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Yuchen LUO

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Abstract

In this paper, I employ a linear regression model to examine the effectiveness of four microeconomic variables, namely government debt, GDP growth rate, household consumption growth rate and government spending growth rate, in stimulating economic growth. In order to test the effectiveness of expansionary fiscal policy in different macro-environments, countries were first partitioned into low and high government debt categories. In addition, raw dataset was partitioned into two time periods, respectively, representing normal macroeconomic years and recession years. My results suggest that countercyclical government spending has been an effective stimulation tool but its effect was more significant in countries of low government debt rate or during recession years.

1. Introduction

Most governments responded to the outbreak of the subprime crisis with expansionary fiscal policies. As a result, we observed increases in government spending while the real GDP shrank. Some critics assert that easing strategy would not help real economy but merely bring about hyperinflation. Ho (2013), however, argued that quantitative easing strategies were certainly effective and added that "the evidence" of ineffectiveness of expansionary fiscal policy in Japan is due to other factors such as a strong yen. Proponents of austerity policies argue that central government debt to GDP is an indicator of the cost of borrowings for a country. Increasing government expenditure will tend to enlarge government budget deficit, and cause high government debt to GDP ratio. High cost of borrowings for a country will most probably harm a country's economy, which could offset the benefits of increasing government spending. A few governments such as Greece, Spain, and Cyprus, adopted austerity fiscal policies aiming to lower government debt to GDP ratio and expected to improve GDP by doing so. However, the desired results were not achieved. Based on GS/PD model, Ho (2013) stated that increasing government budget deficit, as long as it is powerful enough to strengthen market confidence, can help improve real economy and in return lower the government debt to GDP ratio.

The key objective of this paper is to test if expansionary fiscal policy is effective in dealing with financial crisis and recovering market confidence by examining the effects of increase in government expenditure on private consumption in normal years and during periods of financial crisis. If increasing government expenditure could, to some extent, improve market confidence, private consumption will increase. The dataset includes 428 observations for central government debt, total (% of GDP), GDP growth (annual %), household final consumption expenditure (annual % growth), and general government final consumption expenditure (annual % growth) over a 9-year time period from 2003 to 2011.

My findings are in line with Ho's argument. My results indicate that 1% increase in government expenditure would lead to 0.19% increase in private consumption in normal years, and the effects are even more apparent in periods of crisis as 1% increase would lead to 0.47% increase in private consumption. Besides, I also find that countries with lower government debt to GPA ratios benefit more than those with higher ratios from expansionary fiscal policy. My findings provide empirical evidence that expansionary fiscal policy should be put in place in order to remedy economic downturns and prove the effectiveness of expansionary fiscal policies irrespective of a country's debt level, culture, and political system.

2. Data

The paper's data is collected from the World Bank. The dataset includes 428 yearly observations of 53 countries over 5 continents from 2003 to 2011 for central government debt,

total (% of GDP), GDP growth (annual %), household final consumption expenditure (annual % growth), and general government final consumption expenditure (annual % growth). The data of the rest of the countries are weakly balanced and so are excluded from the analysis.

Table 1

The table represents the summary statistics of this paper's dataset.

Variable	Obs	Mean	Std. Dev.	Min	Max
Time Period	2003 to 2011				
Central government debt, total (% of GDP)	442	51.64775	33.35255	-6.99452	180.5662
GDP growth (annual %)	477	3.396633	3.930371	-14.8	14.76322
Household final consumption expenditure (annual % growth)	469	3.705297	5.878649	-33.5249	66.66397
General government final consumption expenditure (annual % growth)	469	2.834153	3.964874	-18.8111	23.5898

Table 2

The table represents the summary statistics of this data in normal years.

Variable	Obs	Mean	Std. Dev.	Min	Max
Time Period	2003 to 2007				
Central government debt, total (% of GDP)	237	50.95677	33.36398	3.610249	180.5662
GDP growth (annual %)	265	4.833063	2.764677	-0.91112	14.43354
Household final consumption expenditure (annual % growth)	265	5.048156	6.128967	-33.5249	66.66397
General government final consumption expenditure (annual % growth)	265	3.001832	3.661897	-18.8111	22.24224

Table 3

The table represents the summary statistics of this data in periods of crisis.

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Variable	Obs	Mean	Std. Dev.	Min	Max
Time Period	2008 to 2011				
Central government debt, total (% of GDP)	205	52.44658	33.4031	-6.99452	174.9787
GDP growth (annual %)	212	1.601095	4.410797	-14.8	14.76322
Household final consumption expenditure (annual % growth)	204	1.960897	5.040625	-17.8205	16.7007
General government final consumption expenditure (annual % growth)	204	2.616335	4.326474	-10.9419	23.5898

3. Methodology

This paper examines the effects of government expenditure on private consumption in normal years and in periods of crisis. In order to achieve this purpose, this paper uses regression analysis to examine such effects. The main empirical model is as follows:

$$PC = a \times GE + b \times GE2 + c \times \text{DtY}$$

Where a, b, and c are coefficients, PC represents household final consumption expenditure (annual % growth), GE represents general government final consumption expenditure (annual % growth), DtY represents central government debt, total (% of GDP). GE2 is included in this regression to capture non-linear relationship between GE and PC.

In order to examine the effects of government expenditure on private consumption under different conditions, this regression is run in 2 different sample ranges, respectively from 2003 to 2007 and from 2008 to 2011.

The dataset is partitioned into 2 parts by 50 of central government debt total (% of GDP), so that we can examine how the debt to GDP ratio affects different countries under different conditions.

4. Results

(Government_o represents central government debt, total (% of GDP), government_g represents general government final consumption expenditure (annual % growth), Private_Cons_h represents household final consumption expenditure (annual % growth)

4.1 sample from 2003 to 2007 when the average annual GDP growth rate is nearly 5.0%

```
. regress Privat_Consumption_growth Government_debt_ratio Government_spending GS
> 2 if tin(2003,2007), vce(robust)

Linear regression                          Number of obs =      237
                                           F(  3,   233) =     8.96
                                           Prob > F      =   0.0000
                                           R-squared     =   0.0776
                                           Root MSE      =   5.2989
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.0316281	.0106427	-2.97	0.003	-.0525964	-.0106598
Government_~g	.197174	.0587584	3.36	0.001	.0814083	.3129398
GS2	.0070152	.0040444	1.73	0.084	-.000953	.0149835
_cons	5.724872	.8015309	7.14	0.000	4.145698	7.304047

```
. regress Privat_Consumption_growth Government_debt_ratio Government_spending GS
> 2 if tin(2003,2007) & (Government_debt_ratio <=  50), vce(robust)

Linear regression                          Number of obs =      140
                                           F(  3,   136) =    15.12
                                           Prob > F      =   0.0000
                                           R-squared     =   0.0928
                                           Root MSE      =   6.1259
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.1110857	.0409626	-2.71	0.008	-.1920918	-.0300796
Government_~g	.3185045	.1496775	2.13	0.035	.0225082	.6145007
GS2	-.0044608	.0094686	-0.47	0.638	-.0231855	.0142639
_cons	8.049097	1.591355	5.06	0.000	4.902095	11.1961

```
. regress Privat_Consumption_growth Government_debt_ratio Government_spending GS
> 2 if tin(2003,2007) & (Government_debt_ratio > 50), vce(robust)

Linear regression                          Number of obs =       97
                                           F(  3,    93) =     2.52
                                           Prob > F      =   0.0625
                                           R-squared     =   0.0637
                                           Root MSE      =    3.566
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.006419	.0101586	-0.63	0.529	-.0265919	.0137539
Government_~g	.1889445	.0811217	2.33	0.022	.0278528	.3500362
GS2	.0126549	.005646	2.24	0.027	.0014431	.0238667
_cons	3.599418	1.097832	3.28	0.001	1.41934	5.779495

First, I find that in normal years private consumption is positively related to rate of growth of government spending. It suggests that Ho's assumption holds in normal years- that increase in government spending would lead to increase in private consumption. Moreover, the negative coefficients of government spending square and central government debt ratio indicate that increase in government spending does cause some counter-effects.

Second, I find that countries of lower debt ratios would benefit more from increases in government spending than those of higher debt ratios.

4.2 Sample from 2008 to 2011 when the average annual GDP growth rate is less than 2.0%.

```
. regress Privat_Consumption_growth Government_debt_ratio Government_spending GS
> 2 if tin(2008,20011), vce(robust)

Linear regression                               Number of obs =      199
                                                F(  3,   195) =    16.28
                                                Prob > F      =   0.0000
                                                R-squared     =   0.1451
                                                Root MSE      =   4.7353
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.0244182	.0106301	-2.30	0.023	-.0453829	-.0034535
Government_~g	.4766754	.1274364	3.74	0.000	.2253448	.7280059
GS2	-.011165	.0067798	-1.65	0.101	-.0245361	.0022062
_cons	2.252368	.886371	2.54	0.012	.5042631	4.000472

```
. . regress Privat_Consumption_growth Government_debt_ratio Government_spending
> GS2 if tin(2008,2011) & (Government_debt_ratio <=  50), vce(robust)

Linear regression                               Number of obs =      111
                                                F(  3,   107) =     3.20
                                                Prob > F      =   0.0263
                                                R-squared     =   0.1114
                                                Root MSE      =   5.5081
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.0736776	.0406166	-1.81	0.072	-.1541953	.0068401
Government_~g	.893953	.3281103	2.72	0.008	.2435127	1.544393
GS2	-.052947	.0215138	-2.46	0.015	-.0955956	-.0102983
_cons	3.415789	1.421565	2.40	0.018	.5977026	6.233876

```
. regress Privat_Consumption_growth Government_debt_ratio Government_spending GS
> 2 if tin(2008,2011) & (Government_debt_ratio >   50), vce(robust)

Linear regression                               Number of obs =       88
                                                F(  3,    84) =    25.33
                                                Prob > F      =   0.0000
                                                R-squared     =   0.2893
                                                Root MSE      =   3.4113
```

Privat_Cons~h	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
Government_~o	-.0229784	.0127488	-1.80	0.075	-.0483309	.002374
Government_~g	.4072267	.1083117	3.76	0.000	.1918371	.6226164
GS2	-.0019001	.0049847	-0.38	0.704	-.0118127	.0080126
_cons	2.156574	1.079169	2.00	0.049	.0105292	4.302619

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First, the change in coefficient of government spending shows that government spending in the periods of crisis has a more significant effect on private consumption than in normal years. Furthermore, the government spending square is still negatively related to private consumption but statistically insignificant. The negative sign of government debt ratio shows that debt ratio still has some counter-effect but the value of the coefficient drops nearly 23% from 0.031 in normal years to 0.024 in the periods of crisis implying that the counter-effect of government debt to GDP ratio weakens during crisis.

Second, it is also consistent with the finding in normal years that expansionary fiscal policy works better on those countries with lower government debt to GDP ratio than those of higher ratios.

5. Conclusion

My findings are based on an empirical model with regression analysis on a database consisting of 53 countries over a 9-year time period. My findings indicate that increasing government expenditure is highly effective in boosting market confidence and generating increase in private consumption both in normal years and in the periods of crisis. Moreover, the effects of expansionary fiscal policy are more apparent in the periods of crisis irrespective of a country's debt to GDP level, region, and culture.

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