

Microsimulation Approaches to studying Shocks and Social Protection in Selected Developing

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Background and Motivation

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- Interest in consequences of macro shocks due to recent crises.
- Social safety nets crucial in helping households cope with shocks.
- Greater response margin regarding how developed economies tackle crisis.
- How good is social insurance in developing countries?
- There is the need for stress testing (Kanbur, 2010)

Study Objectives

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- Examine using microsimulation techniques policies that cushion households from systemic shocks.
- Measurement of households risk exposure in crisis scenarios based on GHAMOD, SAMOD and ECUAMOD [Desc MODs](#) .
- Given redistributive preferences of policy that existed in 2017, I look at two broad themes-:

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- Given redistributive preferences of policy that existed in 2017, I look at two broad themes-:
 - ① Automatic Stabilization/ Fixed government action and
 - ② Discretionary government action based on four case scenarios.
- Examine social protection that incorporates comprise both social protection and insurance policies.

Outline

- 1 Introduction
- 2 Relevance of the Study
- 3 Summary of Results
- 4 Previous Research
- 5 Methodologies
- 6 Results
- 7 Discussion of Results
- 8 Way Forward

Relevance of the Study

Contribution to Literature

Relevance of the Study

Contribution to Literature

- First of its kind to study automatic stabilization for developing countries based on income, demand and informality shocks.
- One of the first aside Doorley (2021) to examine poverty and inequality cushioning using poverty stabilization coefficients.
- Establishing of the link between automatic stabilization and consumption expenditure.
- Study how fiscal policies can be reformed to offer more significant income insurance.
- Add to studies that inform on the effects of economic shocks in transitioning economies.

Results summary

Summary Outcomes

Results summary

Summary Outcomes

- Higher coefficients means stronger stabilization effects. Thus, a % of the shock is absorbed by the fiscal system.
- Automatic Stabilization very limited in Ghana.
- The level of informality in each country plays a role.
- Strong income and demand stabilization as well as fiscal policy impacts in South Africa and Ecuador as compared to Ghana.
- Counterfactual policies (CDG and LEAP expansion) in Ghana, improve welfare and policy impacts.

Macro & Micro Approaches to automatic stabilizers

Previous Research

Macro & Micro Approaches to automatic stabilizers

Previous Research

- Most macro approaches to study automatic stabilization study ratios of revenue and expenditure to GDP. (Girouard & Andre, 2006, Devarajan et al., 2013)
- For micro approaches, microsimulation modelling is employed. (Auerbach & Feenberg (2000); Kniesner & Ziliak (2002); Doorley et al. (2021)).
- Minimal work in developing economies. (Gasior et al. (2022))
- Existing studies covering shocks do not cover social protection while those covering social protection are silent on shocks.

Automatic stabilizers

Deriving Automatic Stabilizers

Automatic stabilizers

Deriving Automatic Stabilizers

- Based on Dolls, Fuest, & Peichl (2012); Dolls et al. (2020) and Doorley et al (2021). Impact on shocks depends on cushioning impacts and income links to consumption demand.
- Define automatic stabilization in three ways.
 - 1 The stabilization of disposable income (τ^I) \Rightarrow (Gross income and Informality shock)
 - 2 The stabilization of demand (τ^C) \Rightarrow (Consumption shock and Liquidity constraints)
 - 3 The stabilization of poverty/inequality (τ^P) \Rightarrow (Gross income and Informality shock)

Automatic stabilizers

Formulas

Automatic stabilizers

Formulas

- Income Stabilization Coefficient

$$\tau^I = 1 - \frac{\sum_i \Delta Y_i^D}{\sum_i \Delta Y_i^M} = \frac{\sum_i (\Delta Y_i^M - \Delta Y_i^D)}{\sum_i \Delta Y_i^M} = \frac{\sum_i \Delta G_i}{\sum_i \Delta Y_i^M} \quad (1)$$

- Demand Stabilization Coefficient

$$\tau^C = 1 - \frac{\sum_i \Delta L_i^{CH}}{\sum_i \Delta Y_i^M} \quad (2)$$

- Poverty Stabilization Coefficient

$$\tau^P = 1 - \frac{\Delta P_i(Y^D)}{\Delta P_i(Y^M)} \quad (3)$$

- Post-fiscal welfare used metric can be income or consumption based.

Automatic stabilizers

Discretionary Action

Automatic stabilizers

Discretionary Action

- Four scenarios to consider when there is an income or demand shock amid existence or absence of tax-benefit policies.
 - ① With/Without government intervention in status quo and
 - ② With/Without government intervention in crisis.
- These scenarios reveal the policy impacts within each country.
- If a country does not perform with existing policies, counterfactual policies are introduced.

Results

Income, Demand & Poverty Coefficients

Results

Income, Demand & Poverty Coefficients

Table: Income, Demand and Poverty Stabilization Coefficients

	Ghana	South Africa	Ecuador
Income stabilization			
Gross income shock	0.012	0.220	0.103
Informality shock	0.036	0.083	0.117
Demand stabilization			
Consumption expenditure shock	0.049	-	0.050
Housing liquidity constraint	0.038	0.249	0.011
Credit-liquidity constraints	0.00	0.251	0.045
Poverty stabilization			
Gross income shock	0.008	0.478	0.464
Informality shock	0.00	0.143	0.00

Source: author's computation based on GHAMOD, SAMOD, and ECUAMOD 2023.

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Source: author's computation based on GHAMOD, SAMOD, and ECUAMOD 2023.

- For gross income shocks, income stabilization is best in SA (22%)
- The impacts on informality is evident. When dominant, income stabilization rises (Ghana-3.6% and Ecuador-12%). When subservient, income stabilization falls (South Africa-8.3%).

Results

Results on Discretionary Action for Ghana

Results

Results on Discretionary Action for Ghana

Table: Income stress test redistributive results for Ghana

Scenarios	Switch	Baseline	Income shock	$\Delta P_i(Y^j)$
Fiscal	On	55.86	57.03	1.17
	Off	55.34	56.52	1.18
Policy impact (τ^p)		0.01		

Source: author's computation based on GHAMOD 2023.

- Post-fiscal poverty headcount increases amid shocks
- Results show that existing policies in Ghana cushion only a 1% income shock.
- Increase in vulnerability when there is a shock.
- Fiscal impoverishment evident for market incomes.
- Counterfactual policies improve the coefficients. [Counterfactuals](#) .

Results

Results on Discretionary Action for South Africa

Results

Results on Discretionary Action for South Africa

Table: Income stress test redistributive results for South Africa

Scenarios	Switch	Baseline	Income shock	$\Delta P_i(Y^j)$
Fiscal	On	33.67	34.25	0.58
	Off	46.40	47.51	1.11
Policy impact (τ^p)		0.48		

Source: author's computation based on SAMOD 2023.

- There is increase in poverty headcount due to shock to employment income.
- Counterfactual government action has a bigger effect on the reducing impact of the shock
- No fiscal impoverishment as vulnerability is higher with no tax-benefit policies.
- 48% cushioning effect of overall shock.

Results

Results on Discretionary Action for Ecuador

Results

Results on Discretionary Action for Ecuador

Table: Income stress test redistributive results for Ecuador

Scenarios	Switch	Baseline	Income shock	$\Delta P_i(Y^j)$
Fiscal	On	14.26	15.38	1.12
	Off	12.84	14.93	2.09
Policy impact (τ^p)		0.46		

Source: author's computation based on ECUAMOD 2023.

- Social assistance is relatively effective.
- Counterfactual government action has a better effect on the reducing impact of the shock than in Ghana
- Fiscal impoverishment as vulnerability is lower with no tax-benefit policies.
- 46% cushioning effect of overall shock.

Discussion

Results Discussion

Discussion

Results Discussion

- The study compares coefficients from gross income shocks to the EU and US.
- SA's social protection stabilization compares favorably to developed countries amid shocks to gross incomes.
- In all economies taxes and social security contributions carry much weight than benefits (except SA).
- Although not close to EU and US, stabilization from benefits for GH and EC improve when shocks are informality related. 3.6% & 12%.
- The cost of improving the Ghana inform the size of overhaul needed to restructure tax-benefit policies in the country.

Conclusions

Conclusions and Policy Recommendations

Conclusions

Conclusions and Policy Recommendations

- Automatic stabilization varies and the size of informality plays a role for developing economies.
- Income and demand stabilization continues to remain high for SA.
- Consumption based welfare measures show how noisy income data can be in developing economies.
- Social protection policy swaps and expansion improves the Ghana case but at a high cost.

Conclusions

Appreciation

Many thanks for your attention.

Questions, Comments welcome:

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Summary of Models

Table: GH, SA & EC Microsimulation Models

	(1) GHAMOD v.2.4	(2) SAMOD v.7.0	(3) ECUAMOD v.1.5
Input data	GLSS-7*	LCS-7**	EIGHUR
Input data source	Ghana Statistical Service	Statistics SA	Instituto Nacional de Estadísticas y Censos
Welfare metric	Consumption based	Income based	Consumption based
Policy years	2013–19	2014–19	2011–19
Safety nets	LEAP, School Capitation Grant, Free SHS Grant	Care Dependency, Grant in Aid, Child Support Grant, Foster Child Grant, Old Age Grant, Disability Grant	Human Development Transfer, Joaquín Gallegos Lara Transfer, Housing Grant
Sample	58,864 individuals	88,906 individuals	153,341 individuals
Households	14,009	23,380	39,617

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Note: * Ghana Living Standards Survey Round 7. ** Living Conditions Survey Round 7.

Improving the Ghana Case

Table: Discretionary action to improve income shock cushioning

Scenarios	Switch	Baseline	Income shock	$\Delta P_i(Y^j)$
Fiscal	On	52.35	53.34	0.99
	Off	55.34	56.52	1.18
Policy impact (τ^p)			0.16	

Source: author's computation based on GHAMOD 2023.

- By introducing additional policies the study improves the income cushion in Ghana.
- Additional safety nets reduce income poverty by 3.5% without shocks and 3.7% amid shocks.
- 16% cushioning effect of overall income shock (19% for demand shock).
- Increased budget expenditure of GHS3,667 (\$460) million is about 1.8% of nominal GDP (11% of total tax revenue). [Back](#)

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