

Capital Flow Waves—Or Ripples? Extreme Capital Flow Movements in an Era of Easy Monetary and Tight Regulatory Policy

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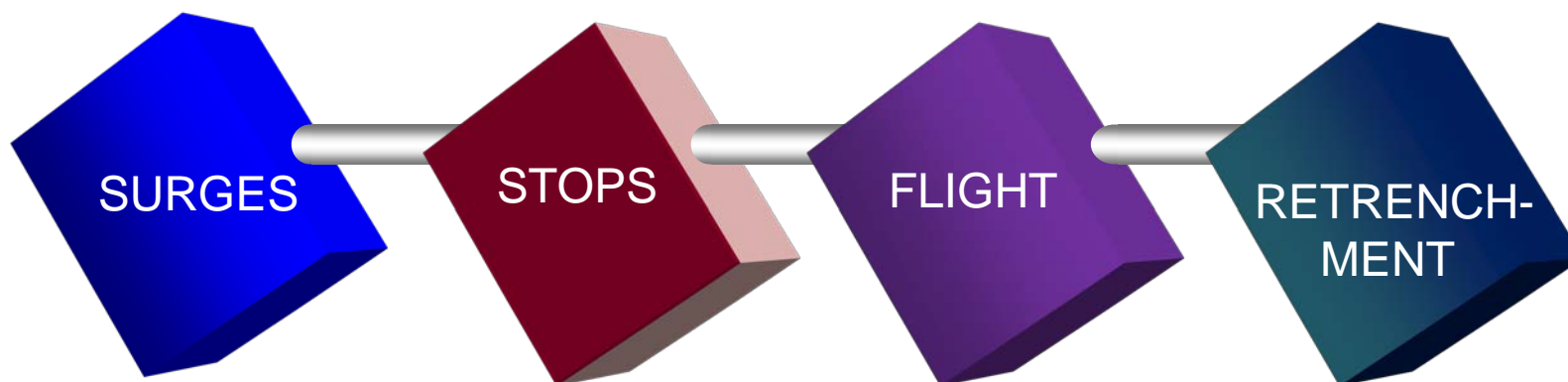
**AEA Annual Meetings
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Capital Flow “Waves”

- **Sharp movements** in international capital flows create substantial challenges
 - “Sudden Stops”, “Surges” or “Bonanzas”
 - Calvo (1998), Calvo et al. (2004), Reinhart and Reinhart (2009)
- **Forbes and Warnock (2012) suggest focusing on gross inflows and outflows by foreigners and domestic to understand the waves**
- **Forbes and Warnock (2019) updates underlying data and corresponding episodes of “extreme capital flows”**
 - What has changed with tighter regulation & easier monetary policy?
 - New data and corresponding code posted online:
 - <https://mitmgmtfaculty.mit.edu/kjforbes/research/>



Forbes & Warnock Approach



Sharp
increase
in gross
capital
inflows
(foreigners)

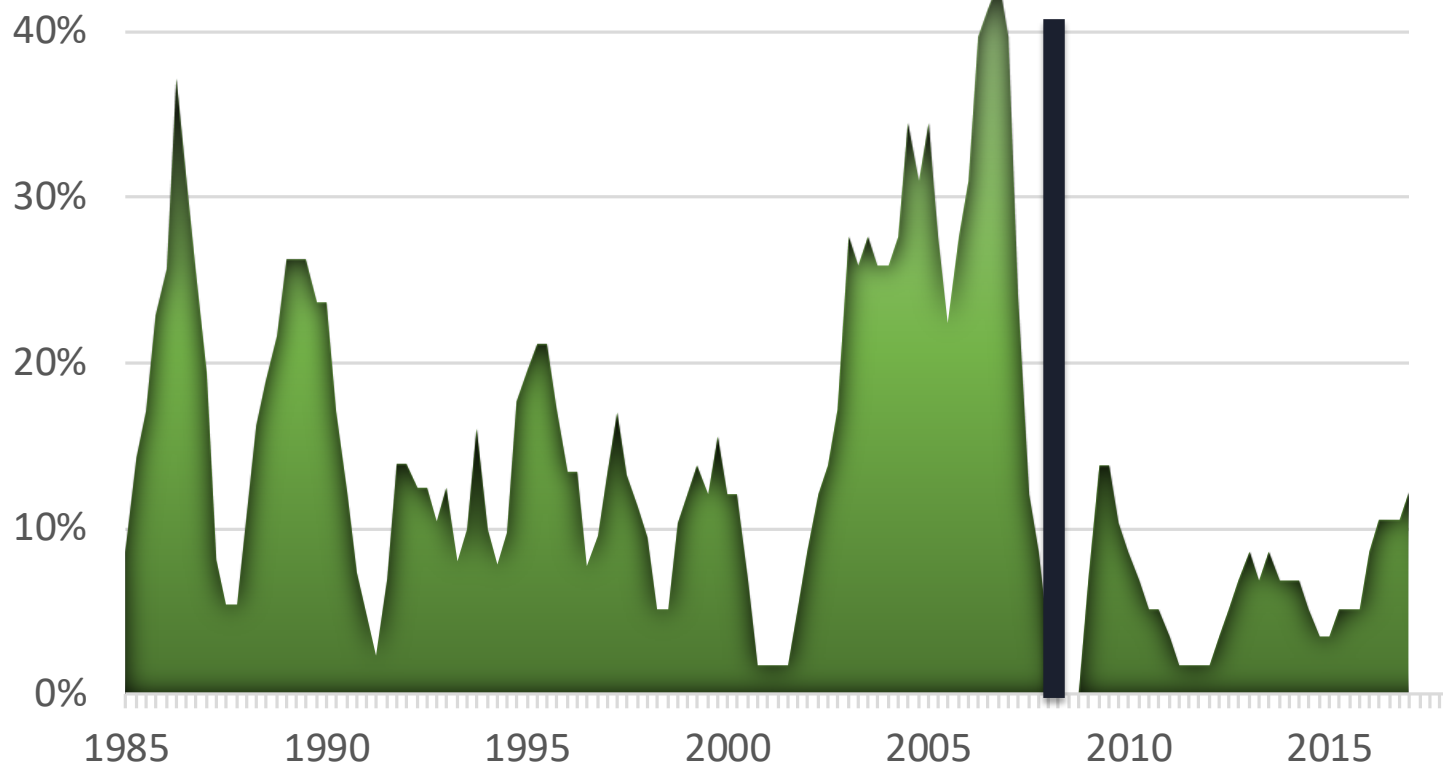
Sharp
decrease
in gross
capital
inflows
(foreigners)

Sharp
increase
in gross
capital
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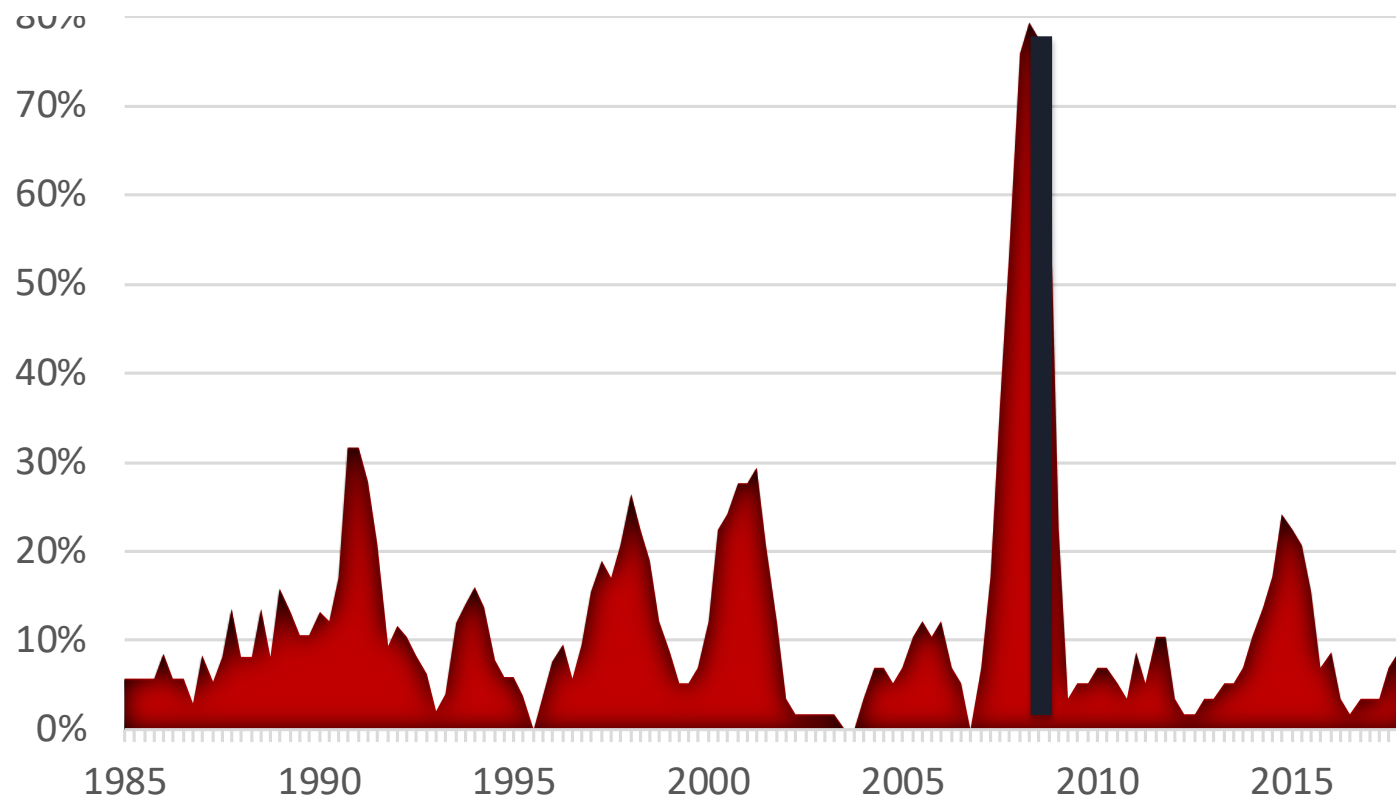
Incidence of Surge Episodes: *Full Sample*



Source: Forbes and Warnock (2019)



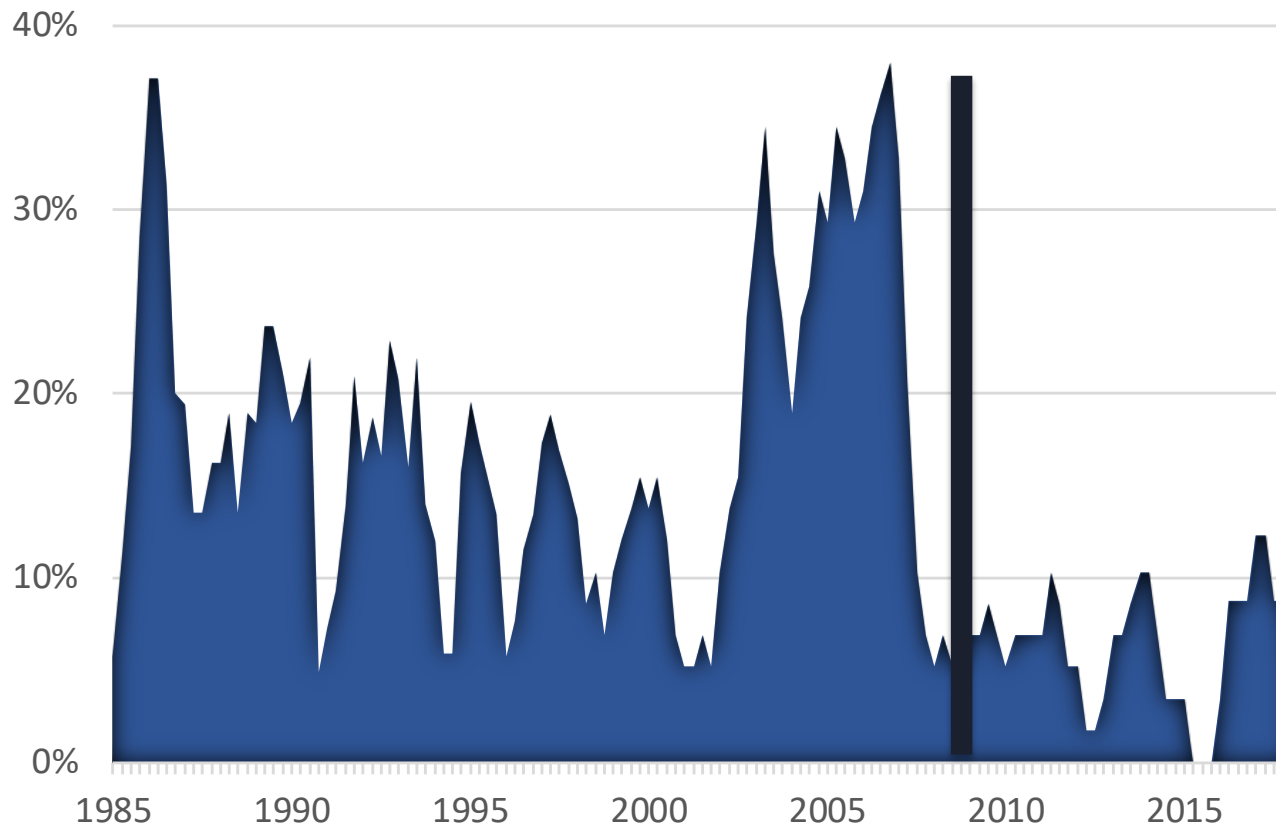
Incidence of Stop Episodes: *Full Sample*



Source: Forbes and Warnock (2019)



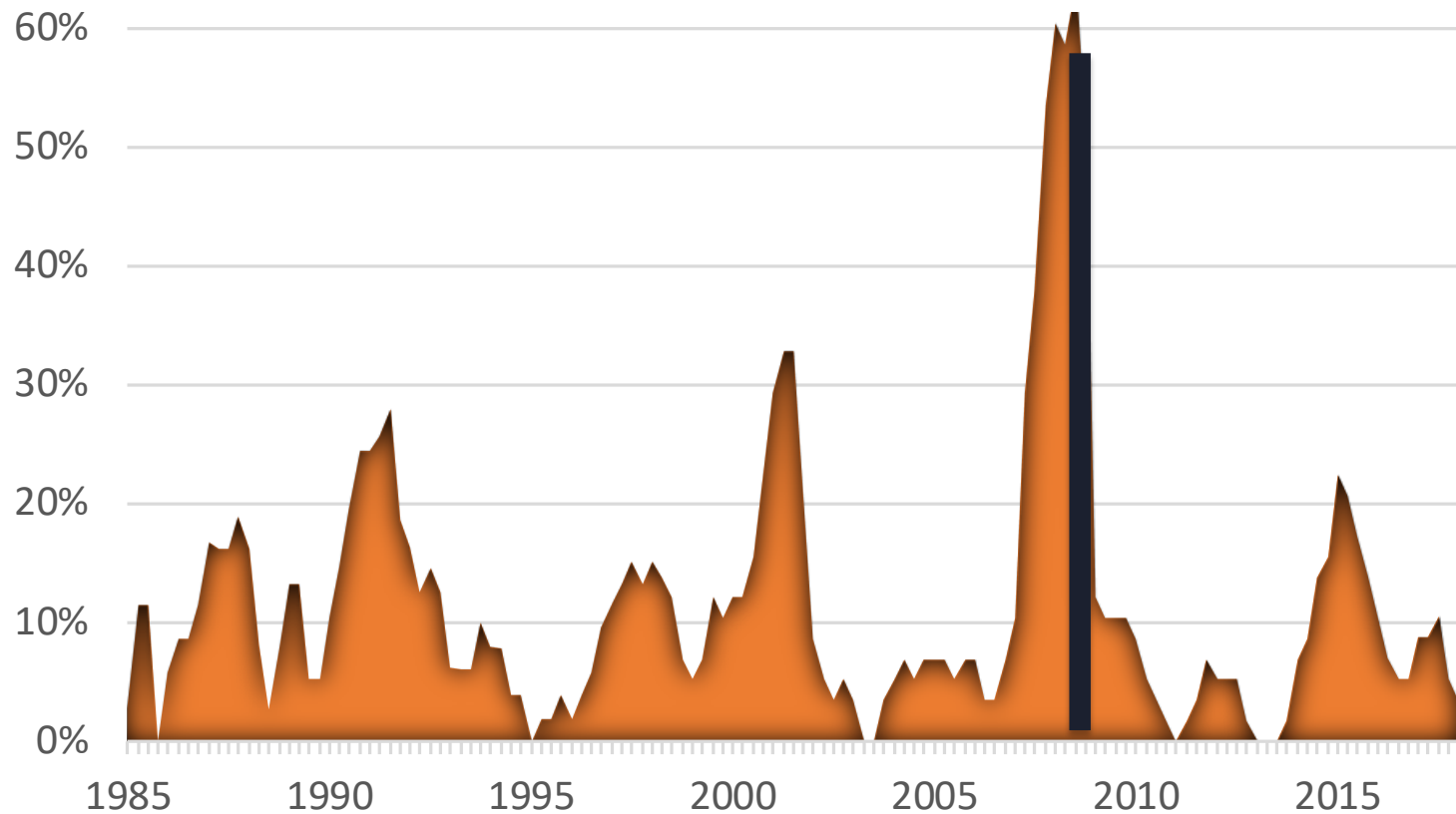
Incidence of Flight Episodes: *Full Sample*



Source: Forbes and Warnock (2019)



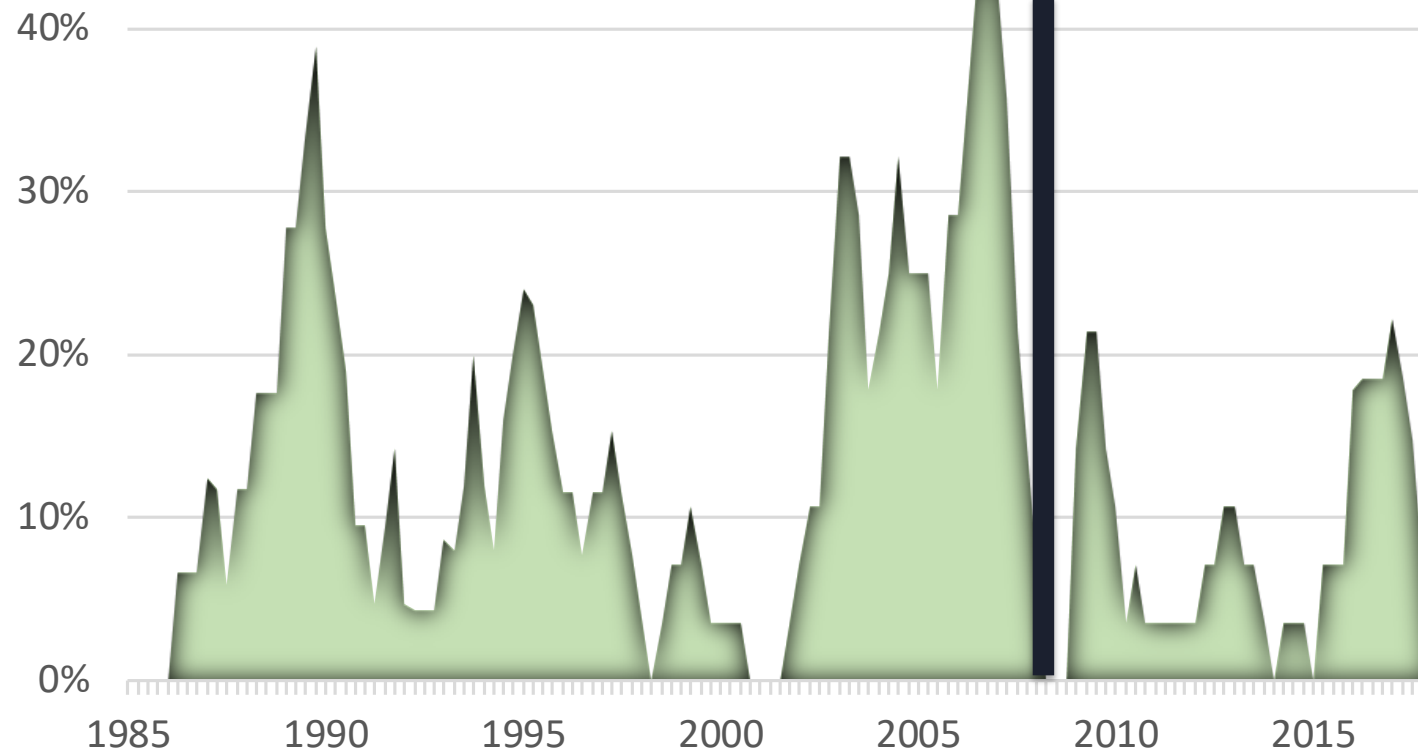
Incidence of Retrenchment Episodes: *Full Sample*



Source: Forbes and Warnock (2019)



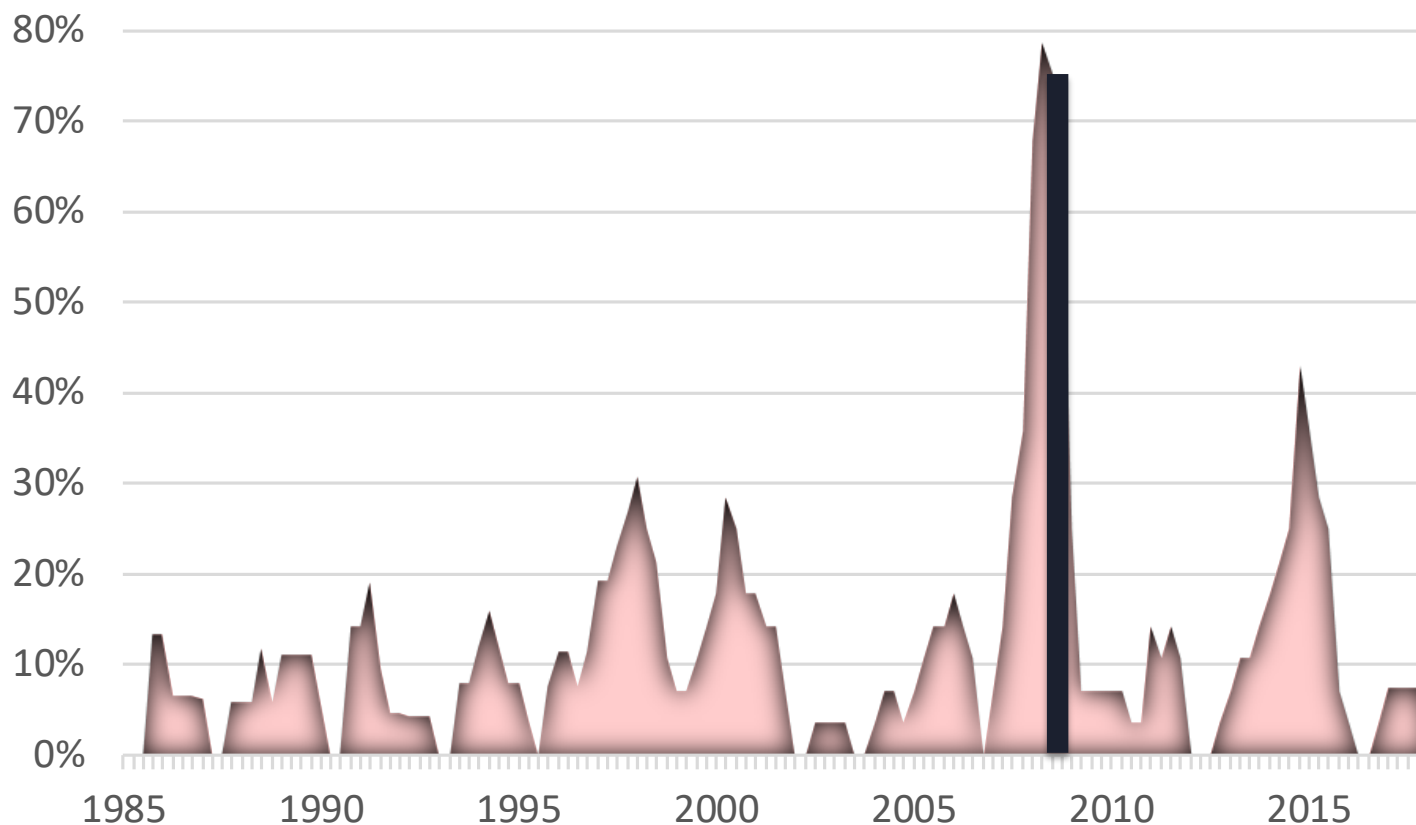
Incidence of Surge Episodes: *Emerging Markets*



Source: Forbes and Warnock (2019)



Incidence of Stop Episodes: *Emerging Markets*



Source: Forbes and Warnock (2019)



Incidence of Stop Episodes: *Full Sample*

	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)



Have the Drivers Changed?

- **Literature on global financial cycle and if it has changed**
 - Rey, (2013), Miranda-Agrippino & Rey (2015)
 - Bruno & Shin (2015), Barrot and Serven (2017)
 - Scheubel, Stracca and Tille (2019), Goldberg and Krogstrup (2018)
 - Converse, Levy-Yeyati & Williams (2019)
 - Avdjiev, Gambacorta, Goldberg & Schiaffi (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)



Estimate 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)

ϕ_t : global factors

γ_{it} : contagion variables

α_{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 liquidity (growth in global money supply in G3)
- **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



Episode Drivers: Pre-Crisis (1980-2007)

Forbes and Warnock (2019)

	Surge	Stop	Flight	Retrench
<i>Risk</i>	-0.040** (0.010)	0.029** (0.011)	-0.041** (0.008)	0.035** (0.013)
<i>Liquidity</i>	-0.006 (0.019)	-0.019 (0.014)	0.016 (0.014)	0.006 (0.019)
<i>Monetary</i>	-0.001 (0.054)	0.114** (0.042)	-0.036 (0.048)	0.082 (0.050)
<i>Policy</i>				
<i>Growth</i>	0.225** (0.076)	-0.085 (0.114)	0.157** (0.072)	-0.250* (0.128)
<i>Oil Prices</i>	0.000 (0.003)	-0.007** (0.003)	-0.005** (0.002)	-0.007* (0.004)
<i>Regional</i>	0.565**	0.662**	0.211	0.399**
<i>Contagion</i>	(0.235)	(0.217)	(0.138)	(0.172)
<i>Domestic</i>	0.020**	-0.114**	-0.000	0.003
<i>GDP Growth</i>	(0.005)	(0.019)	(0.008)	(0.025)
Obs.	2,763	2,763	2,763	2,763



Episode Drivers: *Post-Crisis (2010-18)*

Forbes and Warnock (2019)

	Surge	Stop	Flight	Retrench
<i>Risk</i>	-0.017 (0.032)	0.012 (0.029)	-0.037 (0.038)	-0.030 (0.024)
<i>Liquidity</i>	-0.028 (0.055)	-0.011 (0.049)	0.046 (0.046)	0.058 (0.043)
<i>Monetary Policy</i>	0.054 (0.161)	0.249 (0.176)	-0.013 (0.210)	0.349 (0.214)
<i>Growth</i>	-0.074 (0.187)	0.004 (0.211)	0.244 (0.235)	0.095 (0.286)
<i>Oil Prices</i>	0.009 (0.006)	-0.016** (0.006)	0.005 (0.007)	-0.012* (0.007)
<i>Regional Contagion</i>	0.700* (0.398)	0.441 (0.393)	0.420 (0.310)	0.387 (0.351)
<i>Domestic GDP Growth</i>	0.093** (0.033)	-0.029 (0.048)	-0.081 (0.053)	-0.079 (0.059)
Obs.	1,632	1,632	1,632	1,632

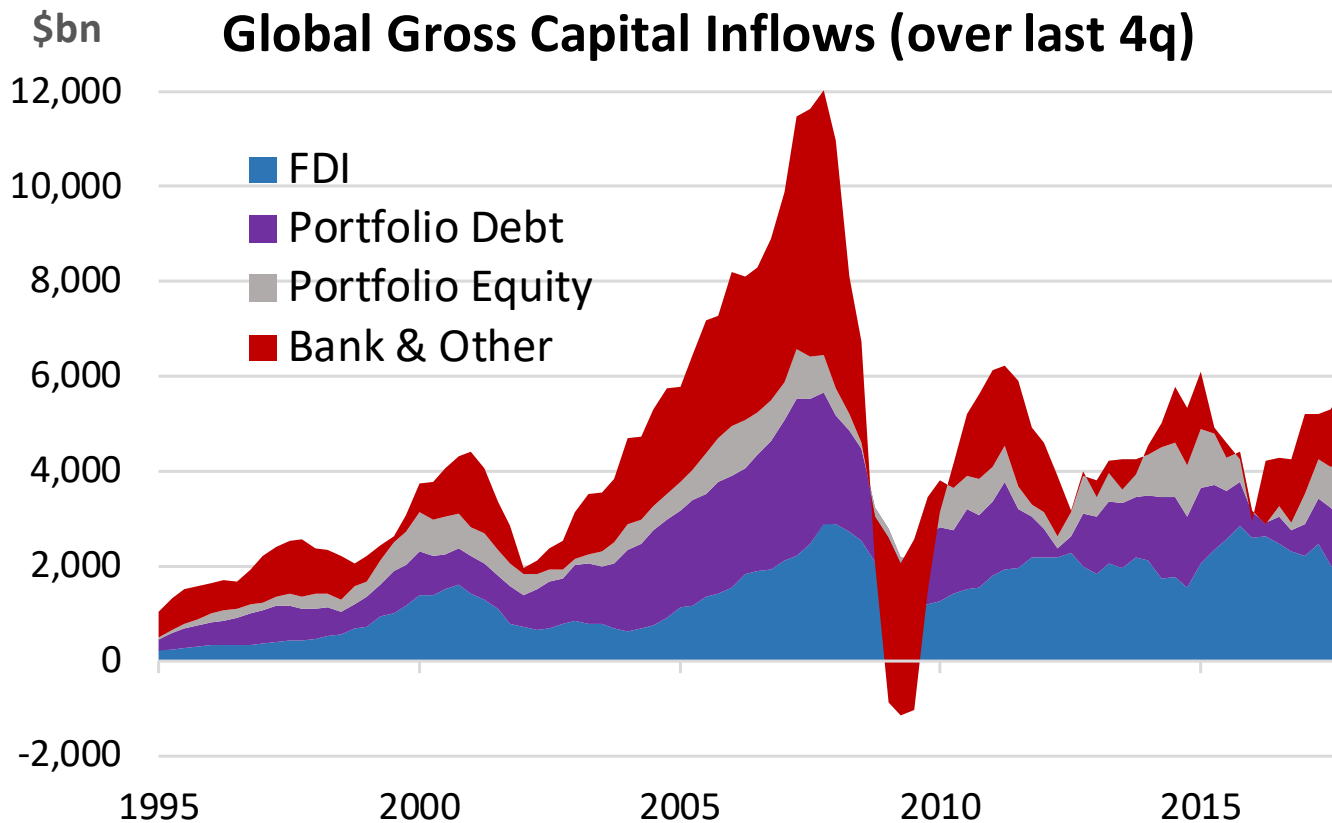


Implications for Resilience

- **“Episodes” of extreme capital flow movements have calmed**
 - More modest improvement for sudden stops & EMs
 - **Caveat: short time period, unusual decade**
- **Capital flow episodes driven less by global factors? Risk? Vix?**
 - ****See yesterday’s session, “Has the Global Financial Cycle Changed Since the Crisis?”**
 - Reduced role for VXO (Forbes, 2019; Miranda-Agrippino & Rey, 2019)
 - Global Financial Cycle still important
 - Miranda-Agrippino & Rey (2019), Scheubel, Stracca & Tille (2019)
 - Increased role of dollar? (Shin et al., 2019)
- **Missing link? Have tighter financial regulations better insulated economies from global shocks?**



Contraction in International Flows *Driven by Bank Flows*



Source: Based on data from Forbes and Warnock (2019)

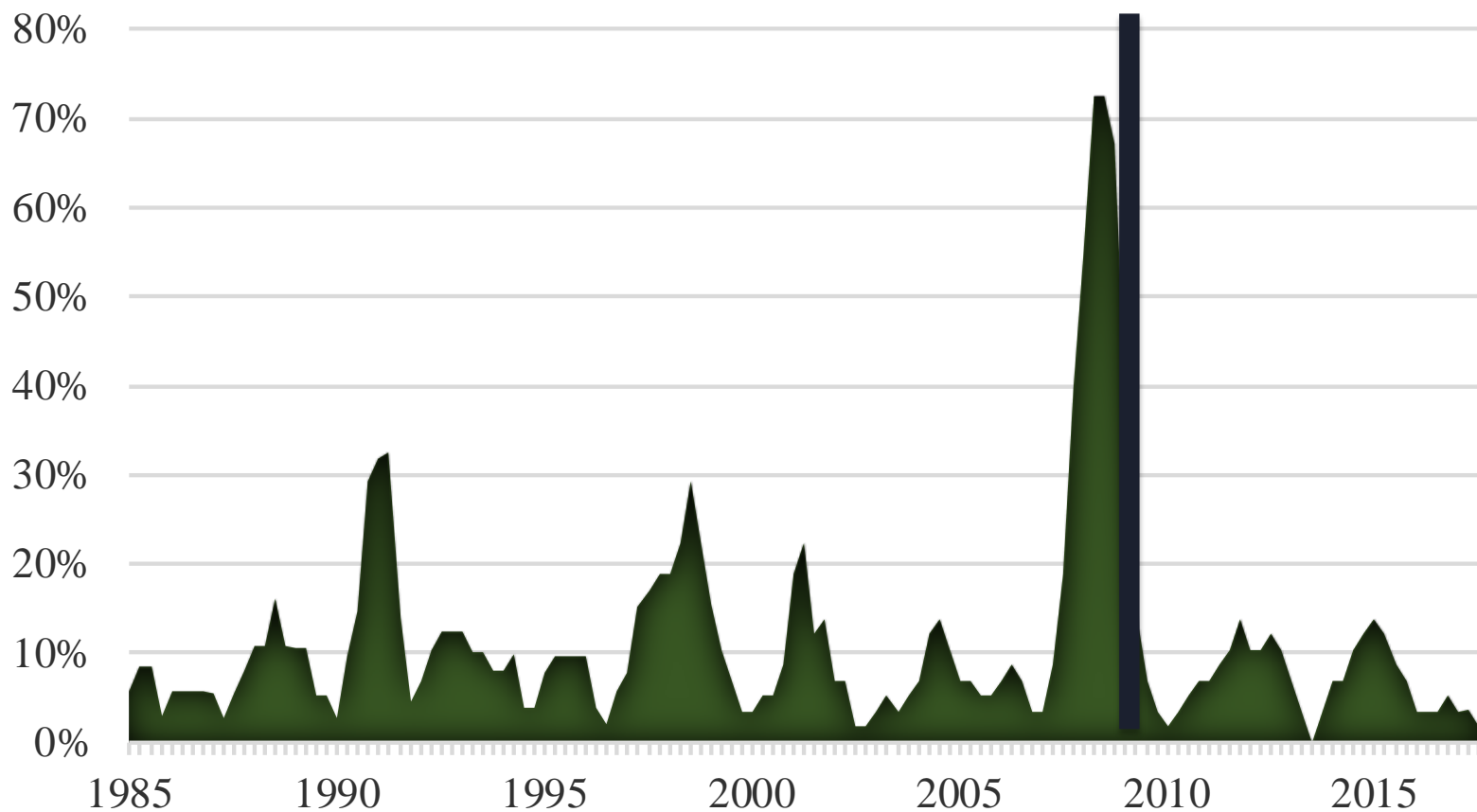


New Results

- **Do Sounder Banks Make Calmer Water? The Link Between Banking Regulations and Extreme Capital Flow Episodes**
 - Forbes (2020)
- **Mixed evidence on impact of regulations on capital flow waves**
 - Better capitalized banks → fewer surges
 - Tighter macroprudential regulations → less impact
 - Not sufficiently tightened?
 - Shifted financial intermediation and risks outside regulated sector?
 - Different effects on different types of capital flows
 - Supports evidence in Ahnert et al., 2019



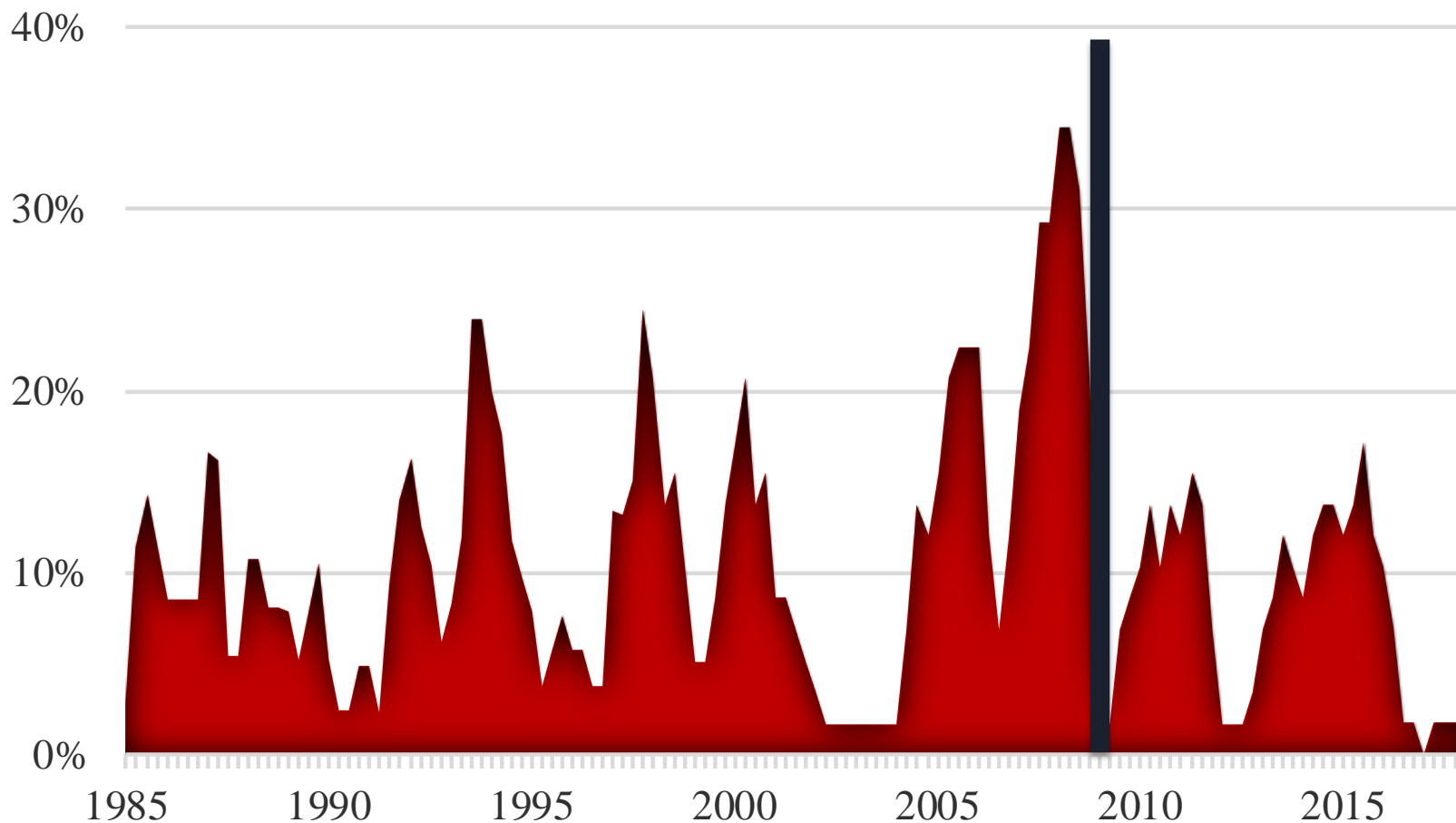
Incidence of Stop Episodes: *Bank Flows – Full Sample*



Source: Forbes (2020)



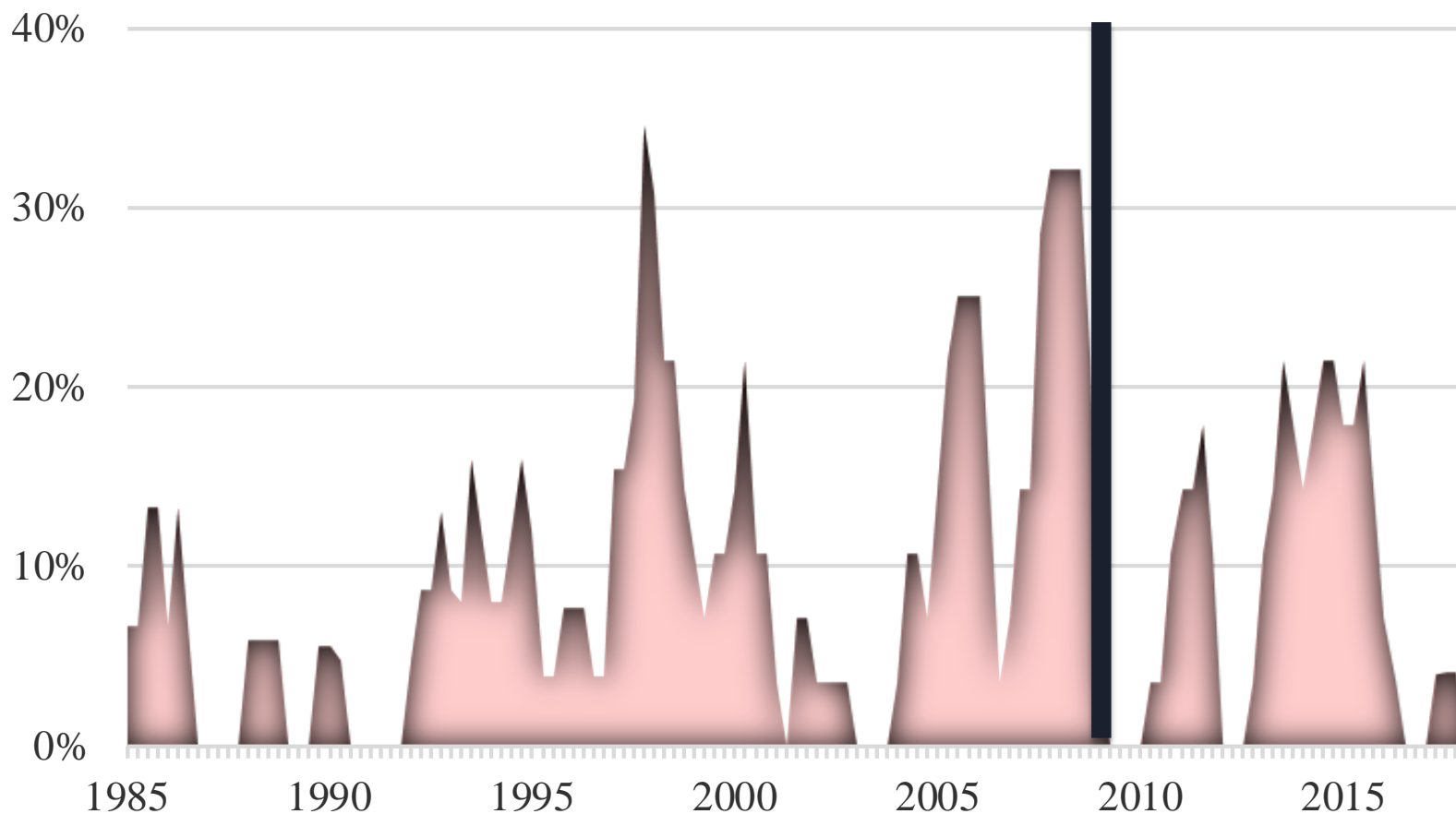
Incidence of Stop Episodes: *Debt Flows – Full Sample*



Source: Forbes (2020)



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



Source: Forbes (2020)



Final Thoughts

- **Important changes in global financial intermediation since 2008**
- **Beginning to document patterns, links and causes**
- **Some promising initial evidence:**
 - Reduced incidence of sharp capital flow movements
 - Tighter bank regulations play some role
 - Weaker link with VIX --- but maybe not other measures of global financial cycle? Dollar?
- **Important context: focus of reforms has been building resilience of financial system**
 - Even if “waves” still exist, they should do less damage

