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Fiscal Policy Regimes in Least Developed Countries

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Introduction

In This Paper

- ✘ Do fiscal surpluses evolve in a manner that ensures long-term fiscal solvency in the least developed countries(LDCs)?
  - ☞ And why?
- ✘ YES $\Longrightarrow$ surpluses endogenously determined $\Rightarrow$ Ricardian regime (Sargent, 1982)
  - ☞ Example: $\Uparrow$ Debt $\Rightarrow$ $\Uparrow$ future taxes or $\Downarrow$ expenditure.
- ✘ NO $\Longrightarrow$ surpluses arbitrarily chosen $\Rightarrow$ non-Ricardian regime (Sargent, 1982)
  - ☞ Example: $\Uparrow$ Debt $\Rightarrow$ $\Uparrow$ Prices(Cochrane, 2023, 2001, 1998).
- ✘ Surpluses in the LDCs seem to evolve differently from other countries.

Figure 1: Primary Surpluses and Liabilities in LDCs

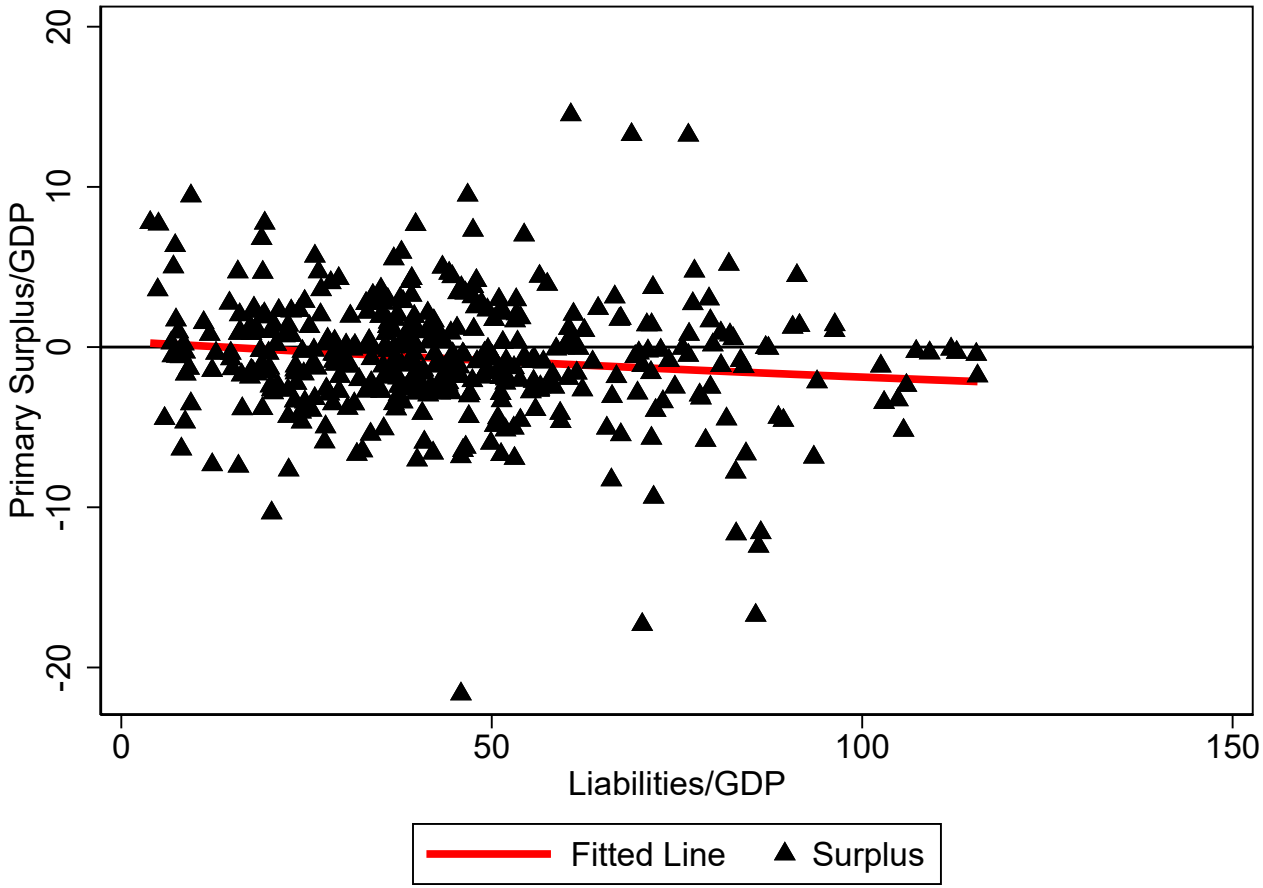
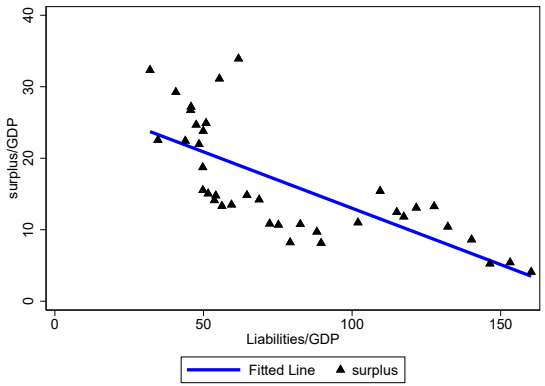
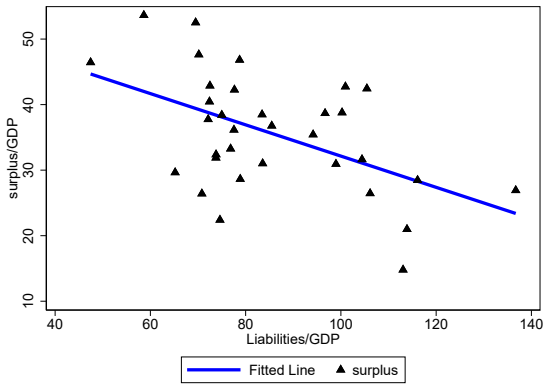


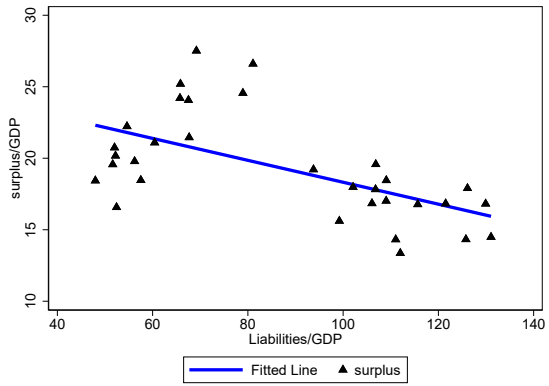
Figure 2: Surpluses and Liabilities in selected countries



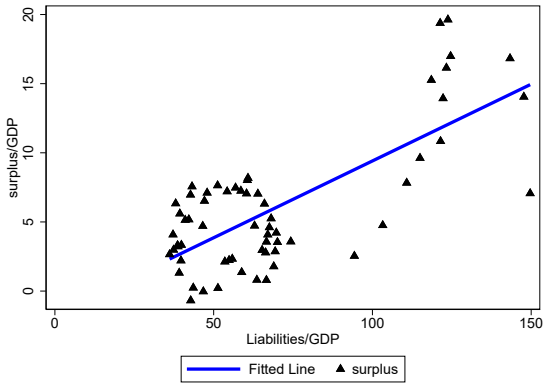
(a) Comoros Islands



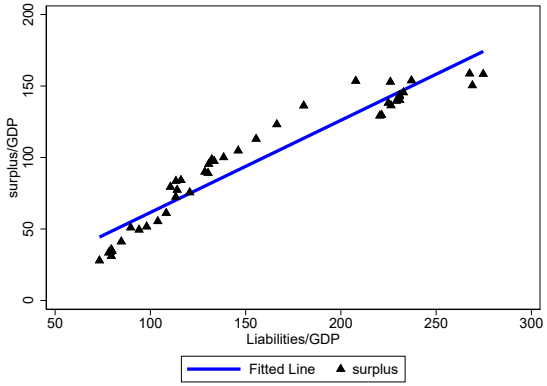
(b) Lesotho



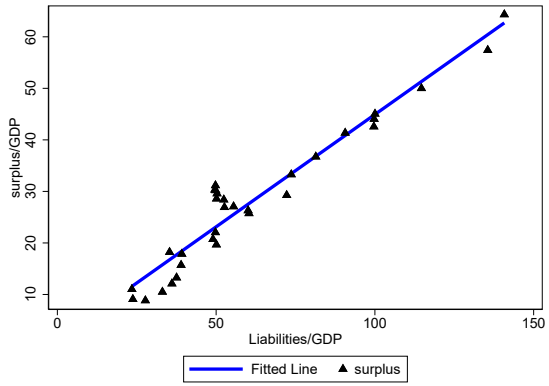
(c) Madagascar



(d) US



(e) UK



(f) Australia

Motivation

1. While empirical evidence of the evolution of surpluses in advanced and other developing economies is abundant, such evidence for least developed countries is nonexistent.

2. Knowledge about surplus evolution affects the optimal design of other national policies such as monetary and exchange rate policy(Aiyagari and Gertler, 1985; Woodford, 1995; Cochrane, 1998)

Example

2.1 Arbitrary surplus evolution $\Rightarrow$ prices jump to ensure long term fiscal solvency

- ☞ This challenges the effectiveness of standard monetary policy

2.2 Arbitrary surplus evolution $\Rightarrow$ monetary tightening or fiscal expansion leads to currency depreciation

Preview of Findings

1. Using time series data for selected LDCs, we find that the evolution of surpluses in most LDCs is arbitrary.

   - ☞ This means that LDCs **do not use fiscal surpluses to ensure long-term fiscal solvency**, potentially opening the door to high borrowing interest rates and sovereign defaults

   - ☞ Importantly, **monetary policy will be less effective in stabilizing inflation because prices have to respond to changes in fiscal stances to achieve fiscal solvency**.

2. We strongly suspect that poor institutional quality in LDCs may be responsible for this behavior of surpluses:

   - ☞ Surpluses positively respond to improved institutional quality

   - ☞ Countries with relatively better institutions but not different from LDCs in level of development show endogenous evolution of surpluses

The Theory

Government's present value budget constraint

$$\omega_t = \chi_t + \mathbb{E}_t \sum_{j=t+1}^{\infty} \prod_{\tau=t}^{j-1} r_\tau \ \chi_j \tag{1}$$

- ω_t:accumulated public liabilities as a percentage of nominal GDP
- r_t: ratio of gross interest rate to gross nominal GDP
- χ_t: total public surplus as a percentage of nominal GDP
- (1) must be satisfied regardless of a fiscal regime
- How χ_t and ω_t relate to each other as the system moves towards (1) determines the underlying fiscal policy regime.

The Methods

Sampled Countries

- Based on data availability, we sampled nine least-developed countries.

1. Lesotho
2. Mozambique
3. Guinea
4. Comoros
5. Gabon
6. Madagascar
7. Equatorial Guinea
8. Malawi

- Annual data over an average sample period of $1980 - 2022$

- For comparative purposes, we applied the estimation approach on selected advanced economies

Empirical Model

- Estimated a Bayesian structural VAR for each country:

$$\mathbf{A}_0\mathbf{Y}_t = \sum_{j=1}^{\Omega} \mathbf{B}_j\mathbf{Y}_{t-j} + \mathbf{Z}_t\varphi + \mathbf{X}_t\Lambda + \eta_t \tag{2a}$$

- $\mathbf{A}_0$: Structural parameters ; $\mathbf{Y}_t$: Endogenous series

  - surplus(χ_t) ; liabilities(ω_t) ;discount factor(r_t)

- $\mathbf{X}_t$, $\mathbf{Z}_t$: Controls and Deterministic terms
- $\eta_t = (\eta_t^{\chi} \quad \eta_t^{\omega} \quad \eta_t^{r})'$:Structural shocks

The interest

- To estimate the reaction of liabilities(ω) following a positive structural shock to surpluses

$$IRF(h) = \frac{\partial \omega_{t+h}}{\partial \eta_t^{\chi}}, \quad h = 1, 2, 3, ...H \tag{2b}$$

Empirical Model..

- Order matters in this case

- We made the following ordering:

$$\chi_t \quad \omega_t \quad r_t \tag{3a}$$

- The results are, however, robust to an alternative ordering: $\omega_t \quad \chi_t \quad r_t$

Decision

- Decided based on the following criterion:

$$Decision \Rightarrow \begin{cases} Ricardian \quad \exists\ h \quad s.t & \frac{\partial \omega_{t+h}}{\partial \eta_t^{\chi}} < 0 \\ non - Ricardian & \frac{\partial \omega_{t+h}}{\partial \eta_t^{\chi}} \geq 0 \quad \forall h \end{cases} \tag{3b}$$

- These conclusions assume that χ_t is **not negatively autocorrelated**.

- **Ricardian**: a positive shock to surpluses implies an increase in resources which are then used to pay off some liabilities, regardless of the autocorrelation structure of χ_t

$$\Uparrow \chi_t \rightarrow \Downarrow \omega_{t+1} \tag{4a}$$

- **non-Ricardian**: three cases can be considered:

$$\Uparrow \chi_t \rightarrow \begin{cases} 1. & \rho_{t,t+k} = 0 \rightarrow \omega_{t+1} = constant \\ 2. & \rho_{t,t+k} > 0 \rightarrow \Uparrow \omega_{t+1} \\ 3. & \rho_{t,t+k} < 0 \rightarrow \Downarrow \omega_{t+1} \end{cases} \tag{4b}$$

- As such, to uniquely identify a fiscal regime, it must be the case that:

$$\rho_{t,t+k} \in [0, 1] \tag{4c}$$

Estimation....Choice of priors

- We compared three priors based on the estimated posterior probability of the model.

- For each country, we chose a prior, among the three, with the highest model posterior probability

Table 1: Choice of priors

Priors	Madagascar	Guinea	Equatorial Guinea	Gabon	Lesotho	Malawi	Mozambique	Comoros
Normal diffuse prior								
Log-likelihood	-183.2993	-217.467	-396.201	-228.021	-226.2002	-104.557	-156.503	-52.605
model prior probability	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333
model posterior probability	0.299	0.990	0.991	0.909	0.000	1.000	0.000	0.000
Normal Wishart prior								
Log-likelihood	-189.766	-221.987	-400.965	-233.124	-238.225	-170.607	-165.246	-238.225
model prior probability	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333
model posterior probability	0.0013	0.011	0.009	0.0055	0.000	0.000	0.000	0.000
Original Minessota prior								
Log-likelihood	-183.448	-228.754	-404.726	-230.379	-193.186	-161.302	-139.521	-11.979
model prior probability	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333
model posterior probability	0.700	0.0000	0.0002	0.0859	1.000	0.000	1.000	1.000

The Findings

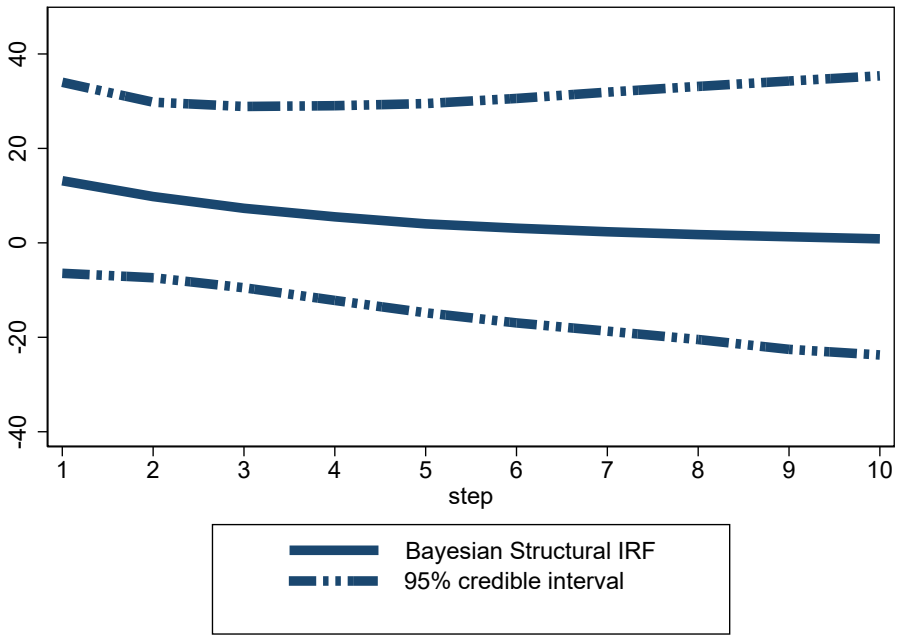
Autocorrelation structure of χ_t

Lag	Malawi	Madagascar	Lesotho	Guinea	Gabon	Equatorial Guinea	Comoros Islands	Mozambique
1	0.3929***	0.739***	0.605***	0.5663***	0.4573***	0.6038***	0.7973***	0.8536***
2	0.2809***	0.6655***	0.4304***	0.5152***	0.2274***	0.6001***	0.7088***	0.7859***
3	0.1581***	0.5622***	0.2809***	0.4726***	0.2195***	0.3179***	0.6409	0.6984***
4	0.1825***	0.467***	0.0892***	0.4602***	0.3171***	0.2466***	0.5406***	0.5775
5	0.0796***	0.3619***	0.030***	0.3566***	0.2953***	0.111***	0.4744***	0.4576***
6	0.0114***	0.2513***	-0.0687***	0.2831***	0.1931***	0.1197***	0.4173***	0.3496 ***
7	0.0325***	0.2393***	-0.2198	0.355	0.0052***	0.0491	0.3627	0.2312***
8	0.1044***	0.1816	-0.4137	0.2114	-0.0319	-0.0288***	0.3578	0.1012
9	0.1171***	0.1602	-0.5398	0.09	-0.1858	-0.0585***	0.2348***	0.0146***
10	0.1049***	0.0945	-0.3743	0.0222	-0.3294	-0.0757***	0.1997***	-0.0612***

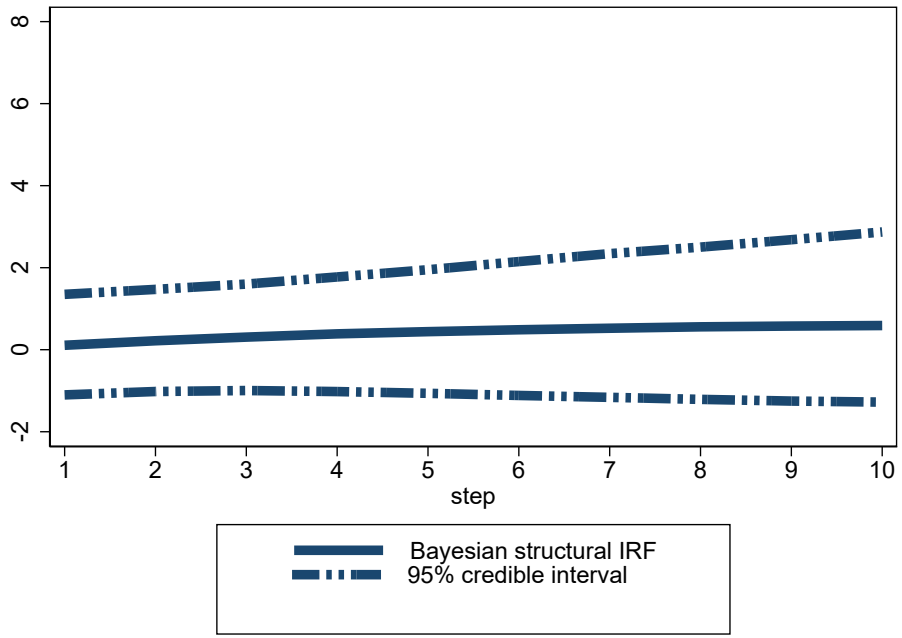
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- ✘ There is no evidence of a negative correlation within at most a six-year horizon for most of these countries
  - ◇ We can uniquely identify a fiscal regime in that horizon for these countries
- ▶ A surplus shock leads to more surpluses at least for the first years post-impact

Figure 3: Response of liabilities to a positive surplus shock

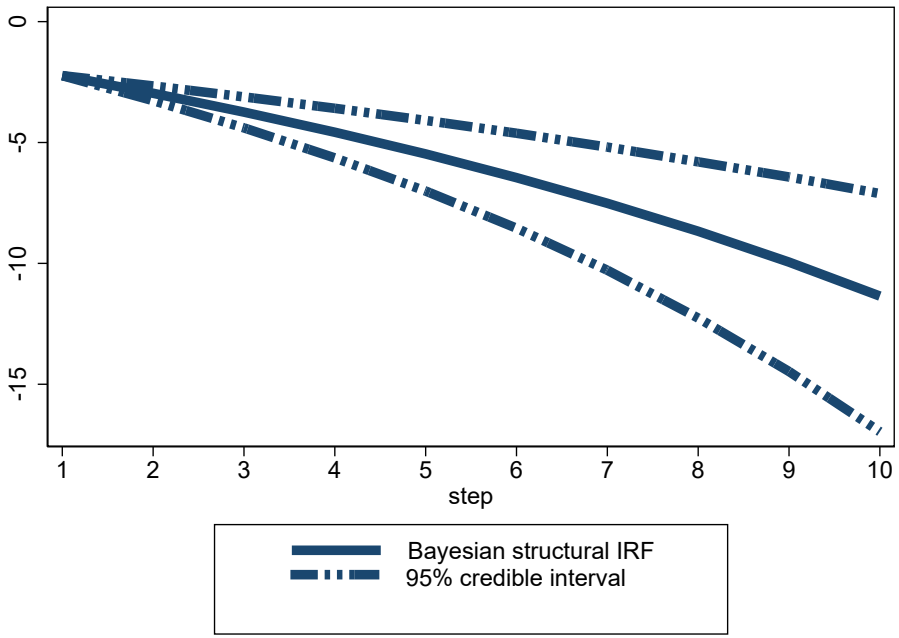


(a) Malawi

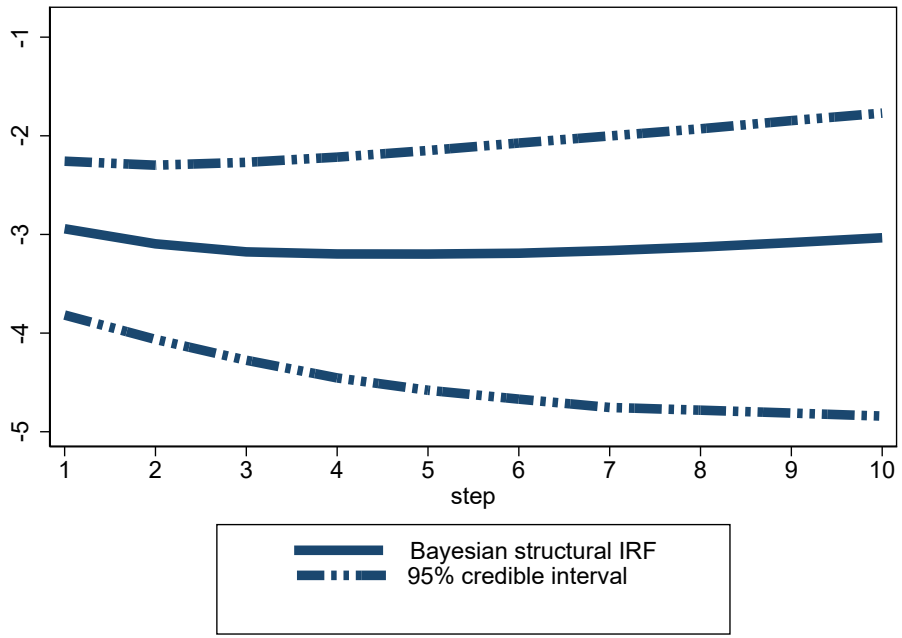


(b) Comoros Islands

Figure 4: Response of liabilities to a positive surplus shock



(a) USA



(b) Australia

Table 2: Reaction to surplus shocks

LDCs	surplus	liabilities	regime	Advanced	surplus	liabilities	regime
Malawi	+	0	NR	USA	+	-	R
Mozambique	+	0	NR	UK	+	-	R
Lesotho	+	0	NR	Canada	+	-	R
Guinea	+	0	NR	Germany	+	-	R
Gabon	+	0	NR	France	+	-	R
Madagascar	+	0	NR	Japan	+	-	R
Comoros	+	0	NR	Australia	+	-	R
Equatorial Guinea	+	0	NR	Italy	+	-	R

Notes: **NR** represents non-Ricardian regime while **R** represents Ricardian regime.

Explanation of the Results

- We suspect that these results are driven by the presence of poor fiscal governance institutions in LDCs

- The quality of fiscal institutions determines fiscal discipline and thereby determines the sustainable evolution of surplus(Debrun and Kumar, 2009)

- To test our suspicion, we followed the following steps:

1. We provide empirical content to the theoretical claim that the quality of governance institutions determines the evolution of surpluses in LDCs.

2. We then show that "developing" countries with better governance institutional quality have Ricardian regimes

- We estimate the following simple fiscal surplus reaction function

$$S_{it} = \alpha_0 + \alpha_1 S_{it-1} + \delta B_{it-1} + \gamma \; institution_{it} + x'_{it}\beta + \eta_i + \epsilon_{it} \quad (5)$$

- $i = 1, \ldots 31$ while $t = 2005, \ldots 2018$.
- S_{it}: primary surplus/GDP B_{it}: debt stock/GDP x_{it}: control variables
  - η_i: country fixed effects

- Institution: Measure of quality of governance institutions

- Following Debrun and Kumar (2009), we use an additive eleven-point scale $(0 - 10)$ time-varying World Bank's democracy index

Table 3: Fiscal policy reaction function for least developed countries

	Fixed Effects		**System GMM**	
	structural surplus	total surplus	structural surplus	total surplus
Lagged structural surplus	0.875***		0.944***	
	(0.049)		(0.012)	
Lagged total surplus		0.328***		0.409***
		(0.107)		(0.015)
Lagged debt stock	0.018	0.033	0.033	0.034
	(0.107)	(0.120)	(0.103)	(0.107)
Institution	0.019***	0.053***	0.093***	0.127***
	(0.030)	(0.084)	(0.006)	(0.007)
Controls?	Yes	Yes	Yes	Yes
Constant?	Yes	Yes	Yes	Yes
Sample size	385	385	386	386
Joint P-value	0.000	0.000	0.000	0.000

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- Finally, we run the structural VAR model on a developing country with relatively better quality institutions
- Two countries Mauritius and Botswana have an average institutional index of 9 and 7 respectively over the period $1980 - 2018$

Figure 5: Average institutional quality index:$1980 - 2018$

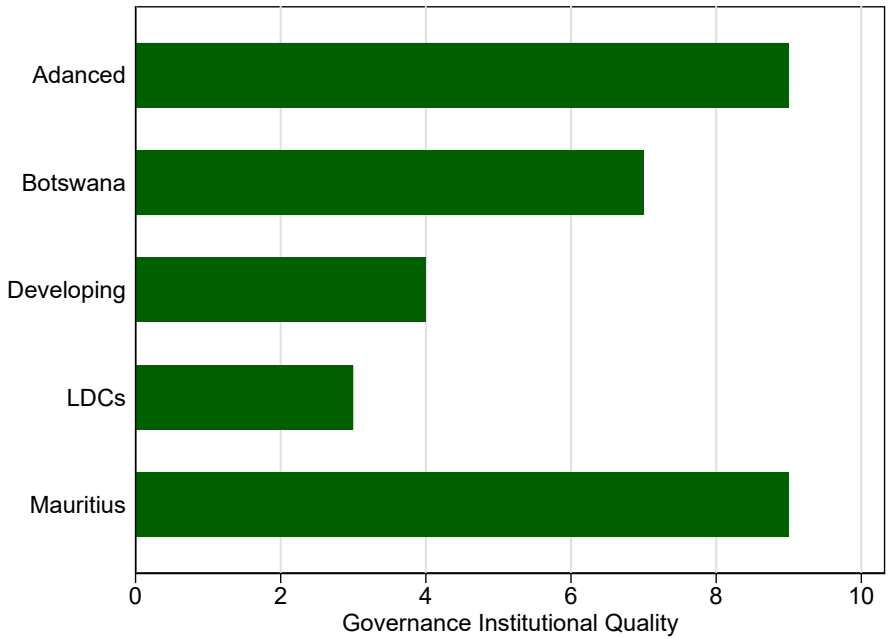
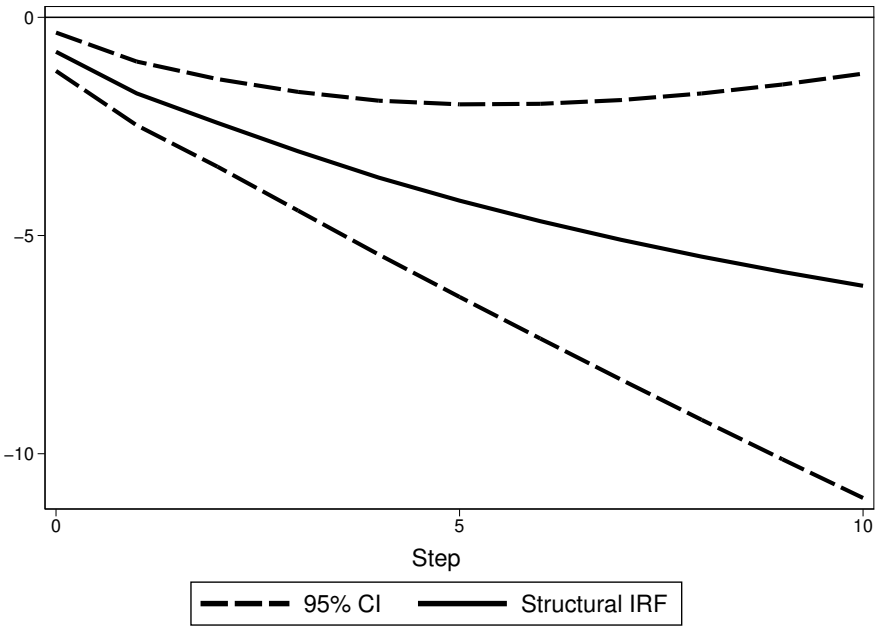
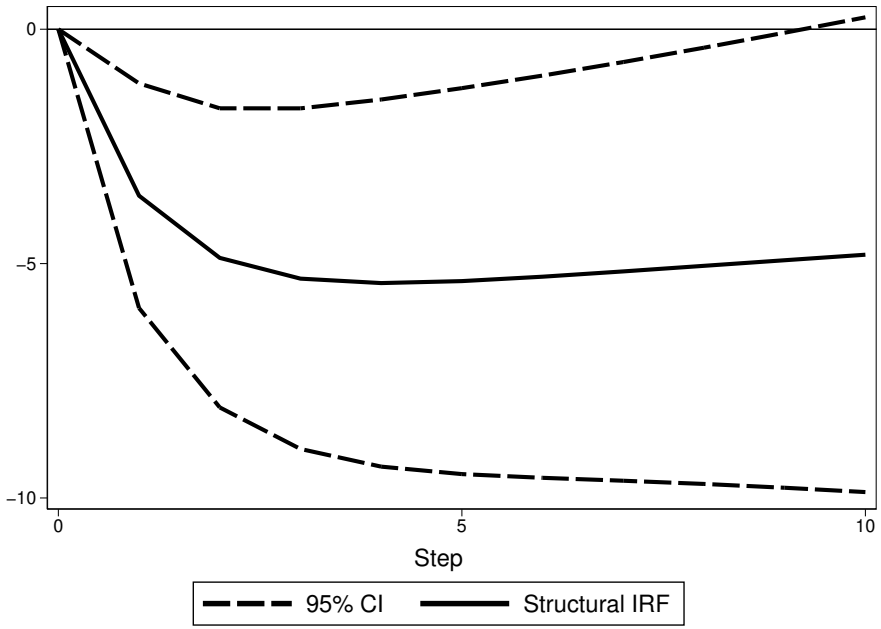


Figure 6: Response of liabilities to a positive surplus shock



(a) Mauritius



(b) Botswana

Conclusion

- Our findings suggest the following:

1. The evolution of fiscal surpluses in LDCs is arbitrary implying non-Ricardian fiscal regime
    - We strongly suspect that this is due to poor fiscal governance institutions in LDCs
2. These findings cast doubt on the effects of conventional monetary policy since prices have to respond to changes in fiscal stances to achieve fiscal solvency
    - Perhaps the need for unconventional monetary policy action
3. To the contrary, advanced economies or economies with quality governance institutions have Ricardian regimes.

Thank you!

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