



**Centre for  
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SOAS University of London

## **Managing Capital Flows**

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# Managing capital flows – three key questions

- ❖ How can macroprudential regulations be designed to support development goals and effectively manage the risks of engagement with international financial markets?
- ❖ [1] What are the main risks of engagement with international financial markets? What are the main transmission channels of global credit market shocks to credit cycles in LDEs?
- ❖ [2] What specific macroprudential regulation can attenuate the virility of the shocks?
- ❖ [3] How can foreign private capital flows be managed to deliver productivity growth and development? Does the recipient sector matter?
- ❖ “The Transmission of Global Credit Market Shocks to Credit Cycles in Developing Economies: Can Macroprudential Regulation Attenuate the Virility of the Shocks?” (Bationo, Murinde and Soumare, 2022)
- ❖ “Foreign Private Capital Flows and Productivity in Sub-Saharan Africa: Does the capital allocation puzzle matter?” (Bationo, Griffith-Jones, Murinde, Soumare and Tyson, 2023).



## The main transmission channels of global credit market shocks

- ❖ **Global "push" and "pull" factors** drive cross-border banking capital flows, e.g. Bruno & Shin (2014); Gropp & Radev (2017); Karolyi & Taboada (2015)
- ❖ **Bank network theory** claims that the structure of the **bank interconnection** plays an important role in financial contagion across banks, e.g. Acemoglu et al. (2015); Bernard et al. (2017); Stiglitz (2010)
- ❖ Identified channels for the **transmission** of international credit shocks across borders: **housing prices** (e.g. Cesa-Bianchi et al., 2017), **exchange rates** (Blanchard et al., 2016; Bruno & Shin, 2014; Cesa-Bianchi et al., 2017) & **asset prices** (Blanchard et al., 2016; IMF, 2017)
- ❖ **The gap - commodity prices**: Despite the importance of the commodities trade, particularly in LDC's balance of payments, the literature is silent on the contribution of commodity price cycles to cross-border banks' activities



## What specific macroprudential regulations can attenuate the virility of the shocks?

- ❖ Macroprudential policy is defined as the use of primarily **prudential tools to limit systemic risk** (cf. IMF-FSB-BIS, 2016)
- ❖ Most macroprudential policies, such as **Basel III**, aim at containing systemic risk, a type of risk that is by nature endogenous
- ❖ We examine the effects of these macroprudential rules in reducing financial instability stemming from the international interconnection of banks and international financial markets



## Econometric model (1)

- ❖ We use the banks interconnection theory of Acemoglu et al. (2015), Allen & Gale (2000), Bernard, Capponi & Stiglitz (2017), Bruno and Shin (2014)
- ❖ We estimate the model for the direct effects of cross-border banking capital flows on domestic credit cycles:

$$y_{it} = \mu_{1,i} + \alpha_1 F_{it-1} + \sum_{j=1}^m \beta_{1,j} X_{ijt-1} + \varepsilon_{1,it}$$



## Econometric model (2)

- ❖ We explore the commodity price transmission channel:

$$y_{it} = \mu_{2,i} + \alpha_2 F_{it-1} + \psi_2 \Delta P_{it} + \theta_2 \Delta F_{it} P_{it} + \sum_{j=1}^m \beta_{2,j} X_{ijt-1} + \varepsilon_{2,it}$$

- ❖ We examine the mitigating effect of macroprudential regulation:

$$y_{it} = \mu_{3,i} + \alpha_3 F_{it-1} + \psi_3 \Delta P_{it} + \theta_3 \Delta F_{it} P_{it} + \phi_3 M_{it-1} + \delta_3 F_{it-1} M_{it-1} + \eta_3 \Delta P_{it} M_{it-1} + \sum_{j=1}^m \beta_{3,j} X_{ijt-1} + \varepsilon_{3,it}$$



## Data and sample

- ❖ Cross-border capital flows are from **BIS Locational Banks Statistics**
- ❖ Credit data are from **IMF International Financial Statistics (IFS)**
- ❖ Commodity prices from **IMF IFS**; commodity trades from **UN comtrade data**
- ❖ Macroprudential policies data are updated from **Alam et al. (2019)**
- ❖ Control variables : Inflation, monetary policy, exchange rate, GDP growth; data are from **World Bank WDI**
- ❖ Sample : 74 countries (DEM) from 1994Q1 to 2015Q3



## Commodity Price Index

- ❖ We rely on the method initially proposed by Deaton et al.(1995), later improved by Gruss (2014), and used by Agarwal et al. (2017)
- ❖ The commodity price index is:

$$CNEP_{i,\tau,t} = \sum_{k=1}^J \Psi_{k,\tau,t} \omega_{i,k,t}$$

where,  $\Psi_{k,\tau,t}$  is the logarithm of the relative price of commodity  $k$  in quarter  $\tau$  within year  $t$  (in U.S. dollars) divided by the IMF's unit value index for manufactured exports

$$\omega_{i,k,t} = \frac{1}{3} \sum_{s=1}^3 \frac{x_{i,k,t-s} - m_{i,k,t-s}}{\sum_{k=1}^K x_{i,k,t-s} + \sum_{k=1}^K m_{i,k,t-s}}$$





# Macroprudential tools

<b>Macroprudential tools</b>	<b>Abbreviation</b>	<b>Definition and measurement</b>
Countercyclical capital buffer	CCB	A requirement for banks to maintain a countercyclical capital buffer
Capital conservation buffer	CB	Requirements for banks to maintain a capital conservation buffer, including the one established under Basel III
Capital requirements	CR	Capital requirements for banks, which include risk weights, systemic risk buffers, and minimum capital requirements
Limit on leverage of banks	LVR	A limit on leverage of banks, calculated by dividing a measure of capital by the bank's non-risk-weighted exposures
Loan loss provisions	LLR	Loan loss provision requirements for macroprudential purposes, which include dynamic provisioning and sectoral provisions
Limits on credit growth	LCG	Limits on growth or the volume of credit (aggregate, household sector, corporate-sector) and penalties for high credit growth
Loans restrictions	LR	Loan restrictions (not captured in "LCG"). They include loan limits and prohibitions, which may be conditioned on loan characteristics and bank characteristics
Limits on foreign positions	LFC	Limits on foreign currency (FC) lending, and rules or recommendations on FC loans
Loan-to-value ratios	LTV	Limits to the loan-to-value ratios (housing loans, commercial real estate loans, automobile loans)
Debt-service-to-income ratio	DSTI	Limits to the debt-service-to-income ratio and the loan-to-income ratio
Taxes and Levies	TX	Taxes and levies applied to specified transactions, assets, or liabilities, which include stamp duties, and capital gain taxes
Liquidity limits	LL	Measures taken to mitigate systemic liquidity and funding risks
Loan-to-deposit	LTD	Limits to the loan-to-deposit (LTD) ratio and penalties for high LTD ratios
Foreign position limits	LFX	Limits on open foreign exchange (FX) positions, limits on FX exposures and FX funding, and currency mismatch regulations
Reserve requirements	RR	Reserve requirements (domestic or foreign currency) for macroprudential purposes
Limits on SIFI	SIFI	Measures taken to mitigate risks from global and domestic systemically important financial institutions (SIFIs)
Other	OT	Measures not captured in the above categories (stress testing, restrictions on profit distribution, and structural measures)



## Macroprudential policy indices

- ❖ From Alam et al. (2019), we identify 17 indices of prudential regulation at monthly frequency
- ❖ We constructed 5 sub-indices: Mppi, MppC, MppF, MppB, MppFI

Indexes	Abbreviation	Construction
MPP Index all	Mppi	Sum of all MPP tools
MPP credit cycles oriented	MppC	CCB + LLR + LCG + LR + LFC + LFX + RR + SIFI
MPP foreign positions oriented	MppF	LFC + LFX + RR
MPP borrowing conditions oriented	MppB	LR + LFC + LTV + DSTI + LTD + LFX
MPP Financial institutions oriented	MppFI	CCB + CB + CR + LVR + SIFI + RR + LL



## Short run versus long term dynamics

$$\Delta(y_i)_t = \sum_{j=1}^m \delta_j^i \Delta(X_{ij})_t + \Delta\gamma^i(y_i)_{t-1} + \Delta\pi^i(F_i)_t$$
$$+ \varphi^i \left[ (y_i)_{t-1} - \left\{ \omega_0^i + \alpha^i(F_i)_t + \sum_{j=1}^m \beta_j^i (X_{ij})_t \right\} \right] + \vartheta_{it}$$



## The long run regression equation

$$y_{it} = \mu_i + \omega_0 + \alpha F_{it} + \sum_{j=1}^m \beta_j X_{ijt} + \varepsilon_{it}$$



# Pooled Mean Group Analysis

ST and LT positive relationship between capital flows in the banking sector and domestic credit cycles

	1	2
<b>Short-term effect</b>		
Error correction	0.0739***	0.0822*
<b><math>\Delta</math>cbbankflows</b>	<b>0.0314**</b>	<b>0.0340**</b>
$\Delta$ logM2	0.447***	0.424***
$\Delta$ CPI	-0.00215	-0.00599
$\Delta$ exrate	-0.00914	0.0244***
$\Delta$ growth GDP		-0.00104
<b>Long-term effect</b>		
<b>cbbankflows</b>	<b>0.124***</b>	<b>0.403***</b>
logM2	0.399***	0.771***
CPI	0.0157***	0.00212
exrate	1.81e-05	0.00540***
growth GDP		-0.00259
Constant	-0.848***	0.451**
Observations	3,458	1,541



# Bank capital flows, credit cycles & commodity prices

	(1)	(2)	(3)	(4)	(5)
<b>VARIABLES</b>					
<b>cbbankflows(t-1)</b>	<b>0.00825**</b>	<b>0.0187***</b>	<b>0.0151**</b>	<b>0.0115**</b>	<b>0.0177***</b>
$\Delta \log M2$	0.118*	0.109*	0.208*	0.0210	0.0595
$\Delta CPI$	0.0118***	0.0122***	0.0125**	0.00917***	0.00965***
$\Delta \text{exrate}$	4.45e-05*	4.18e-05*	3.52e-05**	5.76e-05**	4.43e-05***
L4.log_gdp		-0.0235***			
gdp growth			-0.00529***		-0.00332***
$\Delta CNEP$				-1.160***	-0.440**
<b><math>\Delta CNEP * \text{cbbankflows}</math></b>				<b>0.0462***</b>	<b>0.0189**</b>
Constant	-0.223**	0.170	-0.393**	-0.299**	-0.463***
Observations	3,458	3,402	1,558	3,097	1,484
R-squared	0.013	0.016	0.164	0.013	0.101
# of countries	60	60	32	59	31



## Bank capital flows, credit cycles & commodity prices

- ❖ In all regressions, we find **evidence of positive effect of cross-border banking capital flows on credit cycles** in LDCs
- ❖ When commodity price index is introduced (columns 4 & 5), the cross-product between cross-border banking capital flows and commodity price index is positive; suggesting **the commodity price channel of transmission**



# Impact of macroprudential policies

	(1)	(2)	(3)	(4)	(5)
Cbbankflows(t-1)	<b>0.00871**</b>	<b>0.00834**</b>	<b>0.00814*</b>	<b>0.00809*</b>	<b>0.00853**</b>
ΔCNEP	-0.649*	-0.623*	-0.615*	-0.634*	-0.619*
ΔCNEP x cbbankflows	<b>0.0250*</b>	<b>0.0240*</b>	<b>0.0235*</b>	<b>0.0234*</b>	<b>0.0233*</b>
Mppi	0.0915**				
cbbankflows x Mppi	<b>-0.00345**</b>				
ΔCNEP x Mppi	-0.0316				
MppC		0.151***			
cbbankflows x MppC		<b>-0.00554***</b>			
ΔCNEP x MppC		<b>-0.156*</b>			
MppF			0.149**		
cbbankflows x MppF			<b>-0.00549**</b>		
ΔCNEP x MppF			-0.156		
MppB				0.0727	
cbbankflows x MppB				-0.00264	
ΔCNEP x MppB				0.000359	
MppFI					0.136**
cbbankflows x MppFI					<b>-0.00520**</b>
CNEP x MppFI					-0.0800
Control variables	included	included	included	included	included
Constant	-0.240**	-0.231**	-0.225**	-0.223**	-0.235**





## Impact of macroprudential policies

- ❖ The interaction term of MPP index and cross-border capital flows is significantly negative, suggesting MPP regulations mitigate the propagation of shocks into the domestic economy
- ❖ Results also show that depending on the type of regulation, we observe different degree of mitigation of the adverse effect of cross-border banking capital flows
- ❖ Evidence: **Prudential regulation tools aimed at dampening credit cycles, reducing foreign exposures and preserving the safety of financial institutions are more efficient, than prudential regulation that focused on borrowing conditions**



## How can foreign private capital flows be managed to deliver productivity growth? Does the recipient sector matter?

- ❖ Foreign capital inflows influence positively productivity and economic growth (Alfaro et al., 2014), but:
  - there could be a negative impact of foreign capital flows on productivity (e.g. Aizenman et al., 2013; MacDonald, 2015)
  - capital flows can even cause financial crises (Reinhart and Reinhart, 2008; Forbes and Warnock, 2012), e.g. if the flows are short-term and reversible
- ❖ None of the existing papers examine sectoral composition of capital flows and their relative impact on productivity, i.e. **the capital sectoral allocation puzzle**



# The model

- ❖ **Theoretical foundations:** Take a simple production function (e.g., Hall and Jones (1999) and Bonfiglioli (2008)):

- ❖ 
$$Y_j = K_j^\alpha (A_j H_j L_j)^{1-\alpha}. \quad (1)$$

- ❖ Capital comprises domestic capital ( $K_j^d$ ) and foreign capital ( $K_j^f$ ); dividing  $Y_j$  by the human capital,  $H_j L_j$ , we obtain:

- ❖ 
$$\frac{Y_j}{H_j L_j} = \left( \frac{K_j^d + K_j^f}{H_j L_j} \right)^\alpha (A_j)^{1-\alpha}. \quad (2)$$

- ❖ By assuming  $y_j \equiv Y_j / (H_j L_j)$  and  $k_j \equiv K_j / (H_j L_j)$ :

- ❖ 
$$A_j = y_j^{1/1-\alpha} (k_j^d + k_j^f)^{-\alpha/1-\alpha}. \quad (3)$$

- ❖ Hence, the **econometric model**:

- ❖ 
$$y_{it} = u_i + \pi_j F_{ijt} + \sum_{k=1}^m \phi_{jk} X_{kit} + \varepsilon_{it} \quad (4)$$



## Sample African countries

- ❖ Our country sample contains eighteen (**18**) Sub-Saharan African countries with data available over the period **2006-2015**
- ❖ Benin, Botswana, Cameroon, Ethiopia, Ghana, Kenya, Liberia, Madagascar, Malawi, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia and Zimbabwe

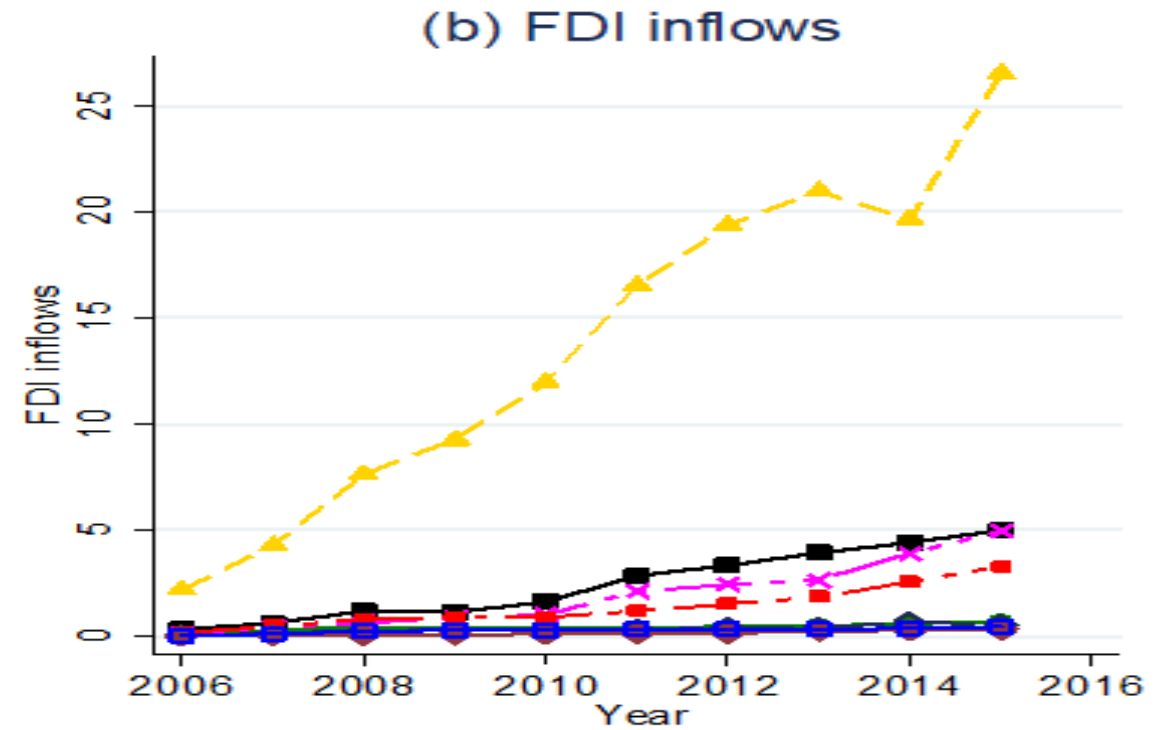
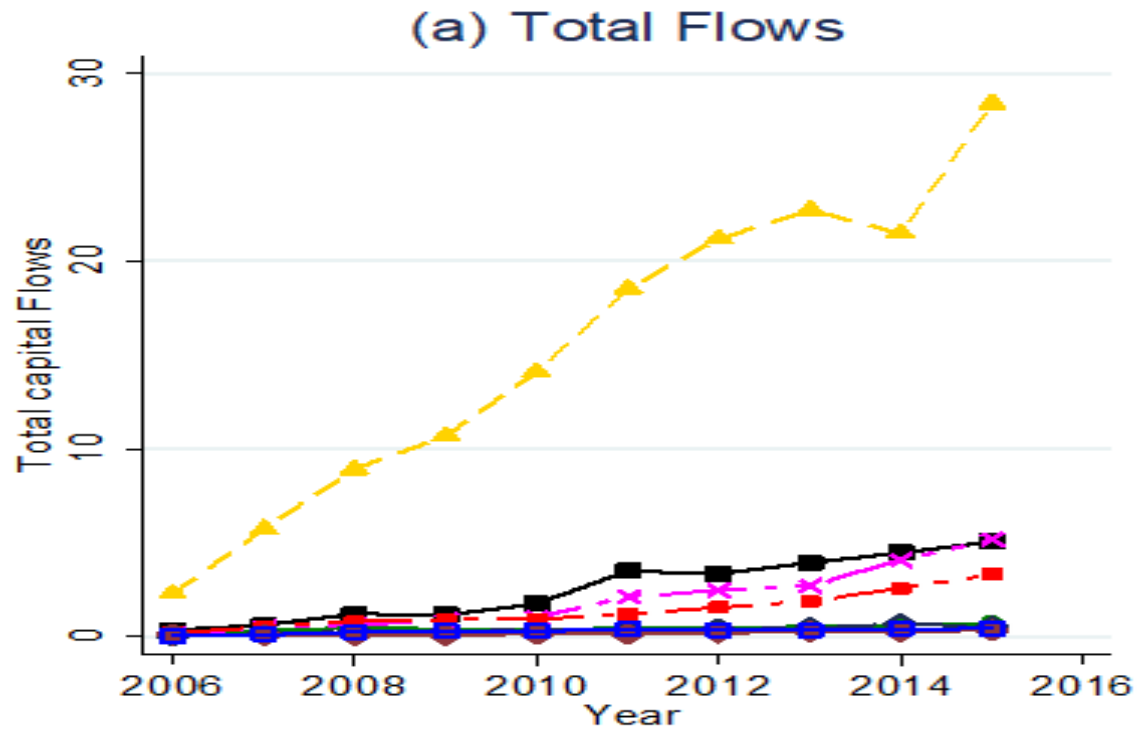


## Key sectors

Sector	Description of content
Agriculture	Agriculture; fisheries; livestock; agri-processing
Manufacturing	Manufacturing excluding those affiliated to agricultural sector
Commerce & trade (short-term)	General commerce; wholesale; Transport & warehousing
Construction & real estate	Real estate; construction; mortgages
Infrastructure	Public roads and transport; water; energy; telecoms; public utilities' waste management; information
Extractives	Mining and quarrying; oil
Tourism	Hotels, restaurants and capital flows related to tourism
Financial services	Banking; insurance; capital markets
Services	Other services (excluding tourism and financial services)
Others	Capital flows not include in the above sectors



# Evolution of total foreign private capital flows and FDI flows for different sectors, 2006 - 2015





# TFP and sectoral total foreign private capital flows

Dependent variable: Total Factor Productivity (TFP)								
	Agriculture	Commerce	Construction	Extractives	Infrastructure	Manufacturing	Services	Tourism
<b>TFP (-1)</b>	0.800***	0.846***	0.796***	0.834***	0.839***	0.836***	0.815***	0.808***
	[0.0293]	[0.0407]	[0.0589]	[0.0480]	[0.0377]	[0.0424]	[0.0473]	[0.0624]
<b>TC Flows</b>	1.122***	1.200*	6.966**	-0.0835	-0.153**	0.101	6.772	2.977
	[0.341]	[0.619]	[3.242]	[0.100]	[0.0673]	[0.307]	[4.706]	[2.190]
<b>Bankcredit</b>	0.326***	0.271***	0.330***	0.283***	0.224**	0.286***	0.385***	0.355***
	[0.0765]	[0.0829]	[0.114]	[0.0740]	[0.104]	[0.0994]	[0.103]	[0.125]
<b>Human Capital</b>	-0.421***	-0.315**	-0.391**	-0.298*	-0.353***	-0.334**	-0.506***	-0.418**
	[0.139]	[0.133]	[0.160]	[0.153]	[0.129]	[0.152]	[0.168]	[0.200]
<b>Institutional quality</b>	-1.014	-2.051	-1.746	-1.743	-0.320	-1.008	-0.759	-1.485
	[1.344]	[1.364]	[1.184]	[1.373]	[1.144]	[1.079]	[1.265]	[1.244]
<b>Constant</b>	28.20***	22.76**	26.97**	21.26**	23.16***	22.11**	29.65***	26.89**
	[9.346]	[9.430]	[11.13]	[9.964]	[8.681]	[10.02]	[10.89]	[12.93]



## Conclusion and policy take-aways

- ❖ Q1: We uncover new evidence that credit market conditions in developed countries are transmitted to LCD credit markets through commodity price cycles
- ❖ Q2: We identify macroprudential policy tools which work for regulators in LDCs: i.e., tools for dampening credit cycles, reducing foreign exposures, and preserving the safety of financial institutions
- ❖ Q3: We uncover a new interesting finding that the effects of the flows on productivity growth depend on recipient sectors; SSA countries may design policy incentives to prioritise some key sectors for foreign private capital flows



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**End**

**Thank you !**

**Q & A**