supply of credit**:

DEVELOPING COUNTRIES

- in **BAD TIMES** they cannot borrow or can do so only at very high interest rates → therefore the governments cannot run deficits and have to cut spending
- in **BOOMS** they can more easily borrow → leading to an increase in spending

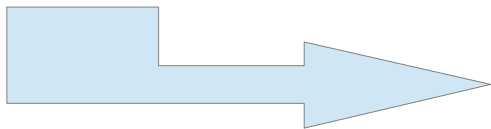
BUT this argument is incomplete:

- x **reserves** creation → low probability to face *binding credit constraints* in bad times
- x the lenders should provide funds to them **anyway**


➡ **Voracity effect** = political distortion that creates spending pressures (budget deficits)

↓ originate from

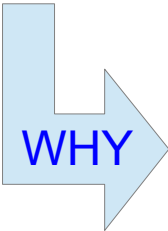
common-pool resource = “A resource or asset that is jointly managed by a group rather than by an individual. Something that is considered to be part of a *common pool* is exploited by a group as a whole, but with the **benefit** passing to the individual and the **cost** spreading across the group”; i.e. a centralised financed government with decentralised spending decision → whilst a *completely centralised system* will be better off



Individually rational but collective
INEFFICIENT equilibrium

 **Corruption** [political agency problem] where governments appropriate part of tax revenues for unproductive public consumption (**political rents**). Originate through:
→ *direct* appropriation of public resources
→ *favors* paid to special interests

In equilibrium voters cannot push rents to zero, although they can replace a government that abuses its powers

 **lack of information**: they observe the *state of economy* but cannot look at government borrowing → i.e. the government can accumulate off-balance-sheet liabilities

HENCE

During a boom ↑ voters' demand

This forces the government to borrow too much, imparting:

- a **procyclical** bias to fiscal policy
- **myopic** fiscal policy (an increase in government spending during booms and excessive government borrowing)

This situation can lead to an EXCESS of **debt** accumulation

THE MODEL: THE ECONOMY

Assumptions:

- Government debt is non-neutral.
- Small open economy with $t \rightarrow \infty$
- Private sector is represented by a consumer that maximizes the present discounted value of expected utility that comes from private and public consumption:

$$E \sum_{t=0}^{\infty} \beta [u(c_t) + h(g_t)]$$

WHERE:

- **E** is the expectation operator
- **u** and **h** are smooth and strictly concave increasing functions
- **c** is the private consumption, where $\mathbf{c} > \mathbf{0}$ and it's given by endowment of income net of taxes: $\mathbf{c}(t) = \mathbf{y}(t) * (1 - \mathbf{r}(t))$ where the income has a maximum and minimum roof.
- **g** is the public consumption. This can give utility to the government that can appropriate of rents: $\mathbf{r}(t) > \mathbf{0}$

$r(t) \leq q(t)$ where $q(t)$ is the quote that the government can steal from the public coffers or it's the upper bound.

Q(t) can be:

- $q(t) = \bar{q} + \rho y(t)$ with $\rho > 0$, it's a linear and increasing function of current per capita income so the taxes can be calculated on a basis that rises up.
- $q(t) = Q(b(t))$, it's a decreasing and concave function of public debt outstanding so if debt is high \rightarrow there's less to steal.
- β : in period t , government can issue, for a maximum amount the public debt, $b(t+1)$, for a maximum amount b , at a market price β . It's then bought by foreigners and it's fully replaced in the next period.

It's important to respect in equilibrium the non-negativity constraint on consumption and rent:

$$\underline{y}(1 - \beta) - \bar{b} > \bar{q} > 0$$

$$\underline{y} - \bar{b} > Q(\bar{b}) > 0$$

From the left part we see that the debt can be repaid without making public and private consumption to zero. The right part (Q), that is more than zero says us that there's always something to steal.

The voters desire an optimal policy where $r(t)=0$ but it's impossible. So, assuming that there's a benevolent government, we can observe 2 cases:

- Negative income shocks (=positive or negative growth in the income distribution) → depletion of assets, debt accumulation and the sum of private and public consumption fall less than one for one with income (ONLY IF DEBT LIMIT IS NOT CURRENTLY BINDING)
- Positive income shocks → debt reduction, asset accumulation, only a fraction of the income can be spent. (DEBT LIMIT ISN'T BINDED)

POLITICAL SYSTEM

The elections are held at the end of each period.

$$E \sum_{t=0}^{\infty} \beta v(r_t)$$

1. At the beginning the rational voters observe their income before taxes, y_t and the debt outstanding. Then they select a reservation level of current period utility, x_t and they promise to reelect the government if it will maintain this level of utility. **REMEMBER** that voters don't observe government rents and debt in the current period → they'll know these after the elections. If they see that there're too much liabilities, they punish the government and for it will be difficult to appropriate of the rents.
2. Government observes this utility, the income and it sets policy for the current period, the rents and the government debt : b_{t+1}
3. Voters observe their utility from private and public consumption and then they vote according to their promise.

EQUILIBRIUM POLICIES

Upper bound on rents is a linear function of income

$$q_t = \bar{q} + \rho y_t$$

Assumptions

- the incumbent chooses to abstain from reelection, so he will certainly obtain as many rents as possible, with a utility of $v(q_t) = v(\bar{q} + \rho y_t)$ [government is indifferent about b_{t+1}]
- the incumbent seeks to please the voters:

$$W(b, y, x) = \max_{\tau, g, r, b'} [v(r) + \beta EV(b', y')]$$

subject to the government *budget constraint* $g_t + r_t + b_t \leq \tau_t y_t + \beta b_{t+1}$,
 q_t , b and to the *reelection constraint* $u[y(1-\tau)] + h(g) \geq x$

$W(b, y, x)$ = incumbent's maximal utility

y = current income

b = debt outstanding

x = reservation utility demanded by voters

$V(\cdot)$ = equilibrium value of reappointment for the incumbent in the future state (b', y')

Considering first assumption, voters cannot push government utility below the threshold $v(\bar{q} + \rho y)$ that is what he can achieve by grabbing maximal rents once

Hence, for any values of b and y , voters' demands have to satisfy the following incentive constraint:

$$W(b, y, x) \geq v(\bar{q} + \rho y_t)$$

Equilibrium demands by the voters (x^*) will be defined implicitly by the condition of:

$$W(b, y, x^*) = v(\bar{q} + \rho y_t)$$

where $x^* = X(b, y)$

we can define the equilibrium value of reappointment as:

$$V(b, y) = W(b, y, x^*) = v(\bar{q} + \rho y_t)$$

Equilibrium rents (r^*) in the current period will be

$$r^* = R(y) \equiv v^{-1}[v(\bar{q} + \rho y) - \beta EV(\bar{q} + \rho y')]$$

where the incumbent government is indifferent between the option to please the voters and stealing as much as possible today

In the case where government seeks re-appointment, the solution of the **optimization problem** will be:

$$\max_{\tau, g, r, b'} [v(\tau y - g + \beta b' - b) + \beta EV(b', y')] \quad (*)$$

subject to $b' \leq \bar{b}$ and to the *reelection constraint*, where
 $-\beta EV(b', y')$ is the **expected equilibrium continuation value** → what the incumbent expects to get from next period onwards if he is re-appointed
 $-v(\tau y - g + \beta b' - b)$ are **rents** in the current period

So:

$$EV(b', y') = v(\bar{q} + \rho y)$$

in this situation future costs are borne by the **consumers**

Indeed the optimal debt policy which solves the optimization problem (*) will be to borrow as much as possible: $b'^* = \bar{b}$

The **optimality condition** which keep fixed public consumption and tax rates is

$$U_c[(1 - \tau^*)y] = h_g(g^*)$$

VARIATION OF THE MODEL

The ceiling on upper bond on rents is a function of debt outstanding

$$q_t = Q(b_t) \quad \text{with} \quad Q_b, Q_{bb} < 0$$

The **equilibrium stochastic steady** state has

$$r^* = v^{-1}[v(Q(b^*))(1 - \beta)]$$

- i. Steady state debt is at an *interior optimum* : $b^* < \bar{b}$
- ii. Public consumption and tax rates are still defined as in the previous model
- iii. The steady state is *locally stable* ($db'/db < 1$ in a neighborhood of the steady state)
- iv. During the adjustments the steady state income shocks only affects public consumption and the tax rate (rents and government debt are NOT affected)

DISCUSSION: WHAT DOES FISCAL POLICY DO FACING AN INCOME SHOCK?

y is a random variable → income shocks are temporary and can be interpreted as business fluctuations

Differentiating the equilibrium

model:

$$R_y = \frac{\rho v_r(\bar{q} + \rho y)}{v_r(r^*)} > 0$$

R_y is positive → Thus equilibrium rents are **procyclical**

↑ Y → ↑ temptation of government to **obtain maximal rents** & to **avoid reelection**

The **size** of increasing in rents depends on

- curvature of the government preferences
- parameter ρ (it captures the extent to which q varies with income)

Procyclicality will be **more pronounced**

- The higher ρ is (the more the ceiling on rents increases with income)
- The less *marginal utility of rents* declines as they increase (the smaller v_{rr} is in absolute value)

Let apply the implicit function theorem to the expression for $G(y)$ and $T(y)$ previous defined:

$$T_y = \frac{(1-\tau)u_{cc} + (R_y - \tau)h_{gg}}{(u_{cc} + h_{gg})y} \lesseqgtr 0$$

$$G_y = \frac{u_{cc}(1-R_y)}{u_{cc} + h_{gg}} \lesseqgtr 0$$

T_y and G_y have
ambiguous signs

HP: $R_y = \tau < 1$ &
positive income shock

If $\tau = k$, the *additional tax revenues* would be fully absorbed by **rents**
→ this is NOT **optimal** because with $\tau < 1$ part of the positive income shock would also increase private consumption

↓ then

Objective: maintain equality in u_{cc} and h_{gg} → the government is

forced to $\uparrow \tau$

This holds a $R_y > \tau$ → SO equality between u_{cc} and h_{gg} may require

↓ τ

Thus a *procyclical tax rate* is more **feasible** the more procyclical rents are and the more larger h_{gg} is relative to u_{cc} in absolute value

Therefore total public expenses net of interest payments also **increase** with $y \rightarrow$ which can go up or down depending on parameter values, but it is more likely to go up the higher R_y is (=the more **procyclical** rents are)

Under the assumption of $q_t = Q(b_t)$, equilibrium rents do not react to income shocks:

T_y and G_y expressions do not vary

While now $R_y = 0$ (or $\rho = 0$)

THUS the **increase in income** is enterily captured by the consumer, resulting in a combination of more public and private consumption

Finally as long as $R_y < 1$

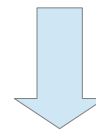
Voters utility always increases with income

Government debt instead is not affected at all by income shocks, so:

- Positive income shocks are NOT saved through the government budget to lead to a higher utility for tomorrow
- Negative income shocks do not bring to more government borrowing

In the same model a benevolent government

- x Would accumulate unbounded (illimited) assets (rather than incur debt) and asymptotically achieve full consumption smoothing
- x Would always respond to a *positive income shock* with an **increase** in the budget surplus and to a *negative income shock* with a **fall** in the surplus



instead

in the political equilibrium considered here (corrupted government) the budget surplus DOES NOT respond to income shocks at all (or it could increase less than the socially optimal level)→This failure is due to an **agency problem** in spite of a credit market imperfection

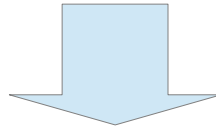
EXPLANATION

Consumers do not observe **debt accumulation** BUT know that they cannot trust government

HENCE -when they see $\uparrow y$ they ask for $\uparrow h_{gg}$, if they didn't do that the government would appropriate more rents

-the opposite happens when voters observe worst macroeconomic conditions ($\downarrow y$)

Government would hold the tax rate roughly **constant** facing income



tax rate can go up or down in response to a income shock depending on *how responsive* are equilibrium rents to income shocks→thus the response of the tax rate to income shocks in both models is ambiguous

NOTE : this model has a degree of corruption which is a zero-one variable[because of the strong assumption on the government preferences]→this means that the fiscal policy is procyclical IF the government can appropriate rents **INSTEAD**, if it cannot, fiscal policy is **socially optimal**

EVIDENCE: EMPIRICAL STRATEGY

The fiscal policy can be procyclical:

1. only in recession
2. In boom and recession time

We measure cyclical in country i making a regression:

$$\Delta F_{it} = \beta_i \text{OUTPUT_GAP}_{it} + \gamma X_{it} + \gamma F_{it-1} + \alpha_i + v_t + \varepsilon_{it}$$

- F_{it} is a fiscal policy indicator (government surplus or public spending)
- OUTPUT_GAP: business cycle
- X_{it} : vector of other controls
- $\alpha_i, v_t, \varepsilon_{it}$: errors
- We've to estimate β_i , instrumenting the output gap of country i with the output gap of the regions of country i .
- We observe 2-3 cycles in each country and each country must have 16 years of data. For this reason we consider only countries larger than 1 million inhabitants. (83 countries from 1960 to 2003).

$\Delta F(t)$ can be estimated in two different ways:

- Following the political agency model, we can put in a pool all the countries together also to gain efficiency. The estimates reflect within-countries variation. This model suggests us that procyclicality is more in the countries where corruption is widespread.

HOW CAN WE SEE THIS?

We interact the variable OUTPUT_GAP with a measure for the control of corruption. If from interaction we see that we've procyclicality in corrupt countries \rightarrow we're in favor of the political agency model.

- We estimate the equation on each country separately, then we regress the β coefficient on a measure of corruption and other controls in a cross-country regression.

DATA

Fiscal policy.

We consider two variables that are procyclical when there's a corrupt government: the budget surplus and the total spending net of transfers scaled to GDP.

- the first is referred to the central government.
- the second is measured by government consumption from the World Development Indicators (WDI). It presents a lot of errors because for developing countries we've poor data.

Income shocks.

Here we consider or the GDP growth or the OUTPUT_GAP as the logarithm deviation of GDP from its Hodrick-Prescott trend. Considering that the developing countries are exposed to more volatile economic shocks, we include in all regressions the TOT_GAP that's the log deviation of the terms of trade shocks from its H-D trend. Then we weight this variable with the degree of openness of the country measured by: $(\text{export-import})/\text{GDP}$

Control of corruption.

We use the index from Kaufman, Kraay and Mastruzzi's aggregate governance indicators. It assumes value from $-2,5$ to $+2,5$. It is available for 1996,98,2000,2002-05, so we consider an average of these. There're also other variables to measure the corruption: Transparency International. International Country Risk Guide.

Democracy.

We use *Polity2* from the Polity IV Project database. We subtract the country's score in an Autocracy index from its score in a democracy index. If *Polity2* is positive or zero \rightarrow democracy is equal to 1.

Per capita income. We consider the real GDP per capita in international prices in the first year of the sample (WDI), over which the measure of procyclicality of fiscal policy is computed for each country.

Borrowing Constraints.

We consider two variables:

1. The average of the existing sample of rating attributed by S&P's to a country's long-term foreign-denominated sovereign debt.
2. The logarithm of the spread of a country's sovereign debt over U.S Treasury Bonds, in the moment in which they're issued. This last in a direct measure of financial constraints

These variables don't vary in the time → we use an average like for the variable "Control of Corruption"

RESULTS

PROCYCLICALITY

Authors observe the cyclical response of the budget surplus and the total government spending for two samples of countries: OECD and non-OECD countries

- β coefficients (parameter of interests) are positive in OECD countries and insignificantly different from zero in developing countries → SO Fiscal policy is **countercyclical** only in developed countries (budget surplus increases only in OECD countries)
- Control of corruption indicator is 1.7 on average in OECD countries (in a rank from -2.5 to +2.5), while it is -0.2 in the non-OECD sample

These values can be explained with credit constraints, which are more often faced by developing countries

- Changes in surplus reflects both changes in spending and revenues. Authors investigating both components separately have found that they contribute all to a more procyclical fiscal policy in developing countries (government spending increases) compared to OECD countries (where spending keeps constant); but of the two, government spending shows a clearest pattern

Government consumption in percentage of GDP, as defined in WDI, goes down with the output gap in OECD countries while in developing countries the sign of the coefficient on output gap is essentially zero

PROCYCLICALITY AND CORRUPTION

Table 2. Corruption and the cyclicality of the budget surplus in democracies and non-democracies (Pooled sample)

	(1)	(2)	(3)
Output_Gap	0.068 (0.131)	-0.174 (0.220)	-0.042 (0.154)
Control_Corruption X Output_gap	0.241 (0.087)***		
Control_Corruption X Output_gap X Democ		0.298 (0.143)**	
Control_Corruption X Output_gap X NonDemoc		-0.034 (0.167)	
Control_Corruption X Output_gap X Polity2			0.023 (0.012)**
Observations	1727	1694	1694
R ²	0.231	0.220	0.217

significant at 5% *significant at 1%

Column 1: better control of corruption pushes towards a positive effect of `output_gap`, corresponding to more countercyclical fiscal policy (so procyclical fiscal policy is more prevalent in the more corrupt countries)

In Column 2 authors check the role of democracy: corruption has an effect on procyclicality only in democracies, in accordance with political agency model

In other words, it is the interaction of democratic accountability and corruption that leads to procyclicality, not corruption itself, nor democracy itself

Using the continuous variable `Polity2` to measure democracy, as we can see in Column 3, there are no changes in results

BORROWING CONSTRAINTS

Here we look at the relation between corruption and borrowing constraints:

- the correlation between *S&P Rating* and *Control of Corruption* is 0.9,
- the correlation between *Control of corruption* and *Spread* is -0.70.

However: *S&P Rating* and *Spread*, both alone or as interaction with the output gap → are insignificant.

BUT we've to discriminate between our corruption hypothesis and a credit rationing explanation of procyclicality.

OUR model says that corruption is highly correlated with procyclicality in democracies.

But there're also other evidences:

- ❖ A regression where budget surplus is a dependent variable. There're 2 periods, one pre- the other after 1982 (the year of the Mexican debt crises). Developed countries display countercyclical fiscal policy pre and after 1982 (β positive), while developing countries present two different signs for the β coefficient in the years, pre and after 1982 → there's countercyclicity after 1982 and procyclicality pre 1982.

	Pre-1982				Post-1982			
	OECD sample		Non-OECD sample		OECD sample		Non-OECD sample	
	1	2	3	4	5	6	7	8
Output_Gap	0.882	0,259	-0,171	-0,298	0,684	0,887	0,084	0,245

- ❖ Another test estimates the response of the budget surplus to downturns and upturns. Under a debt limit we should observe a negative β coefficient in the recession and not during the boom. This doesn't happen in developing countries. → Here the procyclicality is driven by the upturns (the surplus falls when output gap goes up). During the recession, surplus doesn't respond to the output gap, so these countries are able to run longer deficit in a recession. This is inconsistent with the theory that relies on borrowing constraints.

	OECD sample		Non-OECD sample	
	1	2	3	4
Output_Gap x Recession	1,064	0,975	0,194	0,368
Output_Gap x Boom	-0,093	0,105	-0,357	-0,411

SENSITIVITY ANALYSIS

There are different procedures for testing the degree of procyclicality. We've to assess the robustness of the results → we estimate the effects of corruption on procyclicality in a two-step procedure:

- i. We estimate the β coefficient separately for each country → it's difficult for various countries → generally it's procyclical in developing countries (Latin America and Sub-Saharan Africa).
- ii. We do a cross-country regression:

$$Beta_i = \varphi_0 + \varphi_1 Control_of_corruption_i + \varphi_2 X_i + u_i$$

Where:

- I is the country considered
- X is a vector of controls → per capita income measured the year before the start of the sample and other controls
- φ is the coefficient of interest

When we refer fiscal policy to the budget surplus, we've:

- an higher value of β \rightarrow countercyclical fiscal policy
- φ should be positive

When we refer fiscal policy to the government spending

- an higher value of β \rightarrow procyclical fiscal policy
- φ should be negative

Data give us significant results for β /Control of Corruption and insignificant results for β /democracy

The voracity effect

We use a variable which captures the fragmentation of the political process. The variable measures on a scale which goes from 0 to 1 the extent of checks and balances imposed (a high value → more effective checks and balances). This variable has a correlation of 0.5 with our measure of control of corruption → meaning that the government must be responsive and less corrupt.

The regression considers at the beginning only democratic countries and not the autocracies where there're less checks and balances. The variable considered is significant only alone. It's insignificant when we consider this last variable and corruption together.

Different measures of corruption

We can also use ICRG and Transparency International on corruption perception.

In these cases results are similar: the corruption indicators are highly correlated with each other and move slowly over time.

CONCLUSIONS

- ❖ Developing countries have a procyclical fiscal policy
- ❖ Rational voters don't trust corrupt governments so when they know that there's a positive shock, they demand tax cuts or increase in productive government spending or transfers because they think that government will steal resources.
- ❖ Consumers give up on consumption opportunities
- ❖ Governments don't accumulate reserves in good times and so they incur in debt and in a procyclical fiscal policy. This happens for the political distortion.
- ❖ Governments aren't able to repay debt or they're at limit and it starts also a malfunctioning of credit markets → they aren't able to ask the exact moneys for bad times.

According to the authors the failure to self-insure stems from political agency problem inside country:

- procyclicality exists in corrupt countries where voters consider responsible government through democratic institutions
- in developing countries there's a distorted policy reaction to booms and recessions