

Incomplete financial markets, suboptimal fiscal policy, and growth

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What are the growth consequences of procyclical fiscal policy in emerging economies? A procyclical fiscal policy implies decreasing government spending and increasing tax rates during recessions. Indeed, fiscal procyclicality diverts from orthodox macroeconomic prescriptions. On one hand, Keynesian economics prescribes countercyclical fiscal policies to alleviate demand crises, while Neoclassical economics argues for acyclical fiscal policies. Thus, procyclical fiscal policy is suboptimal under either school of economic thought. However, the empirical regularity of procyclical fiscal policy in developing economies has been noted at least since Talvi and Végh (2005).

The macroeconomics literature has rationalized such observation through an incomplete financial markets argument: because developing countries face countercyclical spreads on their debt, they cannot smooth consumption through debt during recessions reliably, and thus resort to tax increases (Cuadra, Sanchez, and Sapriza 2010).

Additional work on the procyclicality includes Mendoza and Yue (2012), who provide a general equilibrium model that incorporates business cycles with sovereign default to explain why defaulting economies experience deep recessions as well. Phuc Canh (2018) shows that emerging economies' fiscal policy is more efficient when they also hold strong institutions, especially through crowding-in effects. Born, Müller, and Pfeifer (2020) show that the effect of government spending on spreads is only increasing for high levels of withstanding debt. However, the cost of incomplete markets in terms of lost growth is yet unknown.

The effect of fiscal policy on growth has been reviewed at least since Kneller, Bleaney, and Gemmell (1999). They find productive government spending to increase growth and distortionary taxation to decrease growth for a sample of OECD countries. Econometric estimations have advanced up to Gemmell, Kneller, and Sanz (2011) who use pooled menas group regressions to overcome endogeneity concerns. However, they also limit themselves to OECD countries.

I propose studying whether fiscal policy has a differential effect on growth within developing countries. I gathered data from the World Bank and replicate the theoretical framework in Bleaney, Gemmell, and Kneller (2001) as close as possible. My results are not conclusive, but

they suggest that fiscal policy does not play a role in the growth of middle income countries, but it does in high income countries. This could be due to underlying problems in developing countries or the assumptions of the model.

I proceed as follows. First, I describe the data and the construction of macro variables. Second, I show summary statistics and descriptive statistics by income level. Third, I show the relationship between growth and fiscal policy variables. Fourth, I estimate the effect of fiscal policy on growth using a two-way fixed effects model. Finally, I conclude with the open questions my research has raised.

Data

The construction of macro variables was the toughest challenge for this project (thus far). To amplify the geographical reach of data from just OECD countries, I downloaded data from the World Bank API. Table 3 shows the allocation of accounting variables to theoretical variables I used, relative to the data construction in Bleaney, Gemmell, and Kneller (2001).

The most crucial difference in my data allocation is expenses accounted for as *productive expenditure*. Opposed to Bleaney, Gemmell, and Kneller (2001) I could not find disaggregated data for administrative services, defense expenditure, housing, or transport. Hence, my *productive expenditure* category includes only education and health expenditure.

Once downloaded and categorized, the data required minimal manipulation. I cut the period of interest from 200 to 2019 to maximize sample size, but also because it allows me to update the findings in Kneller, Bleaney, and Gemmell (1999). The final sample consist of five-year means of fiscal, control and outcome variables.

Descriptive results

Table 1 shows summary statistics *a la* Kneller, Bleaney, and Gemmell (1999). Notice the countries I exhibit as holding minimum or maximum values are from a wider range of latitudes than in Gemmell, Kneller, and Sanz (2011).¹ Also note magnitudes are consistent with the literature.

Table 2 shows descriptive statistics by income level. Notice that middle income countries grew at a higher pace than high income countries, suggesting a reversal from the *Divergence, big time* days, at least within my sample of countries with neat data (Pritchett 1997). The same pattern can be observed in Figure 2.

Figure 3 shows the relationship between growth and fiscal policy variables. Notice that all the included independent variables have different slopes for high and middle income countries. This suggests that the effect of fiscal policy on growth is different for each income level. In

¹Figure 1 shows the countries in my final sample in a map.

those simple linear regressions, growth is more responsive to fiscal policy in middle income countries than in high income countries. Interestingly, productive expenditure has a negative effect on growth in high income countries, and a null effect in middle income countries. This is puzzling, as the literature has shown the positive effects of education and health development (Banerjee and Duflo 2012).

Estimation

To estimate the effect of fiscal policy on growth, I follow the baseline, two way fixed effect model proposed by Kneller, Bleaney, and Gemmell (1999). It can be written as:

$$g_{it} = \lambda_i + \delta_t + \beta X_{it} + \epsilon_{it} \quad (1)$$

where g_{it} is the rate of growth of GDP per capita, λ_i and δ_t are fixed effects for countries and period, respectively, X_{it} is a vector of fiscal policy variables, and ϵ_{it} is the error term. To study whether developing countries have a different effect of fiscal policy on growth, I will estimate the model for high and middle income countries separately.

Crucially, time periods are defined as five year intervals to account for the long-run effects of fiscal policy.

Table 4 replicates the results of Kneller, Bleaney, and Gemmell (1999) as closely as possible, for the updated dataset of high income countries. The most notable feature of the results is the large and positive coefficient for the budget surplus, which is consistent with the literature. It allows fiscal space to finance productive government spending, which in turn increases growth, at least in theory. Contrary to the literature, I did not find a significant effect of productive expenditure on growth. This could be caused to the differences in the construction of the variable.

Note however, my regressions yield a similar goodness of fit as Kneller, Bleaney, and Gemmell (1999). The R-squared values are around 0.6, which is consistent with the literature.

Results

Table 5 shows the effect of fiscal policy on growth by income level, implicitly financed by non-distortionary taxes. None of the coefficients show a significant effect on growth for middle income countries. Although this could be caused by larger standard errors due to a smaller sample size, middle income countries have half the goodness of fit that high income countries have. This suggests that (i) fiscal policy is not as effective for middle income countries because of underlying problems such as high informality rates through which fiscal policy dissipates, and/or (ii) the effect of procyclical fiscal policy they usually follow on growth cannot be modeled using the same assumptions vis-a-vis high income countries.

Conclusions

Because of the time limitations of this project, I will only be able to conclude what are the open questions that my research has raised. The most pressing question is whether the use of procyclical fiscal policy in developing countries has had a negative effect on their growth. My results suggest that fiscal policy does not play a role in the growth of middle income countries, but it does in high income countries. Whether this is due to the underlying problems of developing countries or the assumptions of the model is yet to be determined.

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Tables and figures

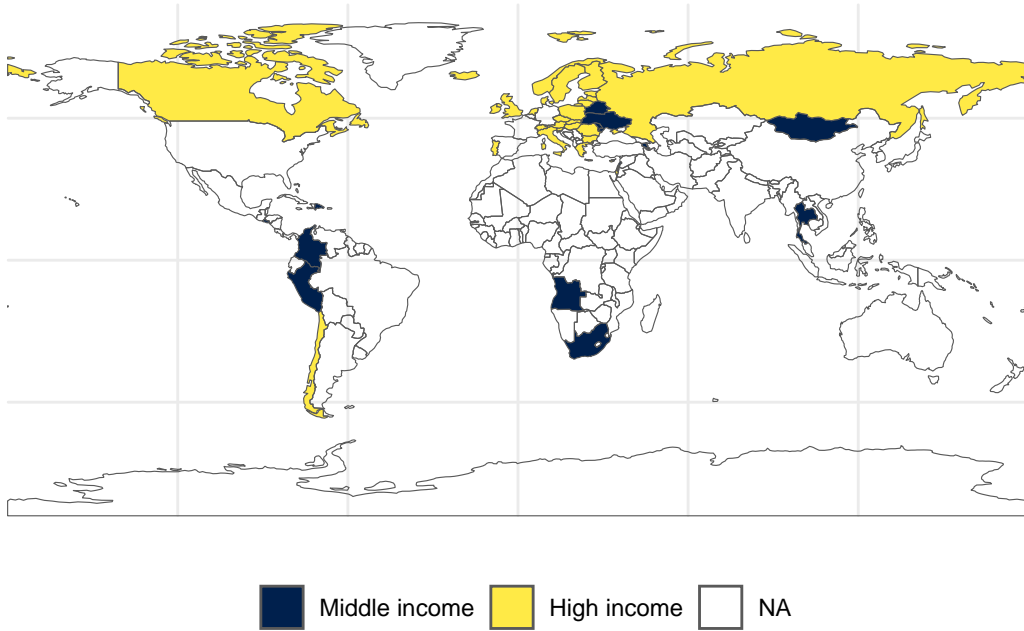


Figure 1: Countries by income group

Table 1: Summary statistics (% of GDP unless noted)

Variable	Mean	SD	Min	Min Country	Max	Max Country
GDP per capita growth (annual %)	2.67	2.42	-4.57	Greece	11.63	Armenia
Initial p.c. GDP (thousands 2015 USD)	22.62	22.91	1.25	Armenia	106.54	Luxembourg
Labor growth (annual %)	0.93	1.31	-3.26	Romania	6.46	Lebanon
Net investment in nonfinancial assets	2.34	1.52	0.38	Ukraine	9.49	Angola
Other expenditure	8.04	6.96	0.00	Canada	51.34	Malta
Productive expenditure	9.45	2.84	3.47	Dominican Republic	16.88	Denmark
Unproductive expenditure	15.49	7.12	2.08	El Salvador	33.35	Austria
Budget surplus	-0.89	4.32	-12.15	Ireland	16.84	Norway
Net lending (+) / net borrowing (-)	-1.69	3.83	-14.06	Malta	16.18	Norway
Distortionary taxation	14.95	6.58	2.71	Lebanon	39.15	Malta
Non-distortionary taxation	10.81	3.71	1.20	Angola	28.05	Malta
Other revenues	5.95	3.44	1.48	Canada	22.81	Angola

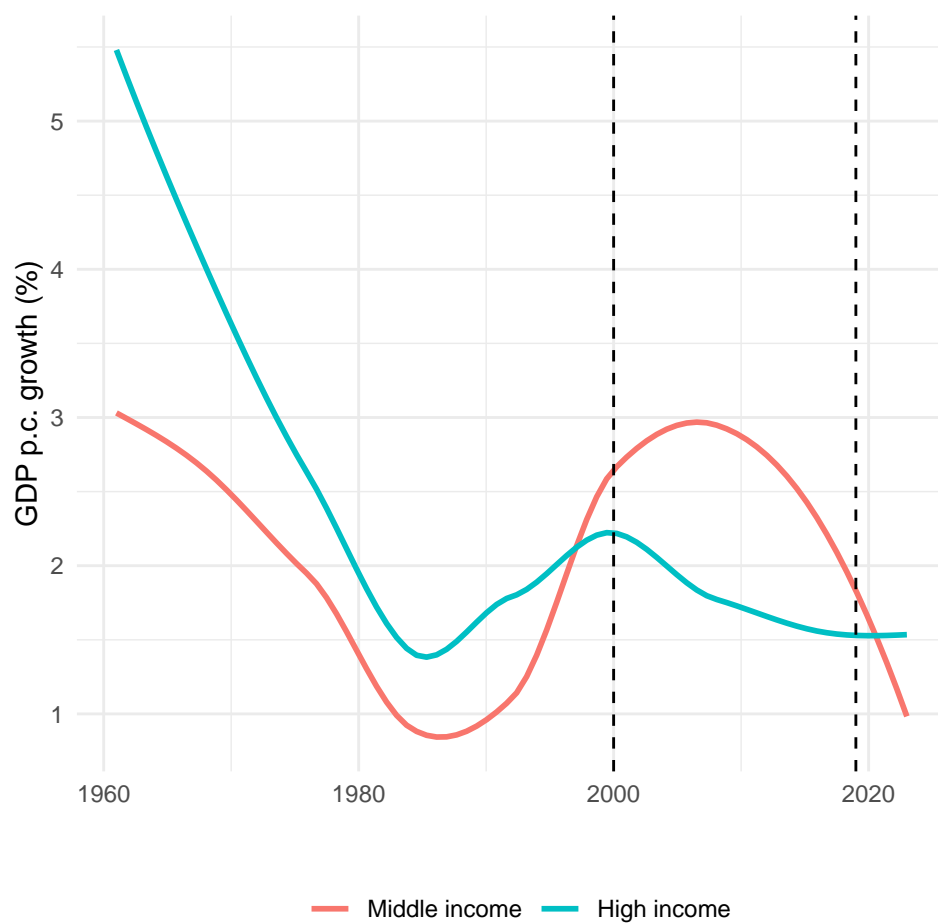
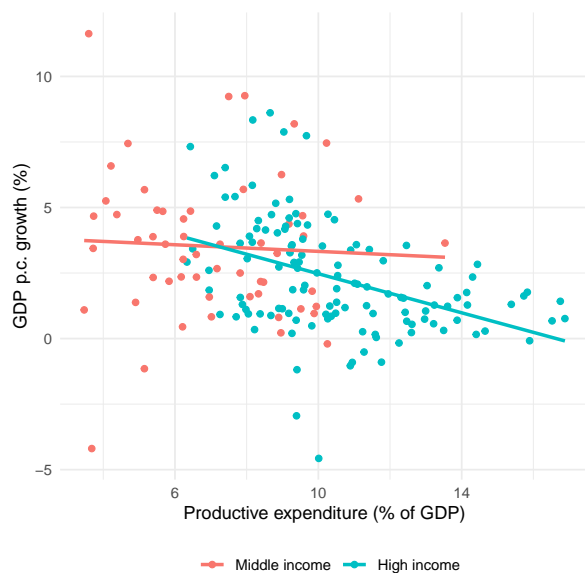
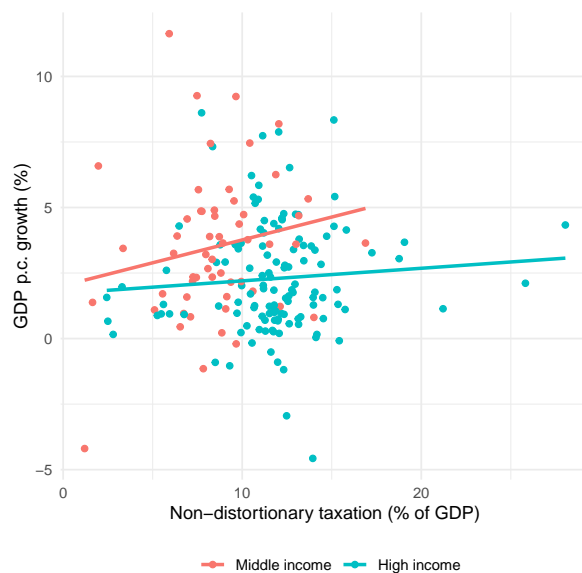


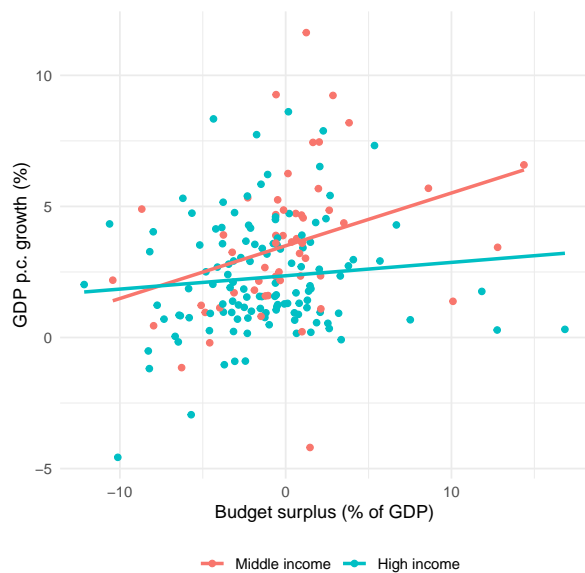
Figure 2: Growth by income level



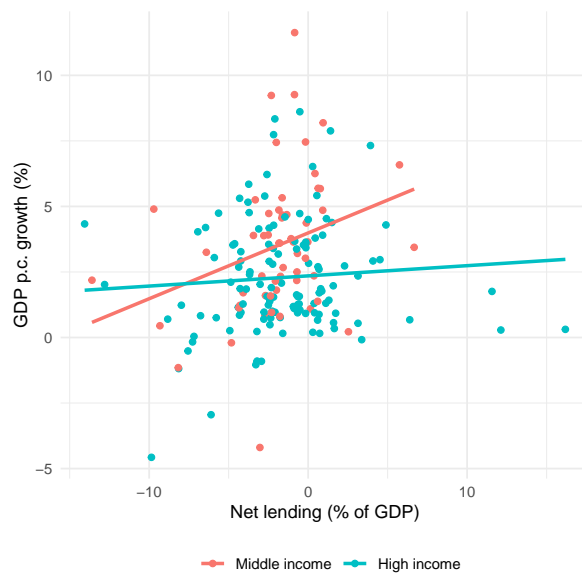
(a) Productive expenditure



(b) Non-distortionary taxation



(c) Budget surplus



(d) Net lending

Figure 3: Long-run determinants of growth

Table 2: Summary statistics by income level (% of GDP unless noted)

Characteristic	Middle income, N = 14	High income, N = 31
GDP per capita growth (annual %)	3.51 (1.68)	2.29 (1.54)
Labor growth (annual %)	1.37 (1.14)	0.73 (0.97)
Net investment in nonfinancial assets	2.61 (1.91)	2.21 (0.96)
Initial p.c. GDP (thousands 2015 USD)	4 (2)	31 (23)
Net lending (+) / net borrowing (-)	-1.91 (2.85)	-1.59 (3.44)
Budget surplus	0.04 (4.05)	-1.31 (3.53)
Distortionary taxation	8.9 (3.6)	17.7 (5.4)
Non-distortionary taxation	8.5 (2.7)	11.8 (3.2)
Other revenues	6.5 (3.5)	5.7 (3.1)
Productive expenditure	7.12 (2.12)	10.49 (2.34)
Unproductive expenditure	11 (6)	18 (6)
Other expenditure	6.2 (3.9)	8.9 (7.1)

¹ Mean (SD)

Table 3: Allocation of theoretical variables

Theoretical classification	GFS functional classification	Degetau
Budget surplus	Budget surplus (net operating balance)	Budget surplus (net operating balance)
Distortionary taxation	Taxation on income and profit	Taxation on income and profit
Distortionary taxation	Social security contributions	Social security contributions
Distortionary taxation	Taxation on payroll and manpower	
Distortionary taxation	Taxation on property	
Non-distortionary taxation	Taxation on domestic goods and services	Taxation on domestic goods and services
Other revenues	Taxation on international trade	Other tax revenues
Other revenues	Other tax revenues	
Other revenues	Non-tax revenues	
Productive expenditures	General public services expenditure (administrative services)	
Productive expenditures	Defense expenditures	

Productive expenditures	Educational expenditure	Educational expenditure
Productive expenditures	Health expenditure	Health expenditure
Productive expenditures	Housing expenditure	
Productive expenditures	Transport and communication expenditure	
Unproductive expenditures	Social security and welfare expenditure	Other expenditure
Unproductive expenditures	Expenditure on recreation	
Unproductive expenditures	Expenditure on economic services (sector spending)	
Other expenditure	Unclassified	

Table 4: Two-Way fixed effects results for high income countries following KBG (1998)

Dependent Variable:	GDP per capita growth		
Omitted Fiscal Variable:	Non-dist. tax.	Unprod. exp.	Non-dist. tax. + Unprod. exp.
Model:	(1)	(2)	(3)
<i>Variables</i>			
Initial GDP p.c.	-0.0503 (-0.4113)	-0.0799 (-0.6384)	-0.0411 (-0.3399)
Investment	-0.2996 (-0.9343)	-0.2061 (-0.6694)	-0.3430 (-1.028)
Labor growth	-0.4409 (-1.663)	-0.4490* (-1.736)	-0.4292 (-1.612)
Net lending	-0.5446*** (-3.395)	-0.4741*** (-3.254)	-0.6048*** (-3.925)
Distortionary taxation	-0.1326 (-0.7012)	-0.2147* (-1.774)	-0.2294* (-1.791)
Other revenues	-0.0024 (-0.0144)	-0.1182 (-0.7278)	-0.0722 (-0.4742)
Budget surplus	0.6938*** (3.229)	0.7538*** (7.110)	0.8161*** (6.701)
Productive expenditure	-0.4046 (-1.321)	-0.2962 (-1.026)	-0.3833 (-1.322)
Unproductive expenditure	-0.1011 (-0.6912)		
Other expenditure	0.0837 (0.8527)	0.2320** (2.318)	0.1272* (1.734)
Non-distortionary taxation		-0.2483* (-1.740)	
<i>Fixed-effects</i>			
Country	Yes	Yes	Yes
Year	Yes	Yes	Yes
<i>Fit statistics</i>			
Adjusted R ²	0.62986	0.64055	0.63191
Observations	124	124	124

Clustered (Country) co-variance matrix, t-stats in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 5: Regression results by income level

Dependent Variable:	GDP per capita growth		
Income level	Full sample	Middle income	High income
Model:	(1)	(2)	(3)
<i>Variables</i>			
Initial GDP p.c.	-0.0631 (-0.4898)	-1.191 (-1.558)	-0.0503 (-0.4113)
Investment	0.2067 (0.5577)	0.7099 (0.6247)	-0.2996 (-0.9343)
Labor growth	-0.1625 (-1.180)	0.0094 (0.0455)	-0.4409 (-1.663)
Net lending	-0.2024 (-0.6147)	0.4565 (0.4592)	-0.5446*** (-3.395)
Distortionary taxation	0.1303 (0.5706)	0.5548 (1.493)	-0.1326 (-0.7012)
Other revenues	0.0007 (0.0039)	0.1081 (0.3133)	-0.0024 (-0.0144)
Budget surplus	0.4191 (1.104)	-0.3472 (-0.3045)	0.6938*** (3.229)
Productive expenditure	-0.1525 (-0.6244)	0.0221 (0.0434)	-0.4046 (-1.321)
Unproductive expenditure	-0.1374 (-0.7239)	-0.5469 (-1.032)	-0.1011 (-0.6912)
Other expenditure	-0.0507 (-0.3652)	-0.2145 (-0.3929)	0.0837 (0.8527)
<i>Fixed-effects</i>			
Country	Yes	Yes	Yes
Year	Yes	Yes	Yes
<i>Fit statistics</i>			
Adjusted R ²	0.49259	0.33320	0.62986
Observations	180	56	124

Clustered (Country) co-variance matrix, t-stats in parentheses

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*