

# **Do Sounder Banks Make Calmer Water? The Link Between Regulations and Extreme Capital Flow Episodes**

***Kristin Forbes***  
***MIT-Sloan School of Management,***  
***NBER & CEPR***



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# Comments Today

- **Have tighter prudential and macroprudential regulations since 2008 reduced “capital flow waves”?**
- **Key results**
  - Changes since GFC in relationship with global factors (& waves)
  - Mixed evidence on impact of regulations
    - Higher bank capitalization ratios → ↓ surges
    - Tighter macroprudential regulations → less impact, ↑ stops?
    - Different effects of bank-focused regulations on different flows
- **Implications**
  - Bank flows calmer, but may be more “chop” in other flows
  - Sounder banks at core of financial system can reduce impact of any “waves”



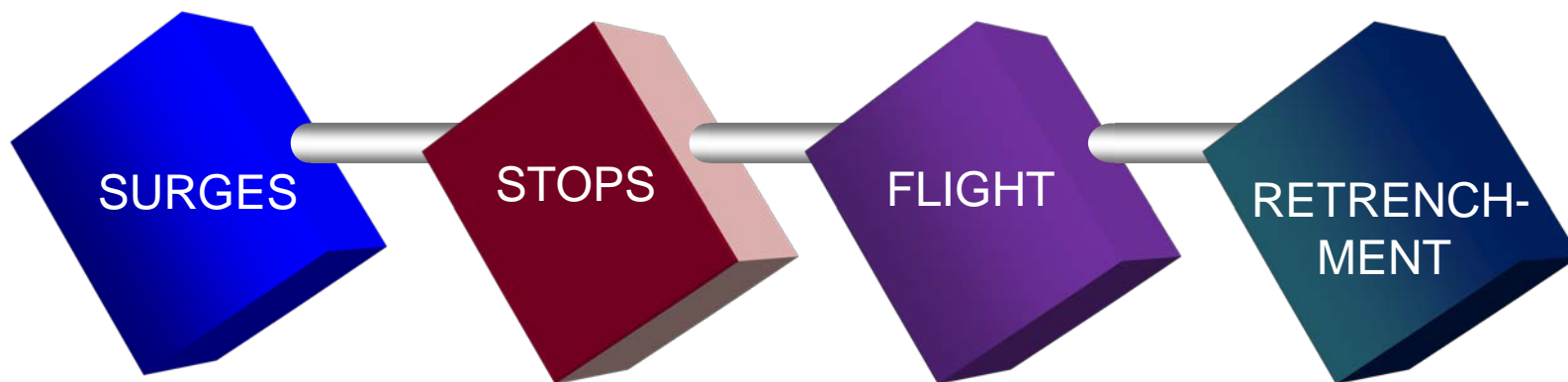
# Builds on Key Papers

- **Literature on global financial cycle and if it has changed**
  - Rey, (2013), Miranda-Agrippino & Rey (2015)
  - Bruno & Shin (2015)
  - Scheubel, Stracca and Tille (2019)
  - Converse, Levy-Yeyati & Williams (2019)
  - Avdjiev, Gambacorta, Goldberg & Schiaffi (2019)
- **Literature on extreme capital flow movements/episodes**
  - Forbes & Warnock (2012, 2019), Scheubel et al. (2019)
- **Shifting composition of capital flows**
  - Shin (2013), Cerutti & Claessens (2014), Avdjiev et al. (2019)
- **How bank characteristics affect vulnerability to liquidity shocks**
  - Bruno & Shin (2015), Buch & Goldberg (2015)
- **Impact of regulations on international bank lending**
  - Aiyar et al (2014), Forbes, Reinhardt & Wiededak (2017)



# Waves / Extreme Capital Flow Episodes

*Forbes & Warnock (2012) Approach*



Sharp  
**increase**  
in gross  
capital  
**inflows**  
(foreigners)

Sharp  
**decrease**  
in gross  
capital  
**inflows**  
(foreigners)

Sharp  
**increase**  
in gross  
capital  
**outflows**  
(domestics)

Sharp  
**decrease**  
in gross  
capital  
**outflows**  
(domestics)



# Calculating a Surge or Stop

- Let  $C_t$  be a 4-quarter moving sum of gross capital inflows from foreigners (GINFLOW):

$$C_t = \sum_{i=0}^3 GINFLOW_{t-i}$$

$$\Delta C_t = C_t - C_{t-4}$$

- A surge is when  $\Delta C_t$  increases more than 1 standard deviation above its rolling historical mean
  - provided:  $\Delta C_t$  increases at least 2 sd at some point in episode
  - the entire episode lasts more than 1 quarter
  - country has at least 4 years of data to calculate historic mean
- Stop is defined symmetrically



# Incidence of Waves/Episodes

	Full Sample			Emerging Market		
	1985- 2009	2000- 2007	2010- 2018	1985- 2009	2000- 2007	2010- 2018
Surges	16%	21%	7%	14%	18%	9%
Stops	14%	9%	8%	13%	10%	11%
Flight	17%	22%	6%	17%	22%	7%
Retrenchment	13%	10%	7%	11%	9%	9%

**Source:** Forbes and Warnock (2019)



# Drivers of Episodes

- **Forbes & Warnock (2012, 2019) estimate conditional probability of having a surge, stop, flight or retrenchment in a quarter**

$$\text{Prob}(e_{it}=1) = F(\phi_t, \gamma_{it}, \alpha_{it})$$

$e_{it}$  is dummy=1 for each episode (surge, stop, flight, retrenchment)

$\phi_t$ : global factors

$\gamma_{it}$ : contagion variables

$\alpha_{it}$ : domestic variables

- **Estimation issue: cdf of  $F(\cdot)$  is skewed (85% of episodes=0)**
  - Use complimentary logarithmic estimator (cloglog) which assumes the cdf of  $F(\cdot)$  is the extreme value distribution,  $F(z) = 1 - \exp[-\exp(z)]$
- **Seemingly unrelated regression estimation to allow for cross-episode correlation in errors**
  - Robust standard errors, clustered by country



# Control Variables

- **Global variables:**
  - Global risk: VXO (log)
  - Global interest rates; shadow short-term rate for US, Japan, Euro area & UK (Krippner's RBZ website)
  - Global GDP growth (IMFs' WEO)
  - Change in oil prices
- **Regional contagion:** episode in another country in same region
- **Domestic variables**
  - Domestic GDP growth
  - GDP per capita
  - **Macroprudential policy:** changes in 17 different tools over last 2 or 5 years (from iMapp database in Alam et al., 2019)
  - **Banking system strength:** bank regulatory capital to risk-weighted assets or z-score (World Banks' GFDD)





# Probability of Surges & Stops in Total Capital Flows From Abroad

	<b>Full Period (1990-2018)</b>		<b>Post-GFC (2010-2018)</b>	
	<b>Surges</b>	<b>Stops</b>	<b>Surges</b>	<b>Stops</b>
<i>Global risk</i>	-0.777**	1.081**	-0.550	0.298
<i>Global interest rates</i>	0.133**	0.149**	0.104	0.230
<i>Global GDP growth</i>	0.320**	-0.168**	-0.133	0.191
<i>Δ oil prices</i>	0.001	0.001	0.007	-0.019**
<i>Regional contagion</i>	0.668**	0.691**	0.694*	0.002
<i>Domestic GDP growth</i>	0.021**	-0.072**	0.069	-0.083**
<i>GDP per capita</i>	-0.000	-0.002	-0.009	-0.032**
<b>Observations</b>	<b>4,238</b>	<b>4,238</b>	<b>1,461</b>	<b>1,461</b>

**Note:** Similar framework and variables as Forbes and Warnock (2019)



# Effect of Regulations on Probability of Surges & Stops *in Total Capital Flows*

<b><u>Individual controls:</u></b>	<b>Surges</b>	<b>Stops</b>	<b># obs</b>
<i>Δ macropru regs (2 yrs)</i>	0.027	0.100**	4,099
<i>Δ macropru regs (4 yrs)</i>	-0.025	0.059**	3,808
<i>Capital-asset ratio (risk-wtd)</i>	-0.080**	0.008	3,135
<i>Bank Z-score</i>	-0.012	0.018**	3,590
<b><u>Simultaneous controls:</u></b>			
<i>Δ macropru regs (4 yrs)</i>	-0.035	0.066**	3,019
<i>Capital-asset ratio (risk-wtd)</i>	-0.074**	0.016	
<i>Bank Z-score</i>	-0.010	0.015*	



# Explanations?

- **Short and unusual post-2008 period**
- **Insufficient tightening—especially limited use of macroprudential tools to date**
- **Endogeneity**
- **Different effects of bank-focused regulations on different types of capital flows**



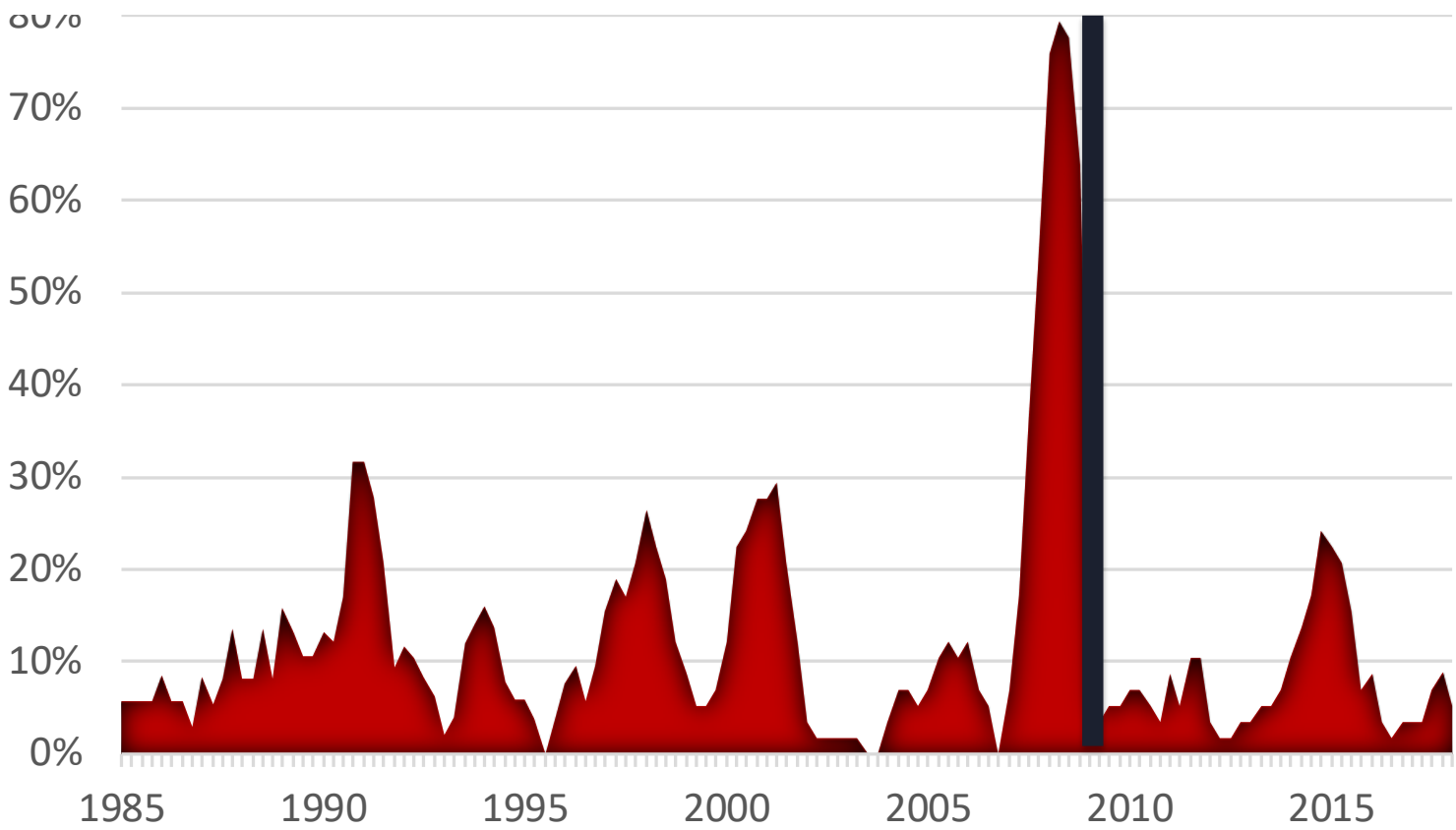
# Effect of Regulations on Probability of Surges & Stops *in Bank & Debt Flows*

<u>Individual controls:</u>	Banking Flows			Debt Flows		
	Surges	Stops	# obs	Surges	Stops	# obs
$\Delta$ macropru regs (2 yrs)	-0.010	0.022	4,099	-0.044	0.076*	4,059
$\Delta$ macropru regs (4 yrs)	0.022	0.023	3,808	-0.036	0.070**	3,756
<u>Simultaneous controls:</u>						
$\Delta$ macropru regs (4 yrs)	0.019	0.036	3,019	-0.061*	0.059**	3,018
Capital-asset ratio (risk-wtd)	-0.067**	-0.035		-0.104**	-0.029	
Bank Z-score	-0.027**	0.008		-0.013	0.013*	

**Supports work on shifting of risks from regulations focused on banks (Ahnert et al., 2019)**



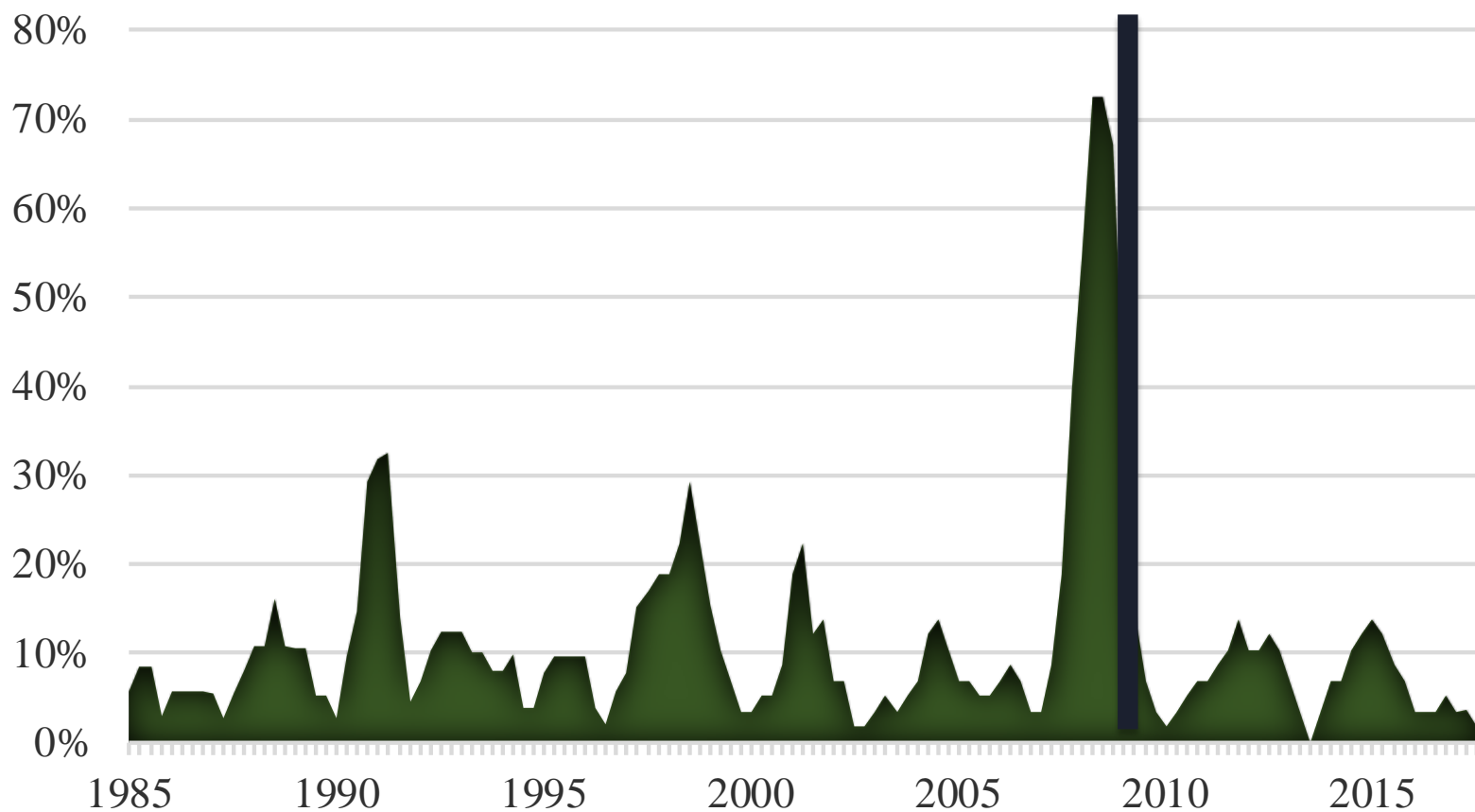
# Incidence of Stop Episodes: *Full Sample*



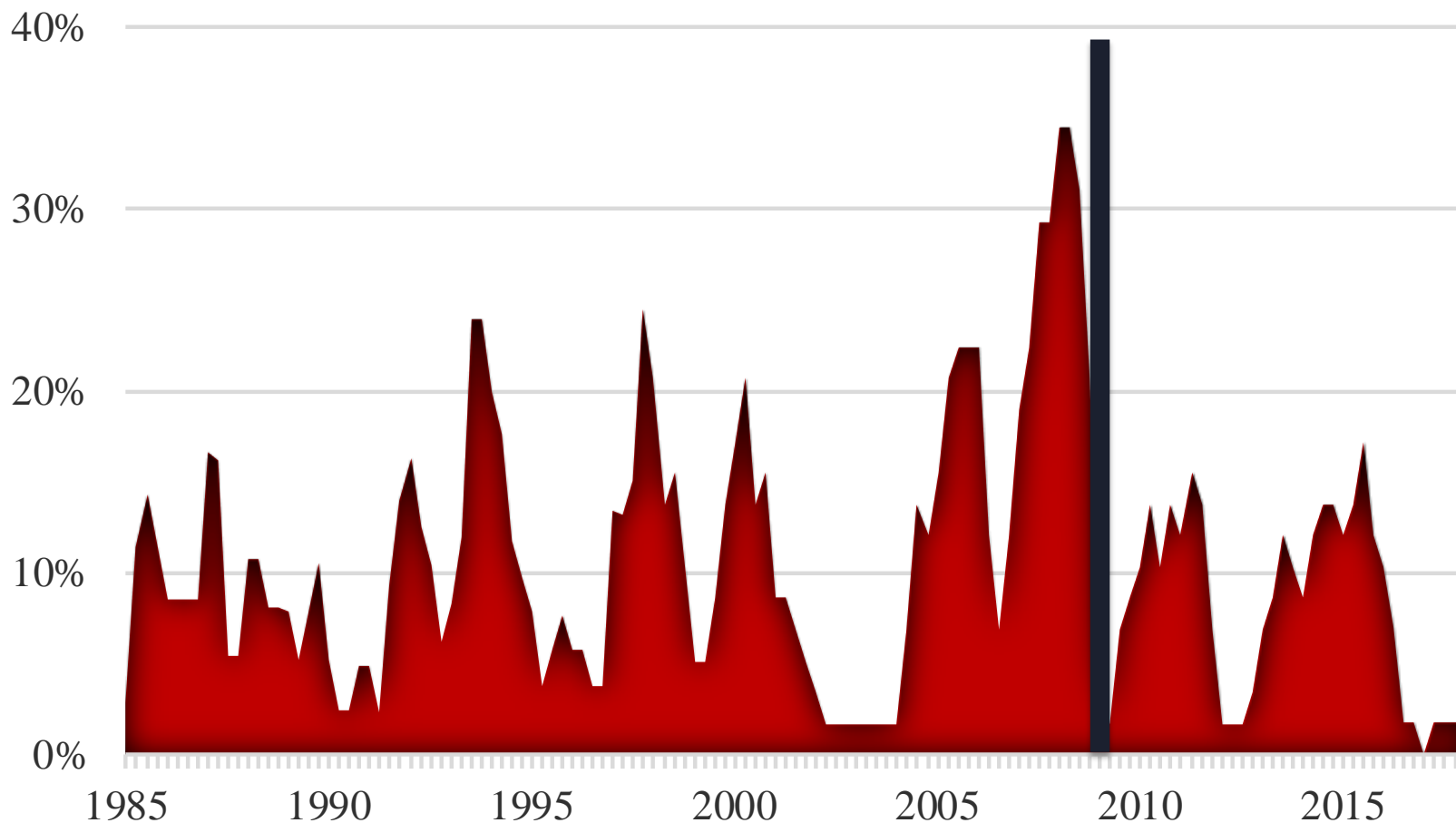
**Source:** Forbes and Warnock (2019)



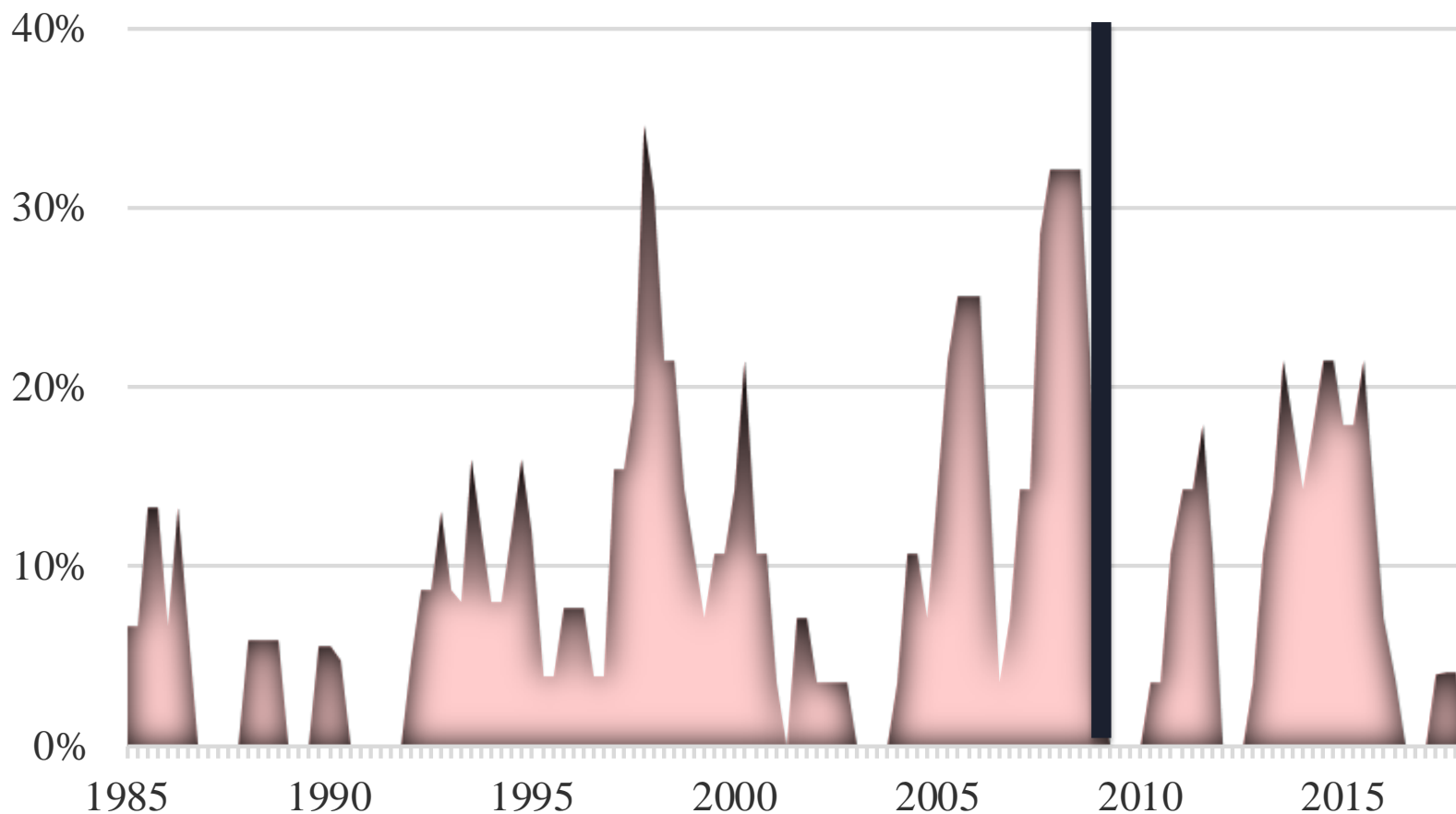
# Incidence of Stop Episodes: *Bank Flows – Full Sample*



# Incidence of Stop Episodes: *Debt Flows – Full Sample*



# Incidence of Stop Episodes: *Debt Flows – Emerging Markets*





# Conclusions

- **Mixed evidence: impact of regulations on capital flow waves**
  - Better capitalized banks → fewer surges
  - Tighter macroprudential regulations → less impact
    - Not sufficiently tightened?
    - Shifted financial intermediation outside regulated sector?
- **Important context**
  - Primary goal of regulations: reduce amplification mechanisms
  - Important even if no impact on incidence of waves
- ***Even if the water is not calmer, waves should do less damage***

