Distinguishing CONSTRAINT ON

financial INCLUSION
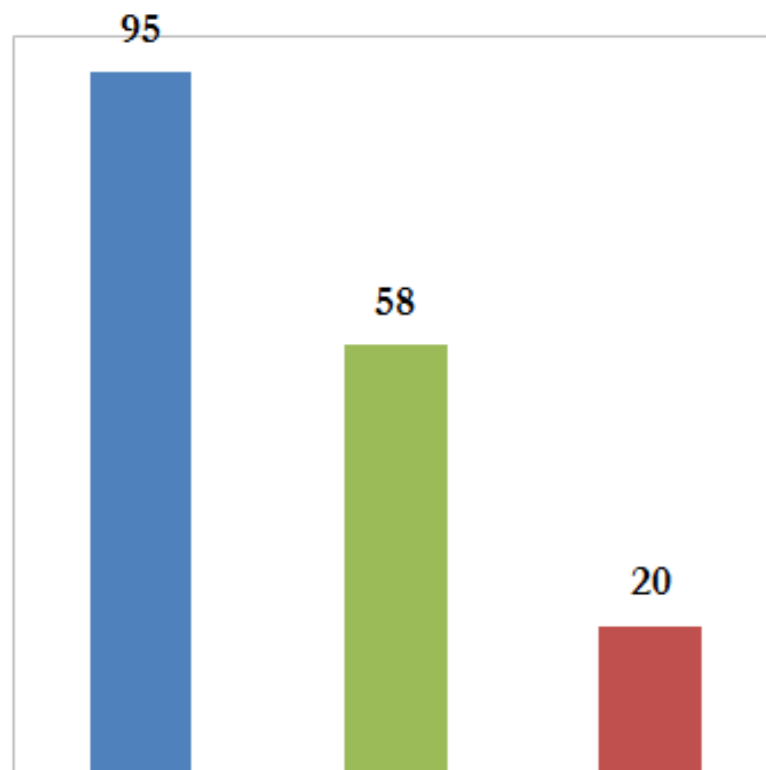
impact on GDP, TFP & INEQUALIT

MOTIVATION

Financial inclusion in the world

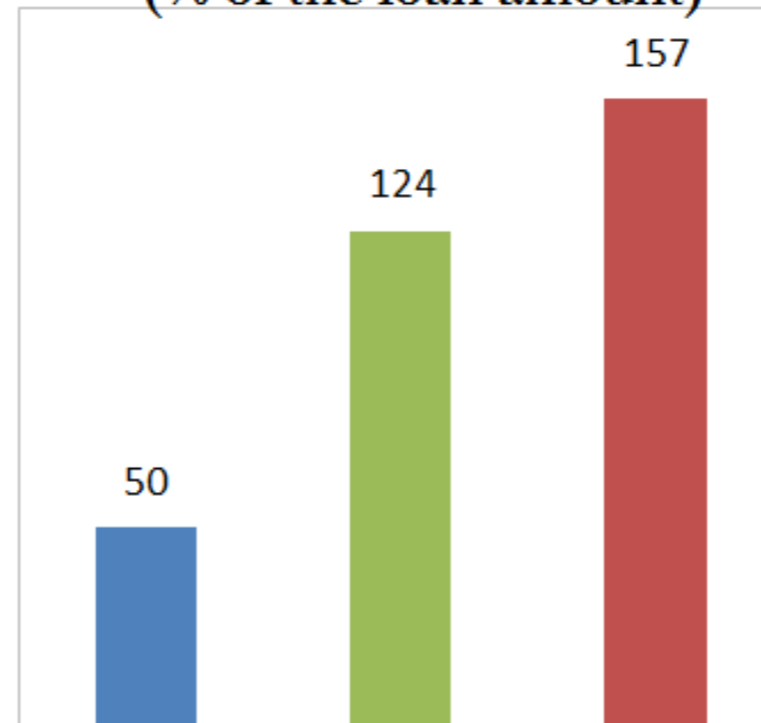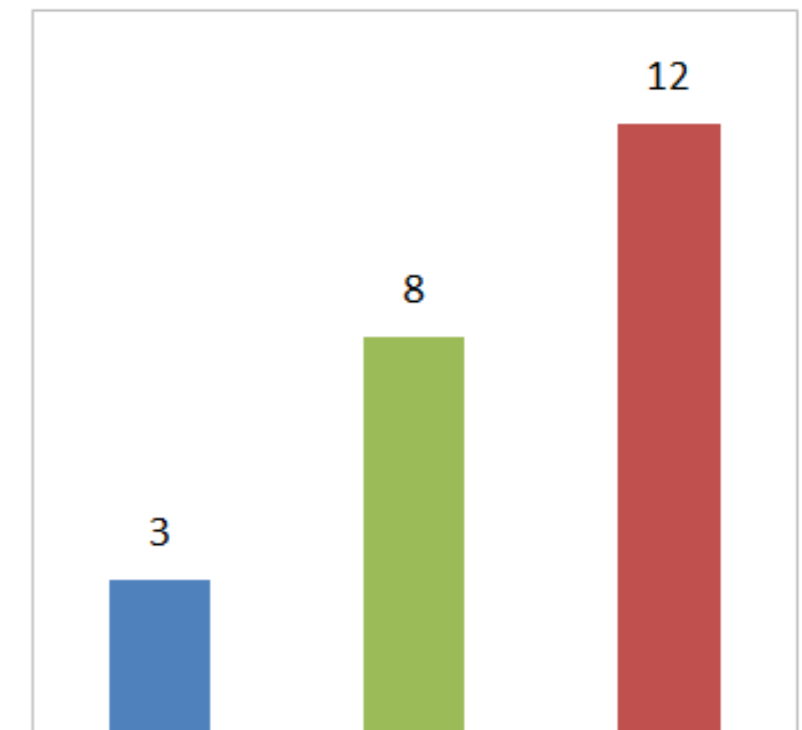# Percent of firms identifying access to finance as a major constraint
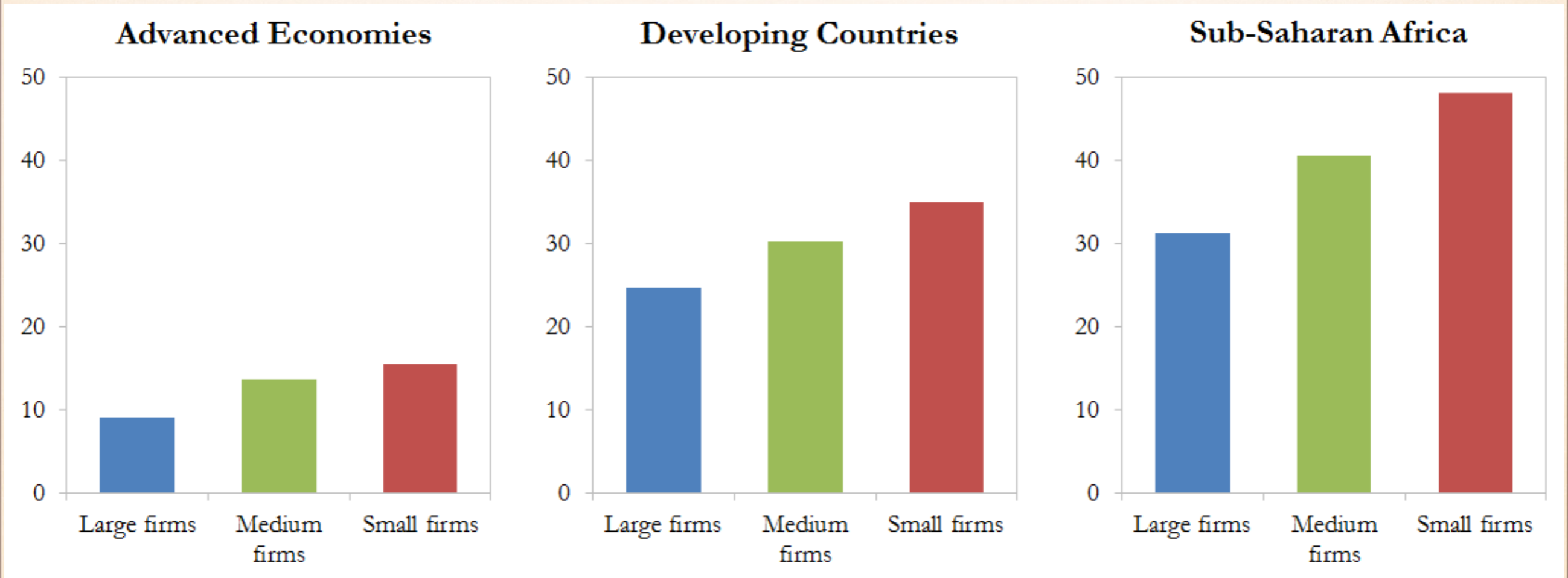
THE MODEL

Agents

* HETEROGENEOUS

* LIVE FOR 2 PERIODS

I. FIRST PERIOD:
make credit participation
occupational choice
and investment decisions

II. SECOND PERIOD:
Optimal consumetion
Bequest decision

Occupational choice
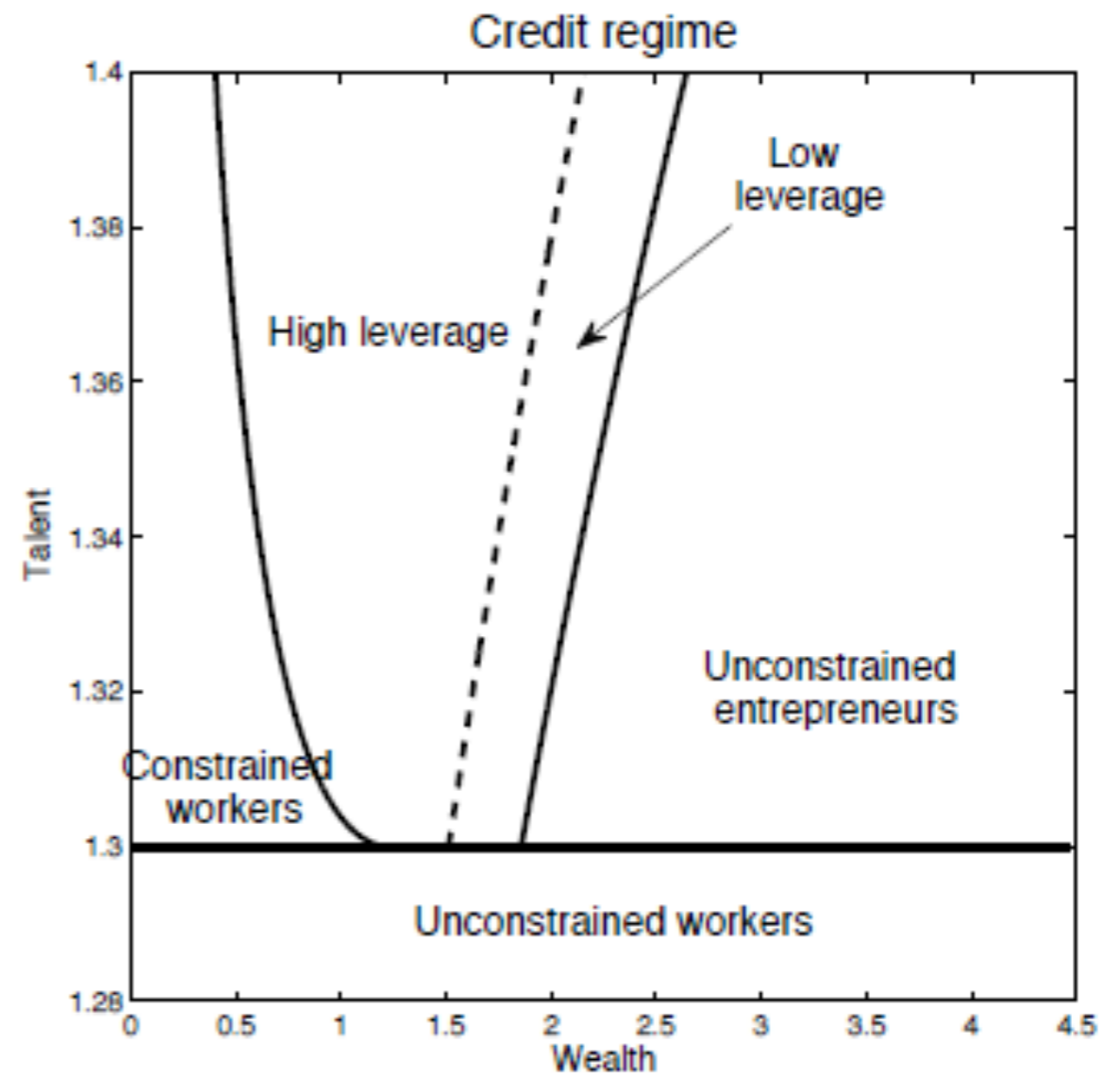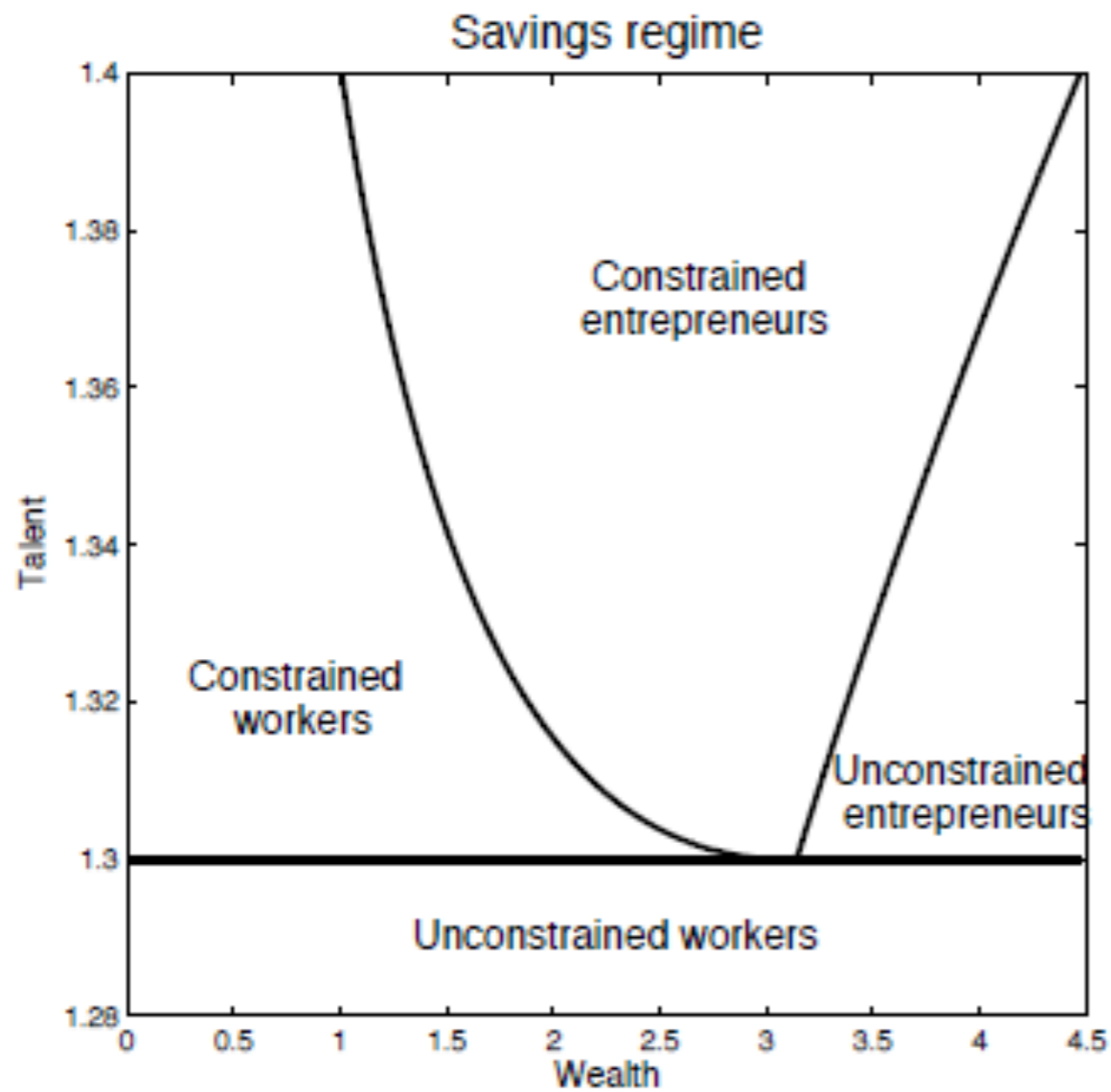
Saving regime

$$W^S = \begin{cases} (1+r^d)b + (1-p)w & \text{for workers,} \\ \pi^S(b,z) & \text{for entrepreneurs} \end{cases}$$

$$\pi^S(b,z) = \max_{k,l} \ (1-p)[z(k^\alpha l^{1-\alpha})^{1-\nu} - wl + (1-\delta)k] + p\eta(1-\delta)k + (1+r^d)(b-k)$$

$$\text{subject to} \quad k \leq b.$$

OPTIMAL CONTRACT

$$(\Phi, \Delta, \Omega)$$

$$(k(b,z), b - \psi, \Omega)$$

where Φ, Δ, Ω is the amount of borrowing, the value of collateral, and the face value of the contract repsctively

Credit regime

$$(1-p)\Omega + p\min(\Omega, \eta(1-\delta)k + (1+r^d)(b-\psi)) = (1+r^d)k + p\chi k \cdot \mathbb{1}_{\{\eta(1-\delta)k+(1+r^d)(b-\psi)<\Omega\}}$$

$$\pi^C(b,z) = \max_{k,l} \; (1-p)[z(k^\alpha l^{1-\alpha})^{1-\nu} - wl + (1-\delta)k - \Omega + (1+r^d)(b-\psi)$$

$$+ p\max(0, \eta(1-\delta)k + (1+r^d)(b-\psi) - \Omega),$$

$$\text{subject to} \quad k \;\leq\; \lambda(b-\psi),$$

DATA AND CALIBRATION

Overview of the Data

	Low-income countries			Emerging market economies		
	Uganda	Kenya	Mozambique	Malaysia	The Philippines	Egypt
Savings (% of GDP)	8	15.4	7.1	39	25.7	24.5
Collateral (% of loan)	173	120.8	92	64.6	238.4	85.5
Firms with credit (%)	17.2	25.4	14.2	60.4	33.2	17.4
Non-perfor. loan (%)	2.3	10.6	3.1	8.5	4.5	19.3
Interest rate spread	10.9	8.5	8.2	3.3	4.3	6.1
Overhead costs/assets	6.9	6.6	7.4	1.5	3.2	1.5
Top 5% emp. share	53.8	54.1	41.3	29.5	52.7	58.4
Top 10% emp. share	64.2	66.	55.8	46.3	65.7	72.7
Top 20% emp. share	74.6	81	71.9	63.5	79	85.9
Top 40% emp. share	86.4	93.2	87.2	84.1	90.8	95

Data, model and calibrated parameters

Target Moments	Uganda			Kenya			Mozambique		
	Data	Model	Parameter	Data	Model	Parameter	Data	Model	Parameter
Savings (% of GDP)	8	8	$\omega = 0.08$	15.4	15.4	$\omega = 0.15$	7.1	7.1	$\omega = 0.07$
Collateral (% of loan)	173	173	$\lambda = 1.58$	120.8	120.8	$\lambda = 1.83$	92	92	$\lambda = 2.09$
Firms with credit (%)	17.2	17.1	$\psi = 0.03$	25.4	25.1	$\psi = 0.07$	14.2	14.2	$\psi = 0.03$
Non-perfor. loan (%)	2.3	2.4	$p = 0.15$	10.6	5.8	$p = 0.17$	3.1	3.1	$p = 0.14$
Interest rate spread	10.9	8.9	$\chi = 0.90$	8.5	11.3	$\chi = 0.61$	8.2	11.2	$\chi = 0.95$
Overhead costs/assets	6.9	6.6	$\eta = 0.37$	6.6	6.5	$\eta = 0.45$	7.4	7.3	$\eta = 0.54$
Top 5% emp. share	53.8	52.9	$\theta = 4.80$	54.1	58.1	$\theta = 4.40$	41.3	46.9	$\theta = 6.00$
Top 10% emp. share	64.2	64.4		66.9	70.1		55.8	58.9	
Top 20% emp. share	74.6	74.7		81	80.5		71.9	69.1	
Top 40% emp. share	86.4	84.7		93.2	88.7		87.2	80.5	

| Target Moments	Malaysia			The Philippines			Egypt		
	Data	Model	Parameter	Data	Model	Parameter	Data	Model	Parameter
Savings (% of GDP)	39	39	$\omega = 0.39$	25.7	25.7	$\omega = 0.26$	24.5	24.5	$\omega = 0.25$
Collateral (% of loan)	64.6	64.6	$\lambda = 2.56$	238.4	238.4	$\lambda = 1.42$	85.5	85.5	$\lambda = 2.17$
Firms with credit (%)	60.4	60.5	$\psi = 0.13$	33.2	33.0	$\psi = 0.07$	17.4	17.5	$\psi = 0.23$
Non-perfor. loan (%)	8.5	7.6	$p = 0.12$	4.5	3.8	$p = 0.11$	19.3	15.7	$p = 0.28$
Interest rate spread	3.3	5.8	$\chi = 0.16$	4.3	6.2	$\chi = 0.6$	6.1	8.0	$\chi = 0.08$
Overhead costs/assets	1.5	1.5	$\eta = 0.37$	3.2	3.1	$\eta = 0.27$	1.5	1.4	$\eta = 0.44$
Top 5% emp. share	29.5	34.5	$\theta = 6.80$	52.7	54.5	$\theta = 4.30$	58.4	62.0	$\theta = 4.25$
Top 10% emp. share	46.3	46.9		65.7	66.0		72.7	74.2	
Top 20% emp. share	63.5	61.5		79	77.0		85.9	83.5	
Top 40% emp. share	84.1	78.5		90.8	87.0		95	90.3	

QUANTITATIVE ANALYSIS

Evaluation of Policy Options

- ❖ Reducing the Participation Cost
- ❖ Relaxing the Borrowing Constraint
- ❖ Increasing Intermediation Efficiency
- ❖ Impact on GDP and Inequality
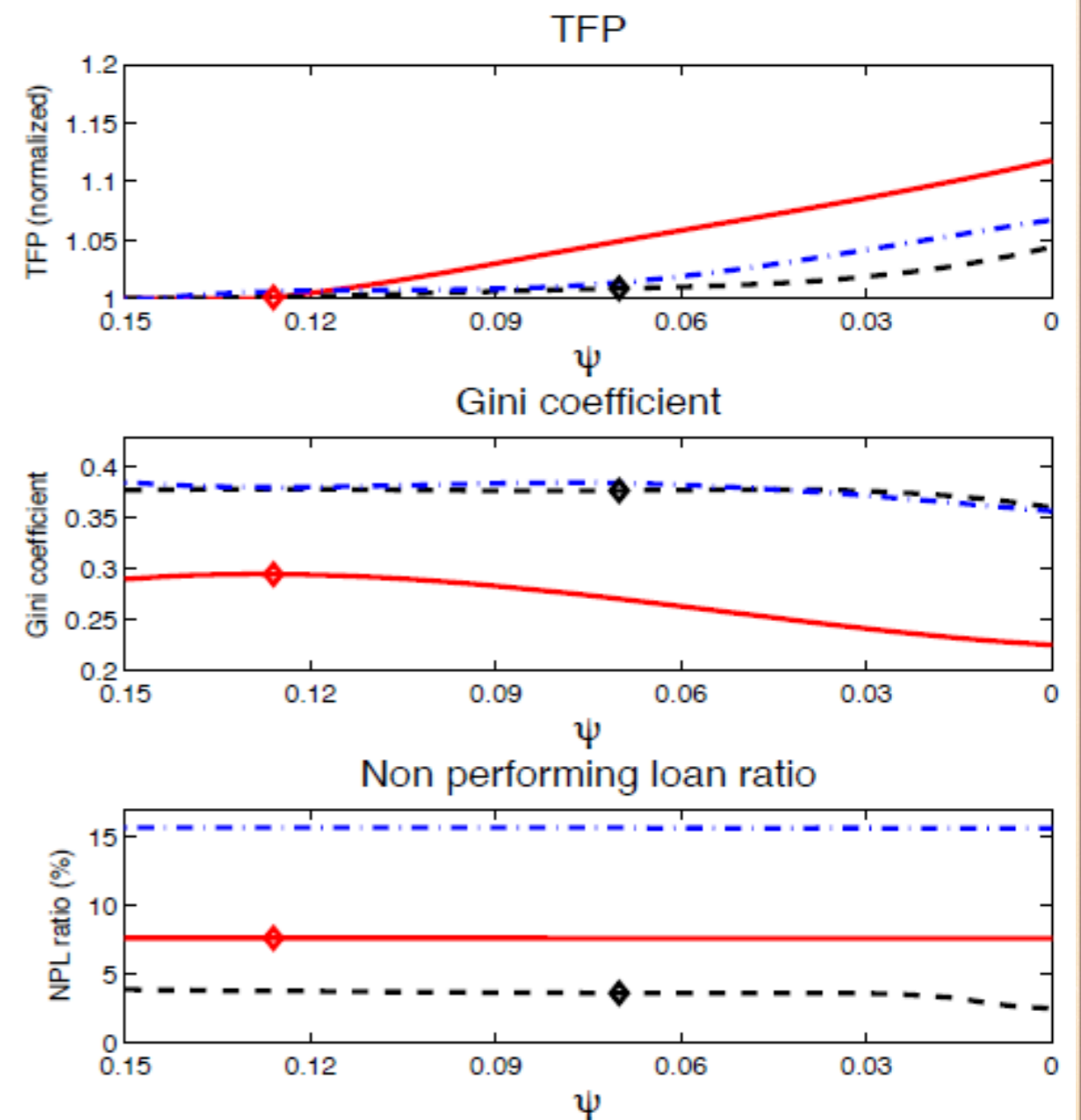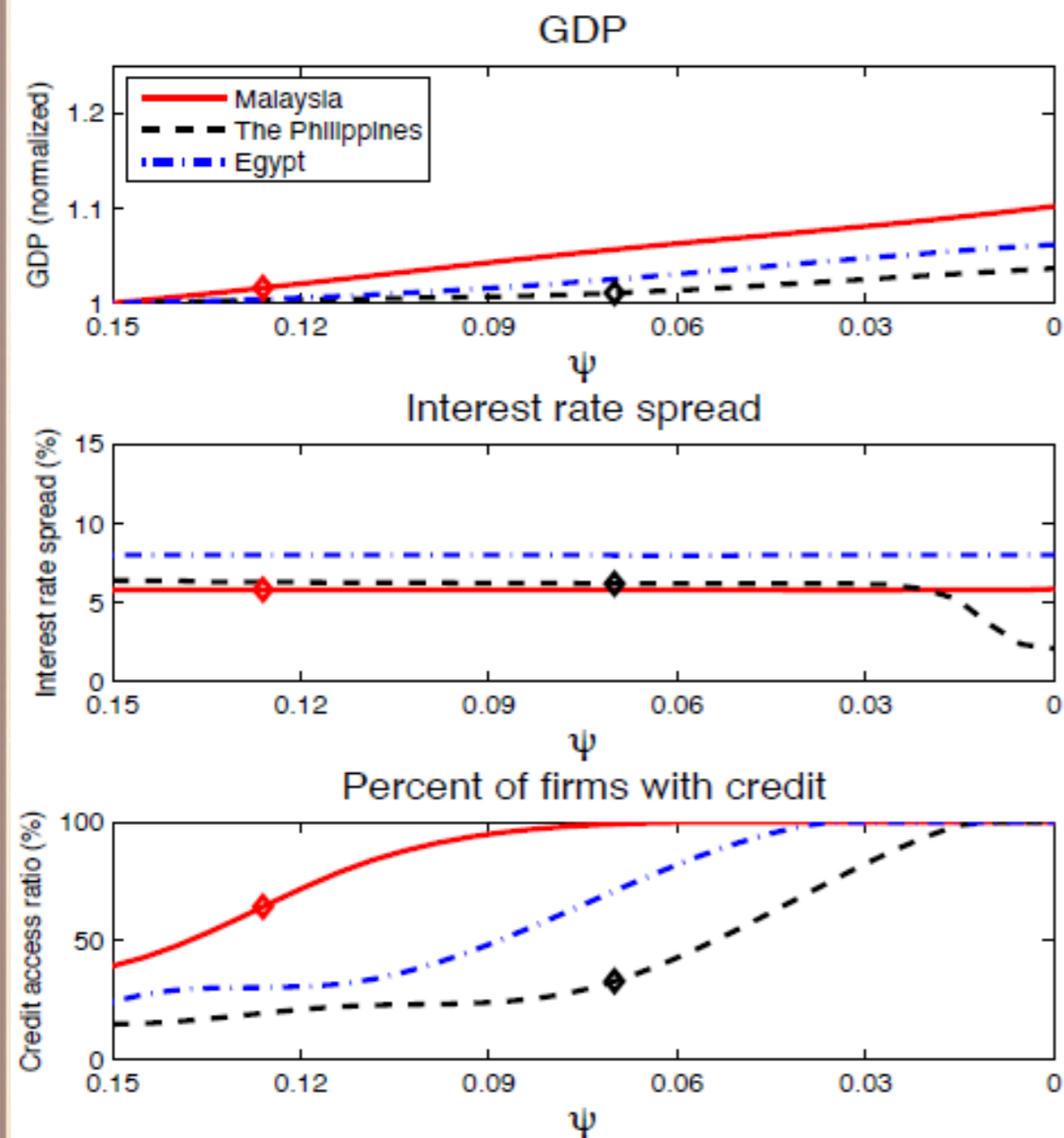
Reducing the Participation Cost

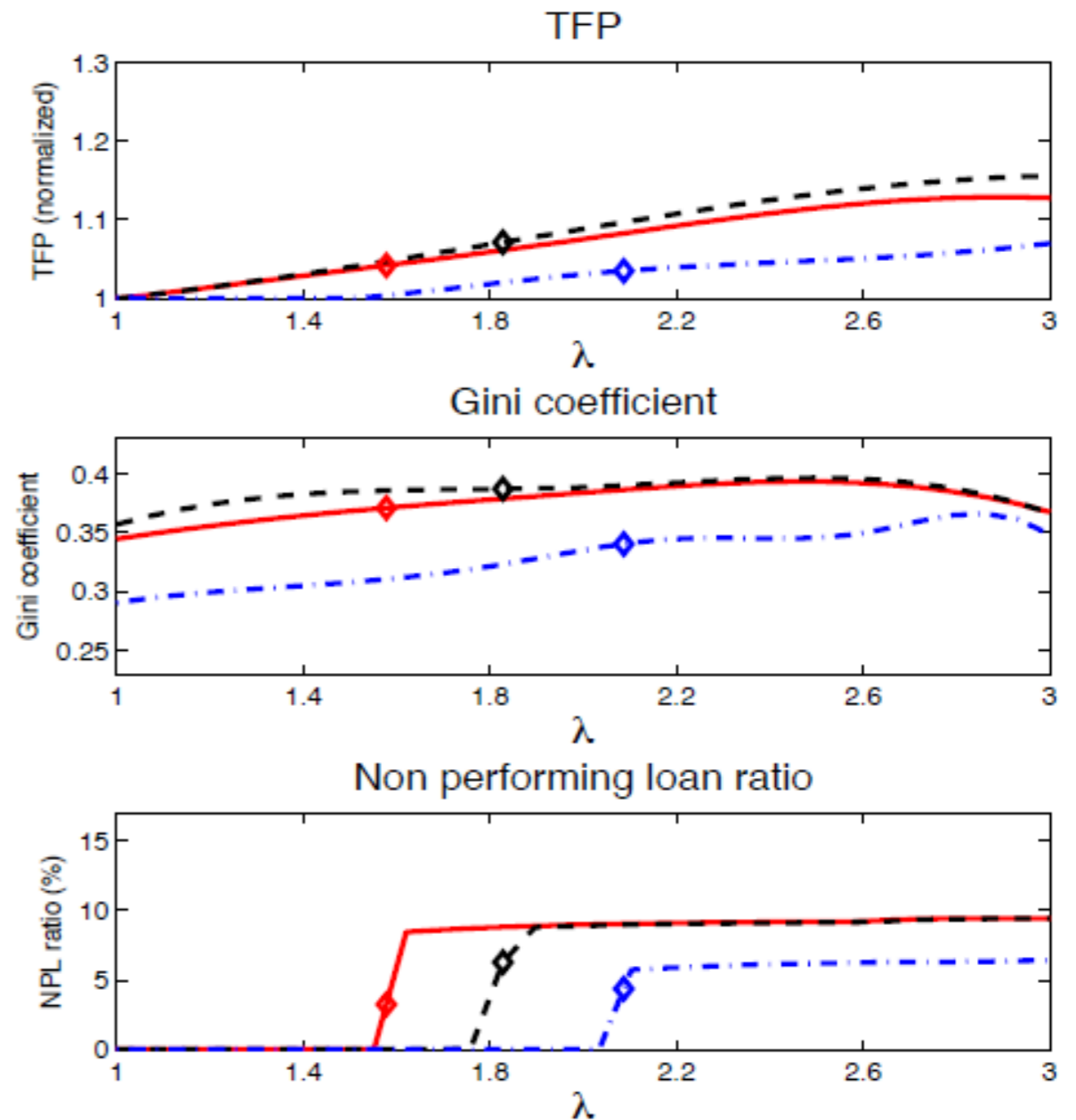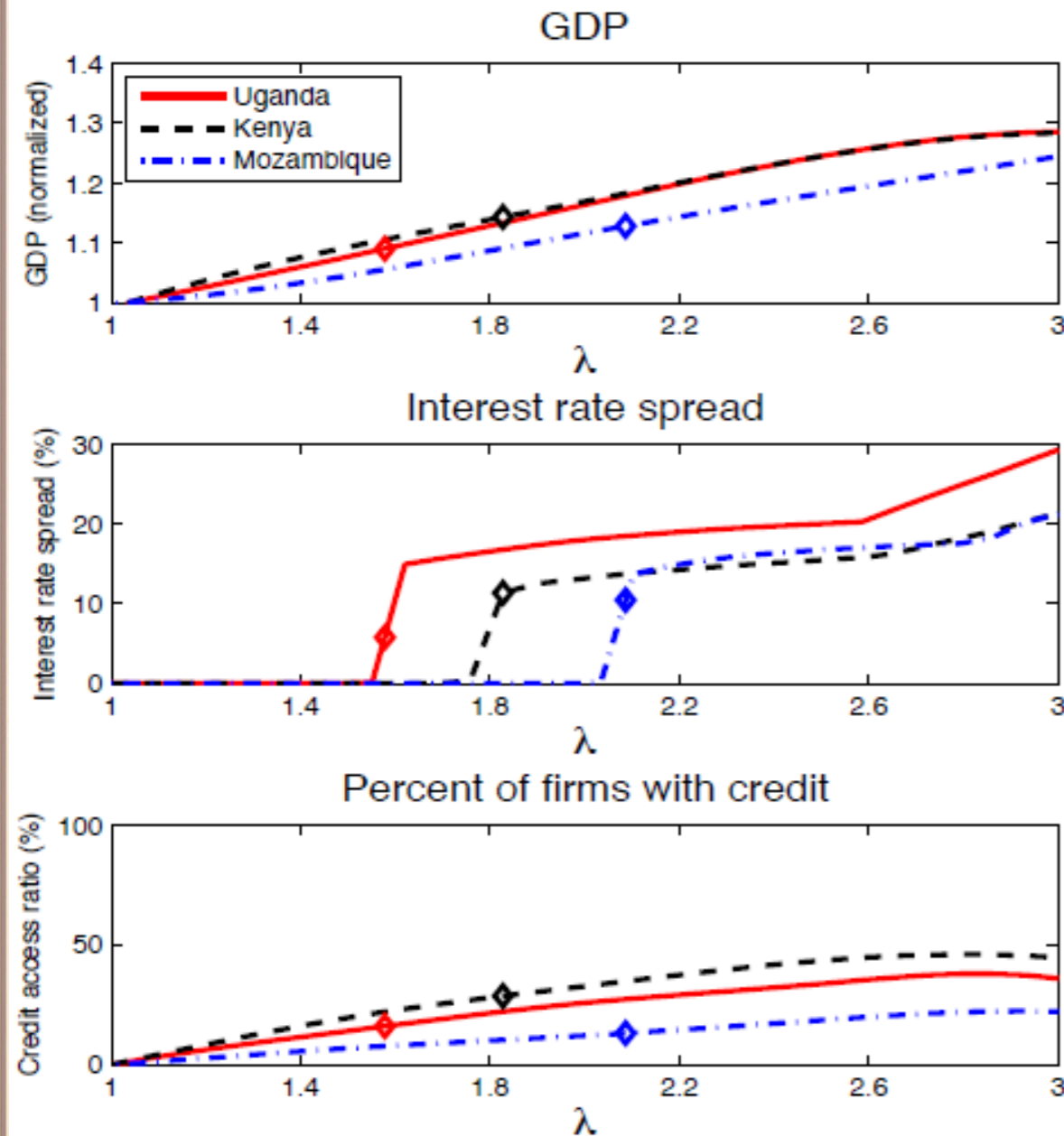Comparative statics: Credit participation cost—low-income countries
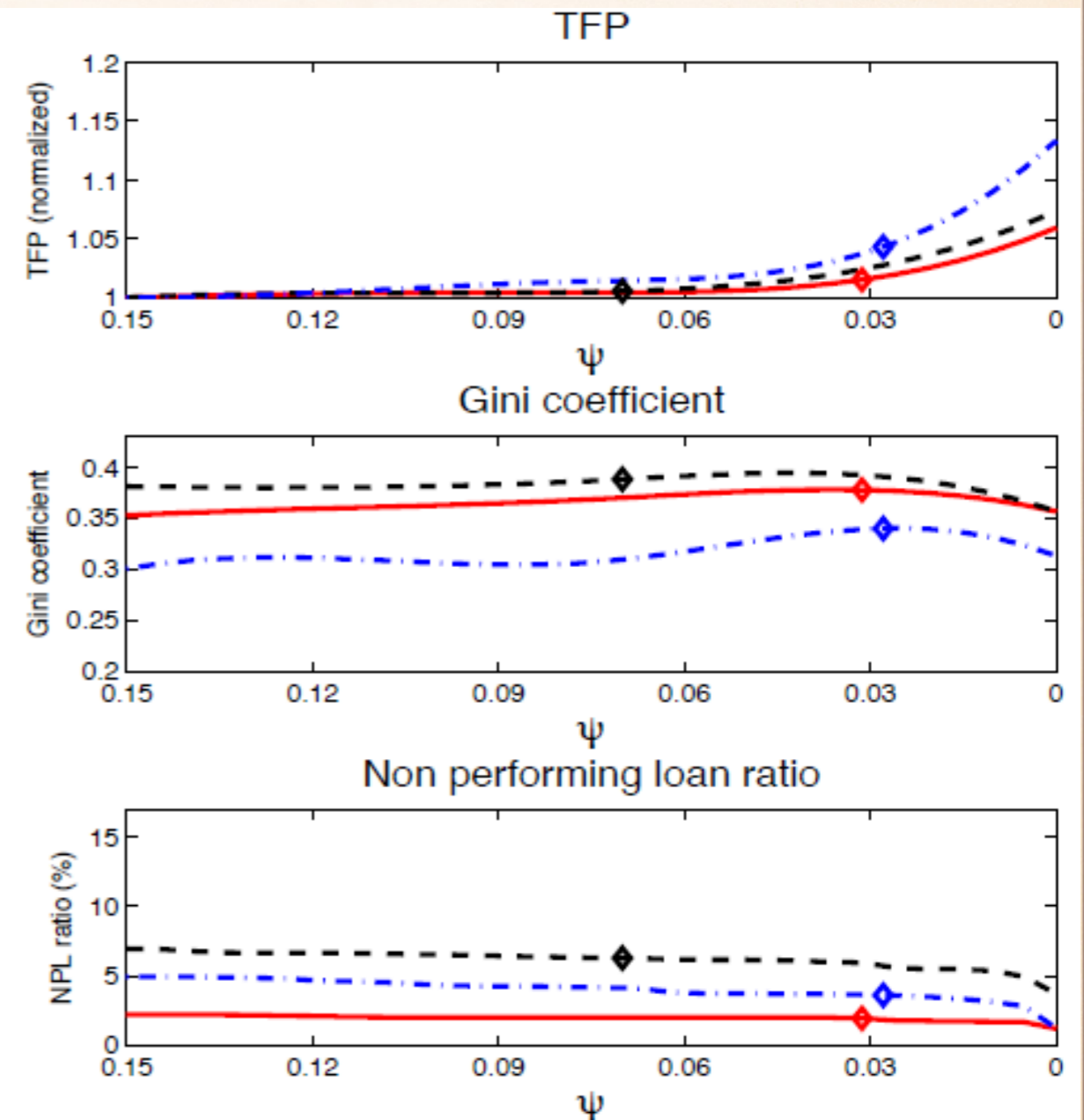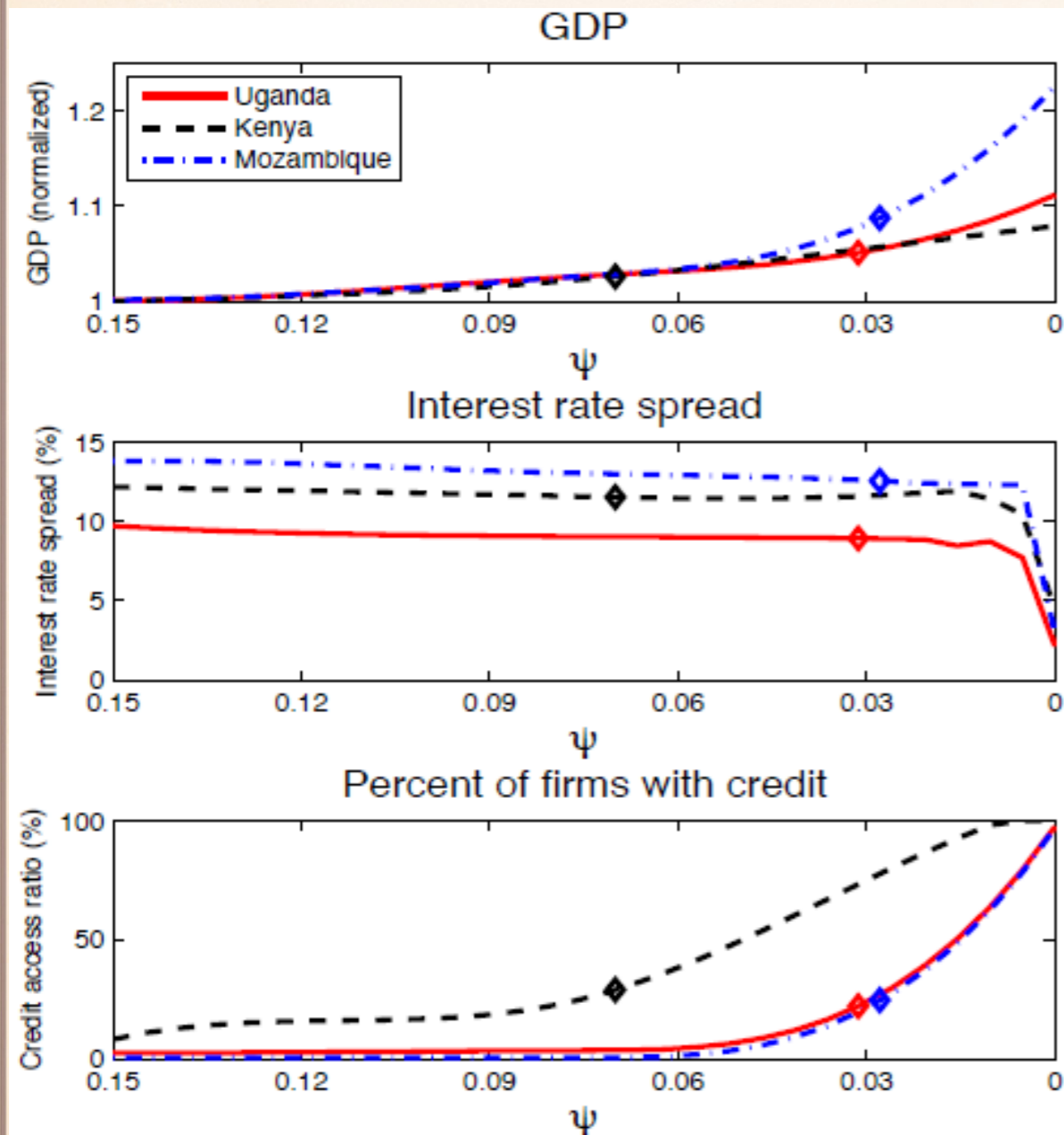
Reducing the Participation Cost

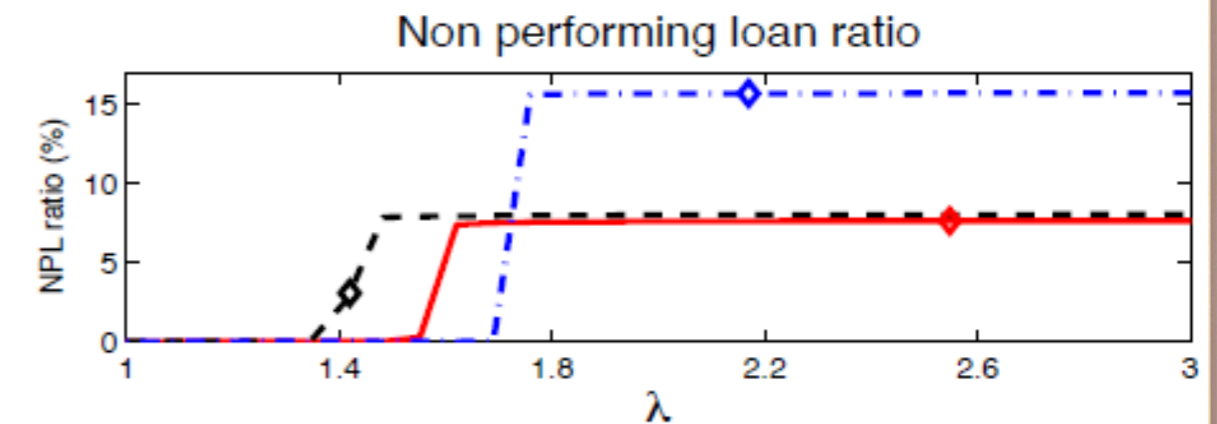Comparative statics: Credit participation cost—emerging market economies

Relaxing the Borrowing Constraint

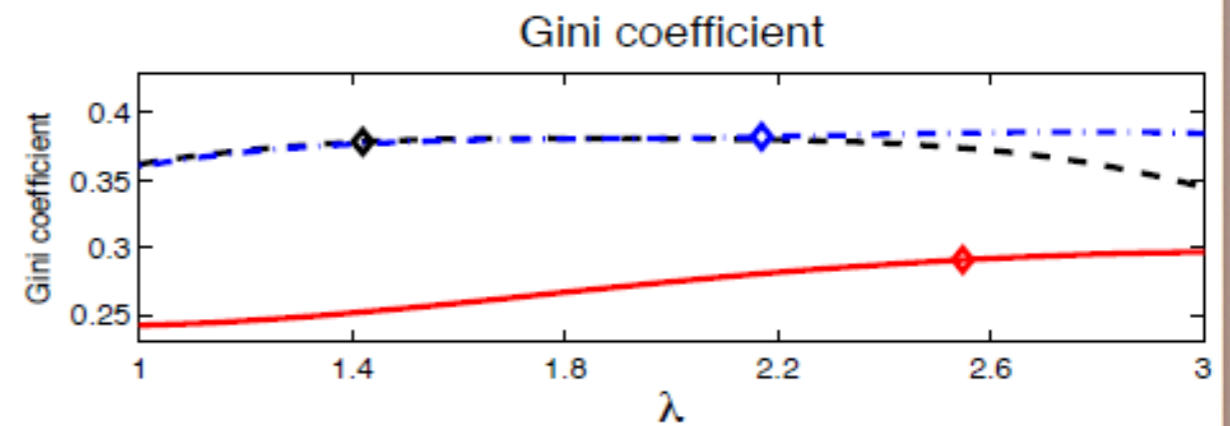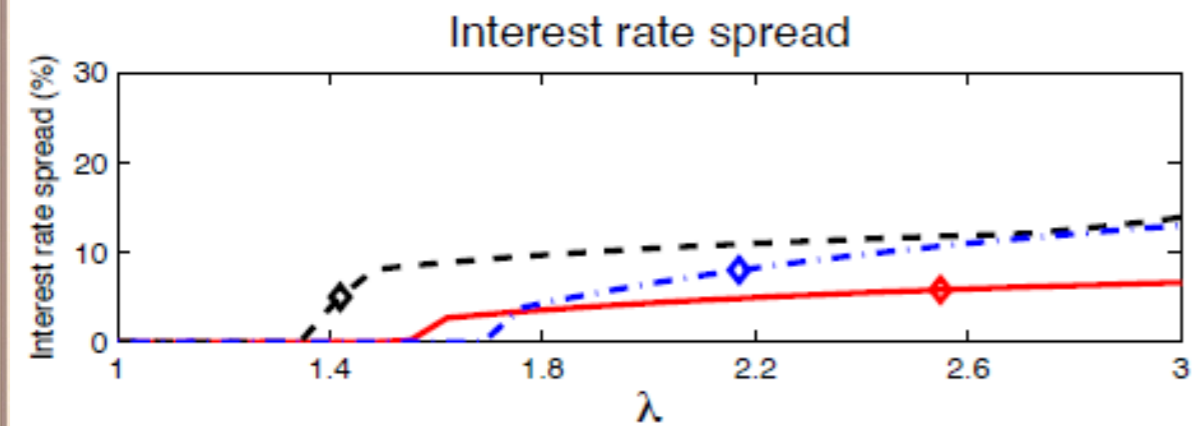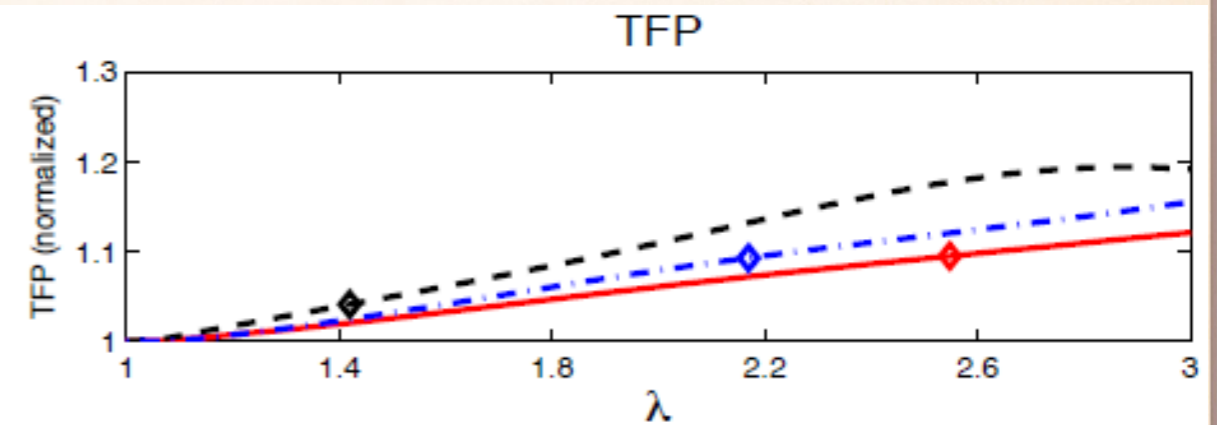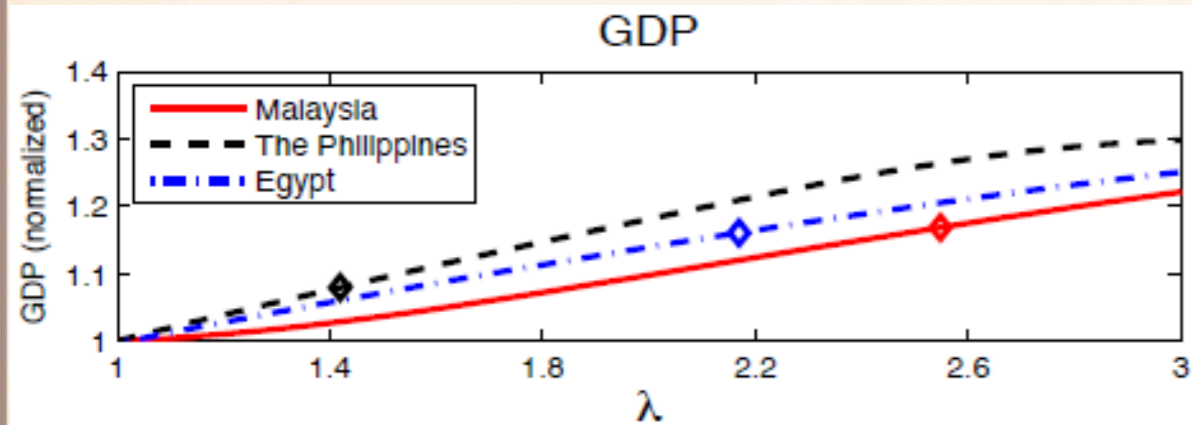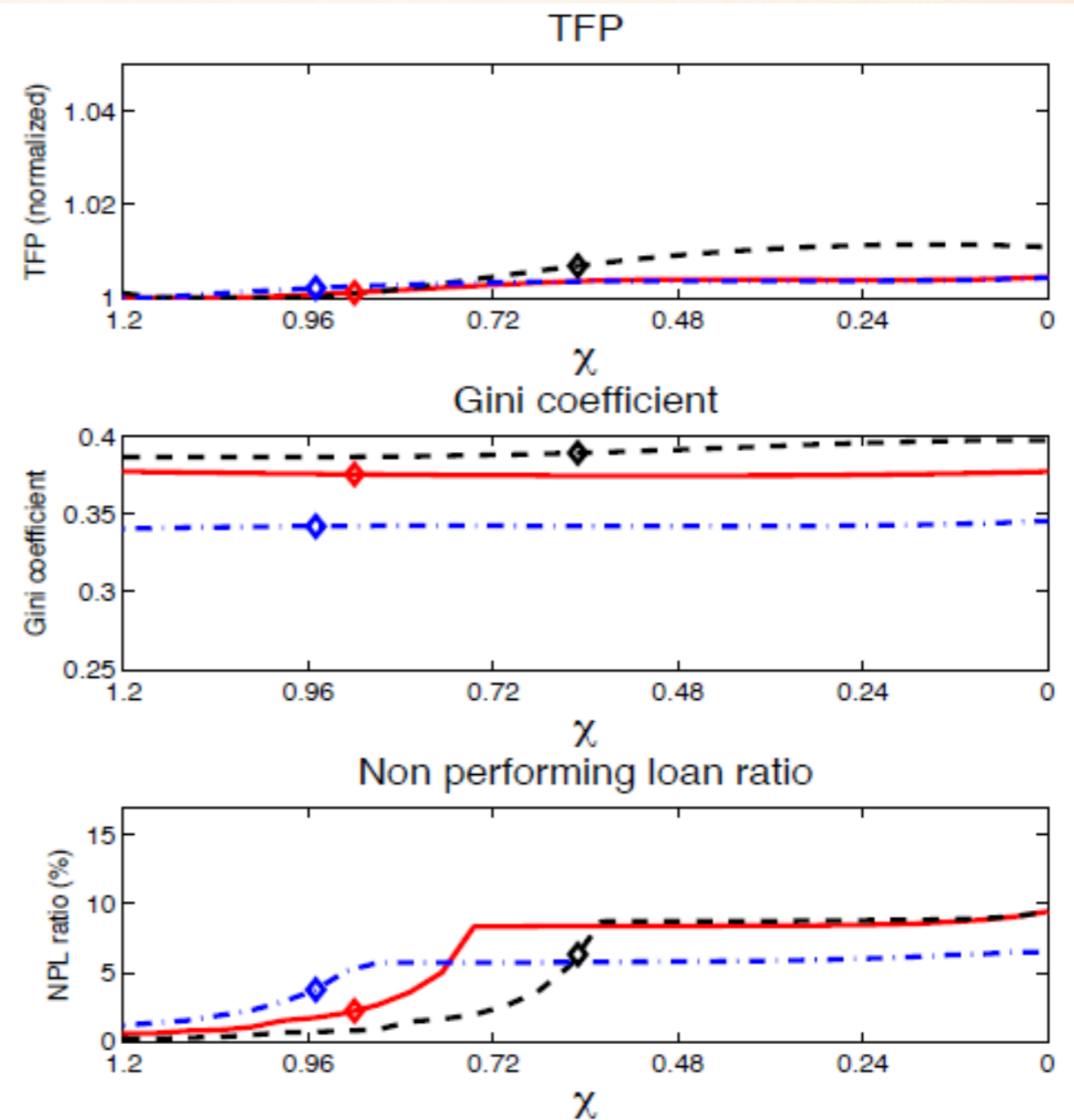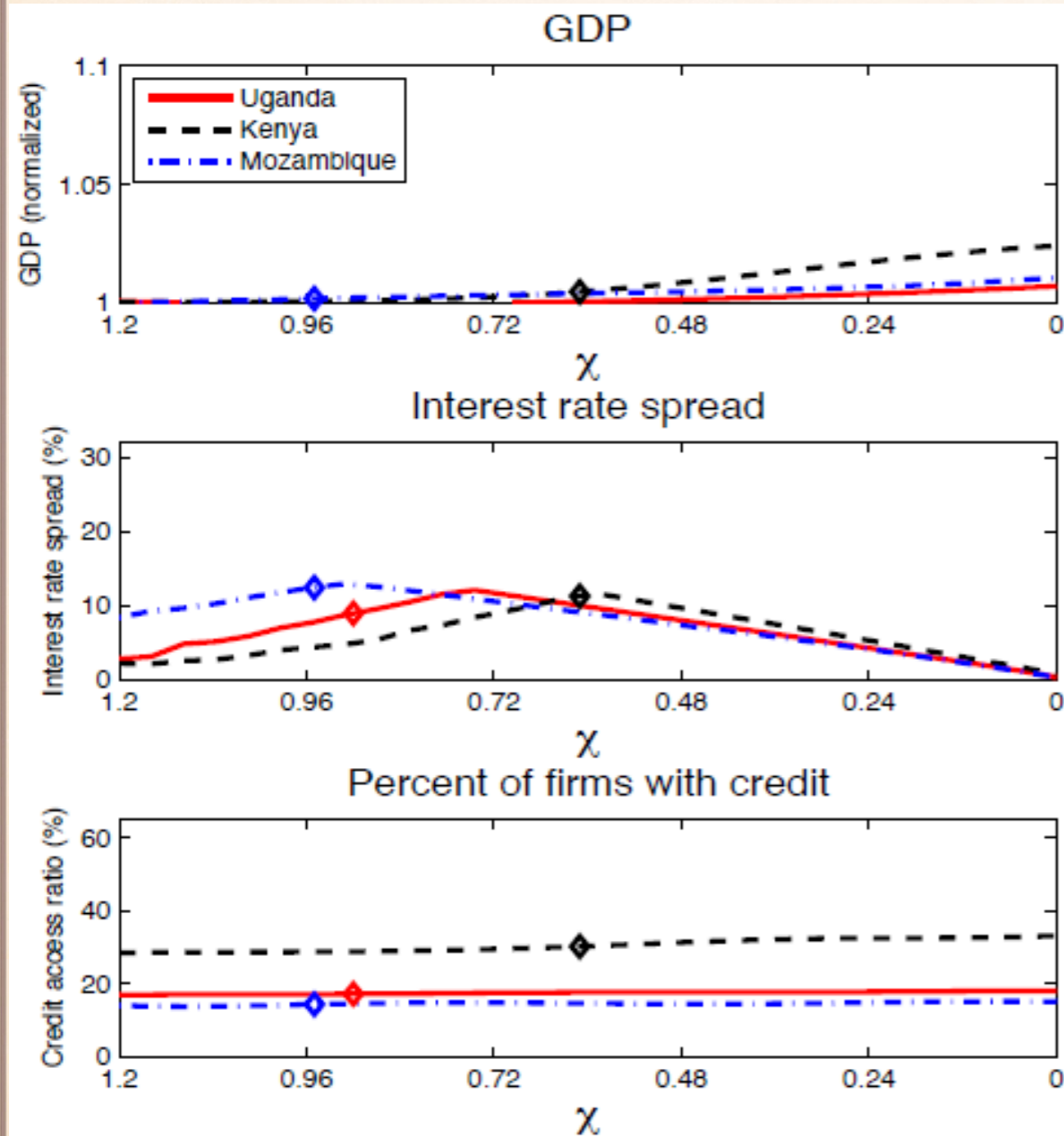Comparative statics: Borrowing constraint—low-income countries

Relaxing the Borrowing Constraint

Comparative statics: Borrowing constraint—emerging market economies
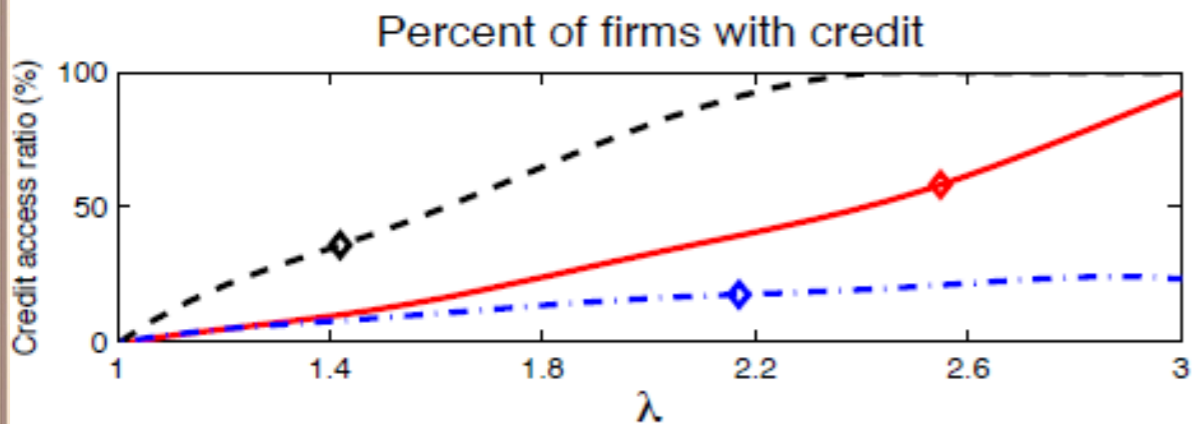
Increasing Intermediation Efficiency

Comparative statics: Intermediation cost—low-income countries

Increasing Intermediation Efficiency

Comparative statics: Intermediation cost—emerging market economies

Impact on GDP and Inequality: A Numerical Comparison

The impact of financial inclusion of various forms on GDP per capita, TFP and income inequality

	Participation cost ψ			Borrowing constraint λ			Intermediation cost χ		
	GDP(%)	TFP(%)	Gini	GDP(%)	TFP(%)	Gini	GDP(%)	TFP(%)	Gini
Uganda	0.40	0.28	-0.0007	0.35	0.20	0.0007	0.03	0.14	-0.0006
Kenya	0.67	0.40	0.0033	0.28	0.22	0.0001	0.07	0.10	0.0004
Mozambique	0.38	0.28	0.0002	0.29	0.13	0.0011	0.38	0.10	-0.0001
Malaysia	0.38	0.37	-0.0005	0.52	0.32	0.0010	1.10	0.00	0.0015
The Philippines	0.28	0.16	0.0006	0.20	0.15	0.0002	0.04	0.08	-0.0003
Egypt	0.26	1.26	-0.0093	0.46	0.35	0.0003	0.69*	0.02*	0.0033*

Impact on GDP and Inequality: A Numerical Comparison

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	Participation cost ψ			Borrowing constraint λ			Intermediation cost χ		
	GDP(%)	TFP(%)	Gini	GDP(%)	TFP(%)	Gini	GDP(%)	TFP(%)	Gini
Uganda	5.77	5.67	-0.0210	17.94	10.41	-0.0034	0.74	0.42	0.0018
Kenya	5.16	6.50	-0.0314	12.28	9.30	-0.0203	1.93	0.74	0.0082
Mozambique	12.72	10.16	-0.0267	10.30	4.83	0.0217	0.88	0.32	0.0033
Malaysia	8.44	10.94	-0.0696	4.52	2.85	0.0059	1.26	0.00	0.0013
The Philippines	2.56	3.40	-0.0165	20.21	16.45	-0.0336	1.48	0.58	0.0033
Egypt	7.04	11.31	-0.0590	7.78	6.61	0.0026	0.69	0.02	0.0033

INTERACTIONS AMONG THE THREE FINANCIAL CONSTRAINTS

The increase in relative GDP per capita when the borrowing constraint is relaxed by 20% for different credit participation costs and intermediation costs
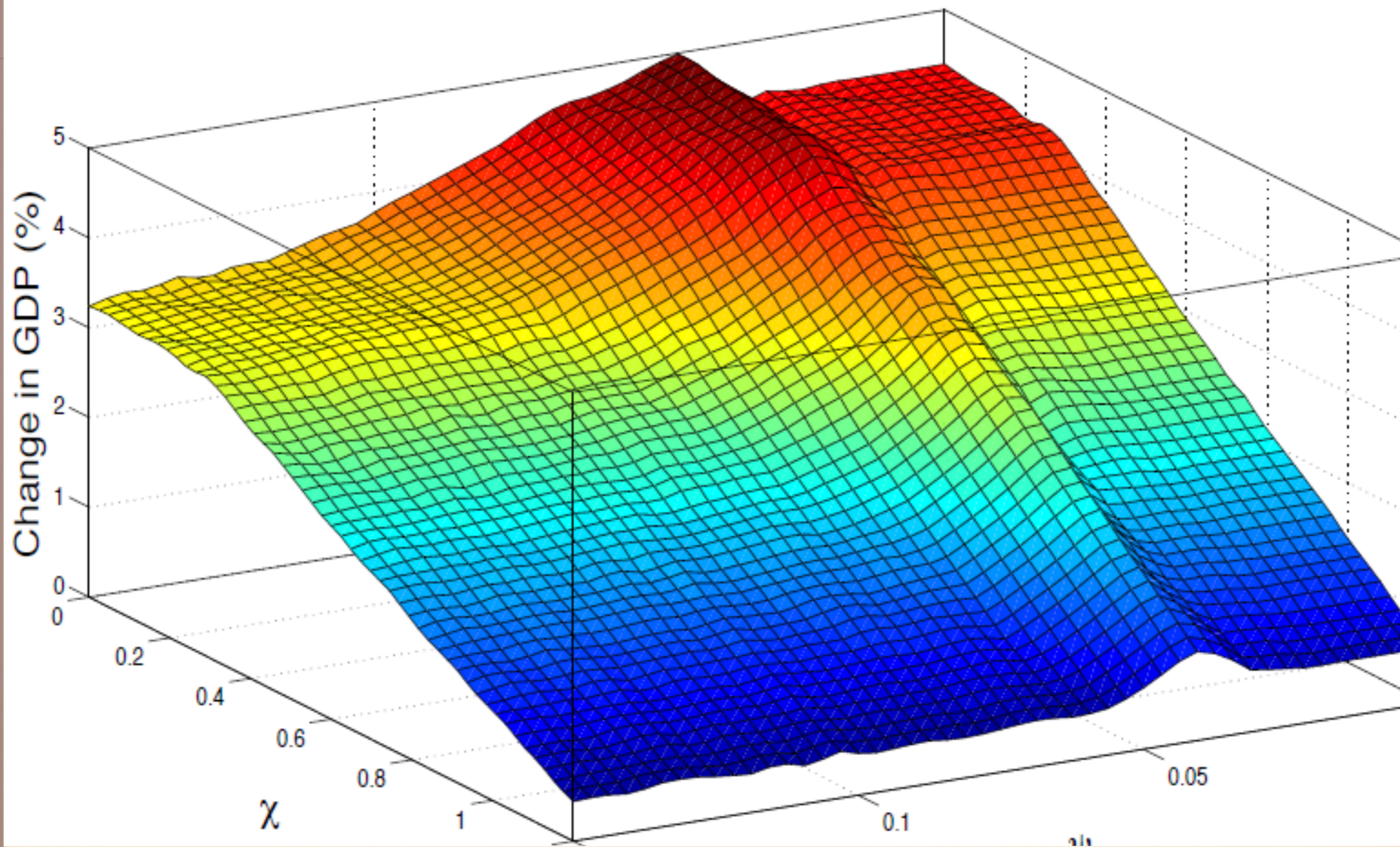
Decomposition of GDP and TFP

GDP decomposition

		General Equilibrium		Partial Equilibrium	
		GDP(%)	Contribution(%)	GDP(%)	Contribution(%)
ψ	Extensive margin	8.94	348.96	3.69	68.08
	Intensive margin	-6.32	-246.73	1.73	31.92
	Savings regime	-0.06	-2.23	0	0
	Total	2.56	100	5.42	100
λ	Extensive margin	2.75	13.59	9.68	19.61
	Intensive margin	24.68	122.13	39.7	80.39
	Savings regime	-7.22	-35.72	0	0
	Total	20.21	100	49.38	100
χ	Extensive margin	0.09	5.76	0.09	4.27
	Intensive margin	1.79	120.70	2.04	95.73
	Savings regime	-0.39	-26.46	0	0
	Total	1.48	100	2.13	100

Decomposition of GDP and TFP

TFP decomposition

		General Equilibrium		Partial Equilibrium	
		TFP(%)	Contribution(%)	TFP(%)	Contribution(%)
ψ	Between-regime shifting	7.68	226.02	15.32	471.36
	Credit regime	-0.85	-25.05	-1.69	-51.95
	Savings regime	-3.43	-100.97	-10.38	-319.41
	Total	3.40	100	3.25	100
λ	Between-regime shifting	22.53	136.95	29.61	296.11
	Credit regime	4.16	25.27	-1.04	-104.05
	Savings regime	-10.24	-62.22	-12.56	-125.60
	Total	16.45	100	16.01	100
χ	Between-regime shifting	0.78	133.98	0.81	142.76
	Credit regime	-0.19	-32.36	-0.22	-38.80
	Savings regime	-0.01	-1.62	-0.02	-3.96
	Total	0.58	100	0.57	100

CONCLUSION

Thank you for your time