

# The IMF and precautionary lending: An empirical evaluation of the selectivity and effectiveness of the Flexible Credit Line

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# Motivation

- Renewed discussion about adequacy of 'global financial safety net'
  - ▶ GFSN has grown in size and is multi-layered (reserves, bilateral central bank swap lines, regional arrangements, IMF)
- IMF has unique position in GFSN: global mandate, near-universal membership, long-time experience, pooling of funds
  - ▶ Since global crisis, increase in IMF resource base and lending + introduction of precautionary lending instruments, most notably Flexible Credit Line (FCL)
  - ▶ Further reforms to lending toolkit are ongoing
- Our contribution: more rigorous empirical evaluation of FCL
  - ▶ **Selectivity**: What explains participation of countries in FCL arrangements?
  - ▶ **Effectiveness**: What have been effects of FCL on bond spreads and capital inflows?

# Key takeaways

- FCL occupies an important place in IMF's lending toolkit
- FCL selectivity is explained by both demand-side/borrower and supply-side/IMF factors
- Some, but not spectacular, beneficial effects of FCL on gross capital inflows into and EMBI spreads of FCL recipients

# Main features of FCL

- No ex post conditionality (i.e., tranching lending with adjustment programme), but instead (strict) ex ante conditionality: nine qualification criteria/domains

*“countries with strong fundamentals and proven sustained policy track records”*

- Large upfront access to funds (uncapped since August 2010), on precautionary basis or to address actual BoP need
- Flexible, discretionary drawing: No Executive Board approval required (unlike CCL, SBA-HAPA)
- Other terms
  - ▶ 1 or 2 year duration, renewable (subject to reviews)
  - ▶ Long grace and repayment period (3.25 to 5 years)
  - ▶ Commitment fee (15 to 60 bps; refundable pro rata) + same borrowing costs as standard SBA

## Experience with FCL arrangements

So far *only*(?) three countries have entered into FCL. Mexico, Colombia and Poland each have had six consecutive arrangements (no drawings!)

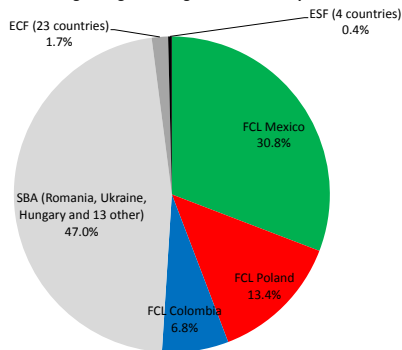
	FCL-1	FCL-2	FCL-3	FCL-4	FCL-5	FCL-6
<b>Mexico</b>	<b>17 Apr 2009</b>	<b>25 Mar 2010</b>	<b>10 Jan 2011</b>	<b>30 Nov 2012</b>	<b>26 Nov 2014</b>	<b>27 May 2016</b>
<i>size (SDR billion)</i>	31.5	31.5	47.3 ↗	47.3	47.3	62.4 ↗
<i>% of quota</i>	1000%	1000%	1500%	1304%	1304%	700%
<i>duration</i>	1 year	1 year	2 years	2 years	2 years	2 years
<b>Poland</b>	<b>06 May 2009</b>	<b>02 Jul 2010</b>	<b>21 Jan 2011</b>	<b>18 Jan 2013</b>	<b>14 Jan 2015</b>	<b>13 Jan 2017</b>
<i>size (SDR billion)</i>	13.7	13.7	19.2 ↗	22 ↗	15.5 ↘	6.5 ↘
<i>% of quota</i>	1000%	1000%	1400%	1303%	918%	159%
<i>duration</i>	1 year	1 year	2 years	2 years	2 years	2 years
<b>Colombia</b>	<b>11 May 2009</b>	<b>07 May 2010</b>	<b>06 May 2011</b>	<b>24 Jun 2013</b>	<b>17 Jun 2015</b>	<b>13 Jun 2016</b>
<i>size (SDR billion)</i>	7	2.3 ↘	3.9 ↗	3.9	3.9	8.2 ↗
<i>% of quota</i>	900%	300%	500%	500%	500%	400%
<i>duration</i>	1 year	1 year	2 years	2 years	2 years	2 years

Latest Mexican and Colombian FCLs have seen nominal increase in size, but decrease in percentage of IMF quota (at time of approval)

# FCL arrangements in perspective

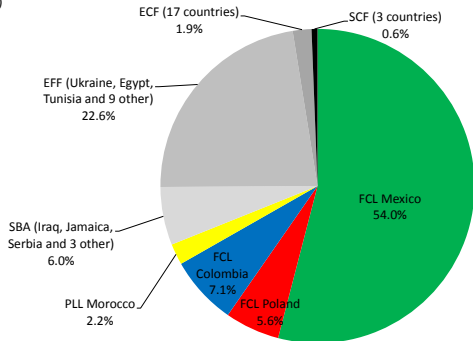
FCLs represent large share of total committed IMF resources

IMF lending arrangements agreed as of 31 May 2009



Note: Total amount agreed is SDR 102.3 billion.

IMF lending arrangements agreed as of 31 May 2017



Note: Total amount agreed is SDR 115.4 billion.

## Selectivity of FCL



# FCL selectivity: Literature

- IMF 2011/2014 FCL reviews and IEO paper
  - ▶ Demand/borrower side: political stigma, economic stigma, subjectivity of qualification, positive externalities, availability of alternatives
  - ▶ Supply/IMF side: no active promotion because of resource implications, strict interpretation of criteria for strength of signalling and to avoid moral hazard
- Econometric studies of IMF lending (e.g., Thacker 1999, Barro and Lee 2005, Sturm *et al.* 2005, Barnebeck Andersen *et al.* 2006, Dreher *et al.* 2009, Presbitero and Zazarro 2012)
- Econometric studies of central bank swap lines (e.g., Aizenman and Pasricha 2010, Aizenman *et al.* 2011, Liao and McDowell 2015)

# FCL selectivity: Our empirical strategy

- JP Morgan EMBI Global countries as potential FCL candidates: 37 countries, incl. Mexico, Poland and Colombia
- Initial selection of about 85 pre-FCL variables
  - ▶ 'Official' macroeconomic-financial qualification criteria
  - ▶ Institutional quality and risk
  - ▶ Shares in US/European/G7 exports, trade, investment, bank claims
  - ▶ Scores for similarities with US/Europe/G7 in UNGA voting
  - ▶ Trade/financial openness; changes in real GDP growth, ToT, exports; exchange market pressure index
  - ▶ Previous IMF arrangements and compliance, elections
  - ▶ GDP and GDP per capita
- Simple difference-in-means tests
- Single-regressor probits
- Multi-regressor probits

## FCL selectivity: Our empirical strategy (2)

- We estimate cross-sectional probit models of following form:

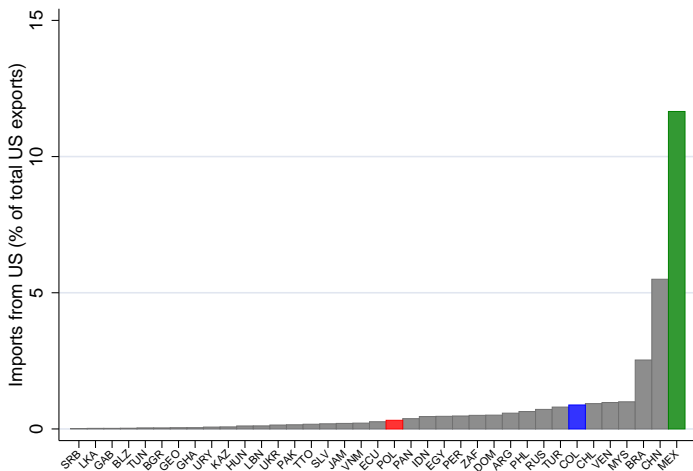
$$P(FCL_i = 1|X_i) = \Phi(X_i'\beta)$$

where  $FCL_i$  equals 1 for Mexico, Poland and Colombia and 0 for other sample countries;  $X_i$  is vector of potential correlates (before official announcement of FCL on 24 March 2009)

- Reduced form; in reality FCL is joint outcome of government's wish to seek FCL and IMF's willingness to approve it
- Selection of regressors based on results of means tests and single-regressor probits, data availability, relation with theory, correlation between variables
- Number of regressors that can be included together is limited due to small sample

# FCL selectivity: Descriptives

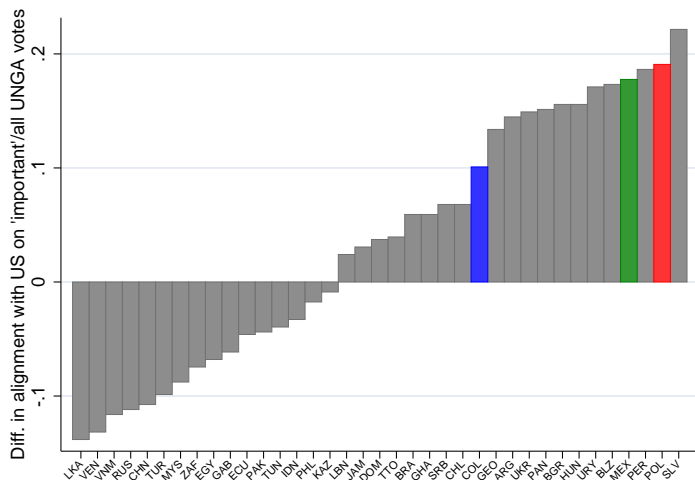
Mexico in particular was key recipient of US exports in year before FCL announcement



Source: IMF Direction of Trade Statistics

## FCL selectivity: Descriptives (2)

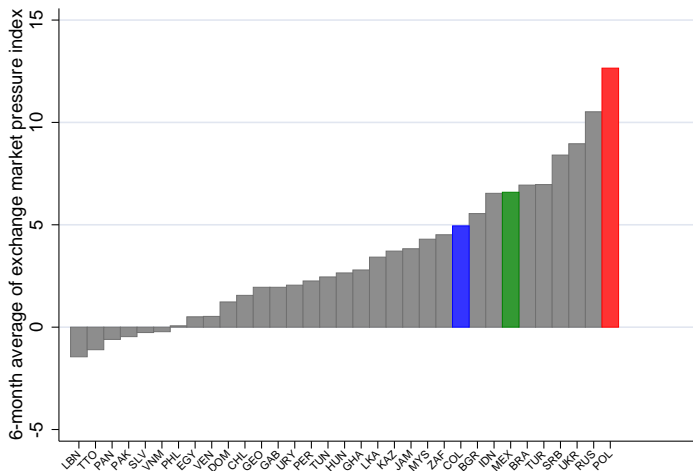
Especially **Poland** and **Mexico** had made 'political concessions' in year before FCL announcement



Source: Calculated from Voeten (2009)

## FCL selectivity: Descriptives (3)

Poland, Mexico and Colombia had experienced relatively strong exchange market pressures in six months before FCL announcement



Source: Calculated from IMF International Financial Statistics

# FCL selectivity: Probit results

Multi-regressor probits show that, when included together, key variables have expected sign and are (generally) significant

Variable	(a) Baseline model		(b) Model without EMBI spread	
	Coefficient	Marginal effect	Coefficient	Marginal effect
<i>EMBI spread</i>	-0.0032 <sup>°</sup>	-0.0002		
<i>Inflation</i>	-0.1394	-0.0071	-0.2496**	-0.0128
<i>Share in total US exports</i>	0.1637 <sup>°</sup>	0.0083***	0.1721*	0.0089***
<i>Political concessions to US</i>	7.8400***	0.3978 <sup>°</sup>	7.4575***	0.3840 <sup>°</sup>
<i>Exchange market pressure</i>	0.3204**	0.0163	0.3141***	0.0162 <sup>°</sup>
Observations	31		31	
Pseudo R <sup>2</sup>	0.6922		0.6828	
FCL countries correctly classified (sample-based cut-off of 3/31 or 9.67%)	3/3		3/3	
Non-FCL countries correctly classified (sample-based cut-off of 3/31 or 9.67%)	25/28		26/28	

<sup>°</sup> $p < 0.2$  \* $p < 0.1$  \*\* $p < 0.05$  \*\*\* $p < 0.01$

Predicted probabilities in baseline model: Mexico (98.4%), Poland (99.8%) and Colombia (13.6%); Brazil (38.1%), Peru (18.2%) and Bulgaria (12.1%)

## Effectiveness of FCL



## FCL effectiveness: Literature

*“The FCL has provided valuable insurance to [recipient] countries and helped boost market confidence during the period of heightened risks.”*

– IMF’s FCL factsheet

- IMF 2011/2014 FCL reviews
  - ▶ Event studies: fall in EMBI spreads in short window around countries’ announcement of interest in FCL
  - ▶ FE panel regressions: FCL dummy has negative (positive) effect on EMBI spreads (bond inflows); also some effects for FCL ‘qualifiers’
- John and Knedlik (2011); Marino and Volz (2012): positive developments in EMBI spreads, exchange rates and stock markets, but no attribution to FCL only
- Fernandez Arias and Levy Yeyati (2012): EMBI spreads evolution broadly similar in FCL(-qualifying) and non-FCL(-qualifying) countries
- None of foregoing look at **longer-term effects** or construct a **proper counterfactual**

# FCL effectiveness: Our empirical strategy

- We evaluate longer-term effects of FCL on Mexican, Colombian and Polish EMBI spreads and capital inflows using **synthetic control method (SCM)** of Abadie *et al.* (2003, 2010, 2015)
  - ▶ Impact of intervention as difference between post-intervention outcomes of 'treated country' and 'synthetic control group', i.e., weighted combination of untreated countries
  - ▶ Untreated countries selected from 'donor pool' of countries with outcomes governed by same structural processes
  - ▶ Country weights chosen so that characteristics of synthetic control over pre-intervention period match closely those of treated country
- Same methodology used by, a.o., recent studies of effects of
  - ▶ Economic liberalisation and integration (Billmeier and Nannicini 2013, Campos *et al.* 2014)
  - ▶ Capital controls and foreign exchange interventions (Jinjarak *et al.* 2013, Chamon *et al.* 2015)
  - ▶ Policy Support Instruments (PSIs) of IMF (Newiak and Willems 2017)

## FCL effectiveness: Our empirical strategy (2)

- Define effect of FCL on country  $i$ 's outcome variable of interest as

$$\tau_{it} = y_{it}^{FCL} - y_{it}^{NFCL}$$

- Suppose  $N + 1$  countries: FCL country  $i = 1$  and donor pool of non-FCL countries  $i = 2$  to  $i = N + 1$
- $T_0$  pre-FCL periods and  $T_1$  post-FCL periods
- We are interested in estimating for  $t > T_0$

$$\tau_{1t} = y_{1t} - y_{1t}^{NFCL}$$

- Abadie *et al.* (2010) show that  $\tau_{1t}$  can be estimated by

$$\hat{\tau}_{1t} = y_{1t} - \sum_{i=2}^{N+1} w_i^* y_{it}$$

where possible weights  $w_2, w_3, \dots, w_{N+1} \geq 0$  and  $\sum w_i = 1$

## FCL effectiveness: Our empirical strategy (3)

- Foregoing holds under conditions that

$$\forall t \leq T_0 : \sum_{i=2}^{N+1} w_i^* \bar{y}_i^k = \bar{y}_1^k \text{ and } \sum_{i=2}^{N+1} w_i^* Z_i = Z_1$$

where  $\bar{y}_i^k$  is generic linear combination of pre-FCL outcomes  $y_{it}$  and  $Z_i$  is a vector of covariates. Generally, conditions can only hold approximately

- Define  $X_1/X_0$  as vector of pre-FCL variables ( $Z$  and  $y$ ) of FCL/non-FCL countries. We choose  $W^*$  optimally so as to minimise

$$\| X_1 - X_0 W \|_V = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)}$$

- We select  $V$  so that it minimises pre-FCL root mean squared prediction error of  $y_{it}$

$$RMPSE = \sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} \left( y_{1t} - \sum_{i=2}^{N+1} w_i^* y_{it} \right)^2}$$

# FCL effectiveness: Our empirical strategy (4)

- Advantages of SCM

- ▶ Makes explicit relative contributions of control units to synthetic counterfactual and similarity of characteristics
- ▶ Avoids *extrapolation*
- ▶ Does not need large cross-sectional samples or minimum number of interventions
- ▶ Extends DID panel estimator by allowing unobserved heterogeneity to vary over time

- Drawbacks to SCM

- ▶ Effects of intervention need to be large relative to idiosyncratic volatility
- ▶ Possible *interpolation* biases
- ▶ Underestimation of effects in case of positive spillovers
- ▶ No traditional large sample inference, but 'placebo' tests, i.e., estimation of effects on non-FCL countries *as if* they participated in FCL

# FCL effectiveness: Our empirical strategy (5)

## ● Variable selection

- ▶ Outcome variables: monthly averaged EMBI spreads; 4-quarter moving sums of gross capital inflows (% of GDP)
- ▶ Covariates for spreads: y-o-y real GDP growth, reserves to GDP, public debt to GDP, current account balance to GDP
- ▶ Covariates for capital inflows: y-o-y real GDP growth, capital account openness, EIU country risk rating
- ▶ Matching based on average values of all pre-FCL outcomes and covariates

## ● Timing

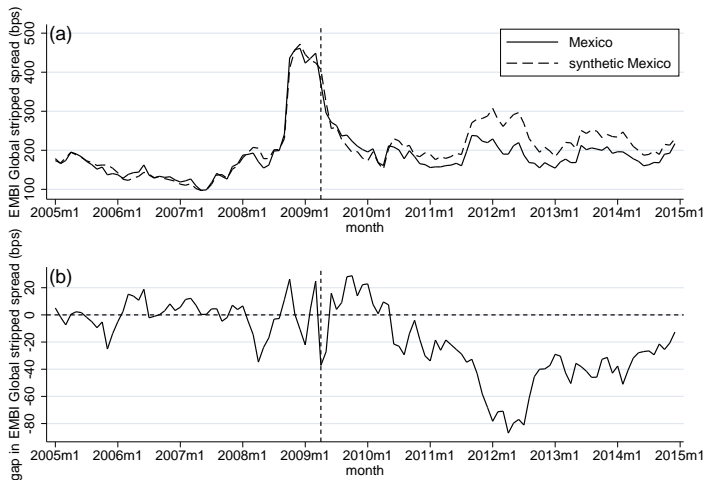
- ▶ FCL agreement as intervention (April/May 2009 or 2009Q2)
- ▶ Full period: 2005-2014

## ● Donor pool selection

- ▶ Same EMBI Global sample minus FCL countries (and minus outliers ARG, DOM, ECU, PAK, UKR, VEN for spreads)
- ▶ Full and regional donor pools

# FCL effect on Mexican EMBI spreads (full donor pool)

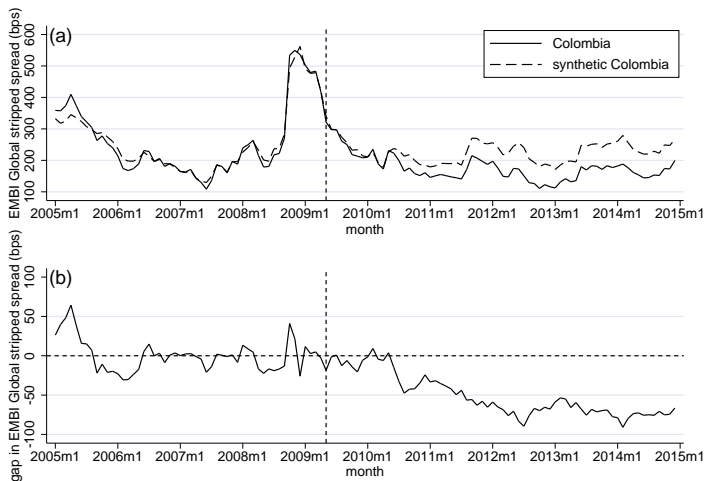
Good pre-FCL match (fit index: 6%). Initial positive effect on spread in April 2009, from June 2010 onwards further positive effects



Note: Synth Mexico: Chile (0.359), Brazil (0.293), Hungary (0.201), South Africa (0.086), El Salvador (0.061)

# FCL effect on Colombian EMBI spreads (reg. donor pool)

Good pre-FCL match (fit index: 7%). Positive effects only from mid-2010 onwards

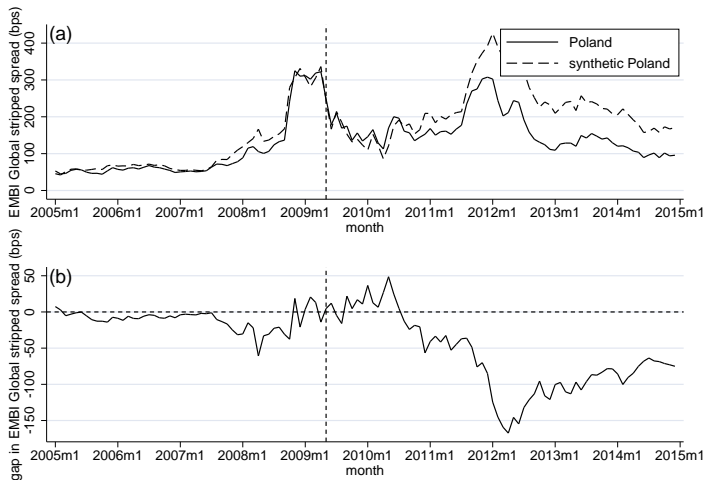


Note: Synth Colombia: Brazil (0.491), Panama (0.237), El Salvador (0.168), Chile (0.062), Peru (0.041)



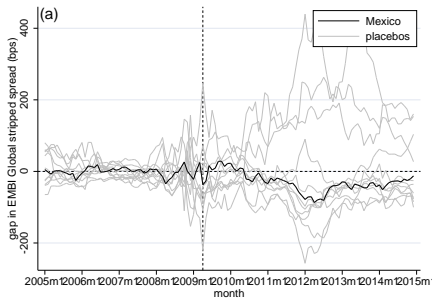
# FCL effect on Polish EMBI spreads (full donor pool)

Moderately good pre-FCL match (fit index: 13%). Again positive effects only from mid-2010 onwards



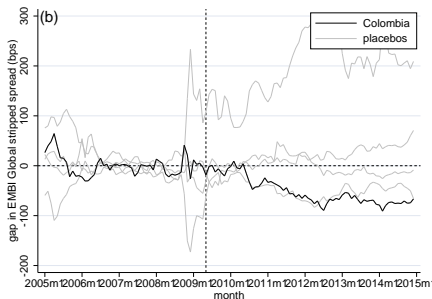
Note: Synth Poland: China (0.613), Hungary (0.387)

# FCL effects on EMBI spreads: Placebos

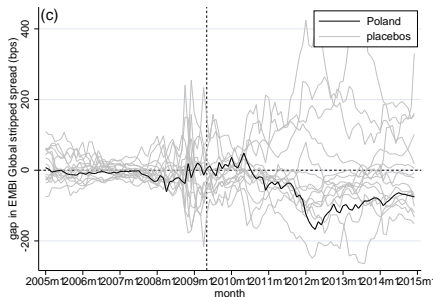


(a) Effects on Mexican spreads not 'significant'

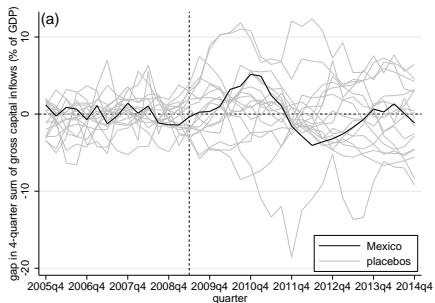
(b) Effects on Colombian spreads comparatively large ('significant'?)



(c) Effects on Polish spreads comparatively large, but not before 2011



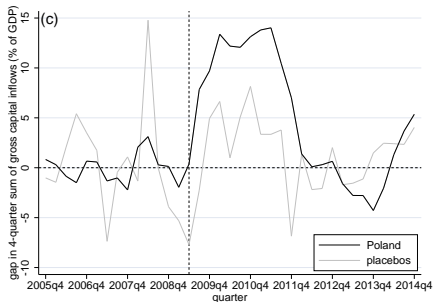
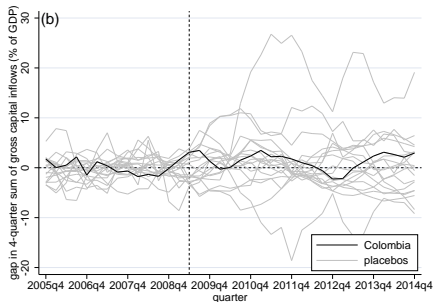
# FCL effects on capital inflows: Placebos



(a) Effects on Mexican capital inflows not 'significant'

(b) Effects on Colombian capital inflows comparatively large at time of agreement, but not so thereafter

(c) Effects on Polish capital inflows 'significant' ?



# Main findings

- FCL selectivity explained by both demand- and supply-side factors
  - ▶ Demand/borrower: Exchange market pressure positively correlated with probability of FCL entry
  - ▶ Supply/IMF: Lower EMBI spreads, lower inflation, higher share in US exports, more 'political concessions' to US associated with greater likelihood of FCL arrangement
- Some, but not spectacular, beneficial effects of FCL on gross capital inflows into and EMBI spreads of FCL recipients
  - ▶ Some 'significant' effects (e.g., on Colombian/Polish spreads) only visible with considerable lag: role of post-FCL factors?
  - ▶ Full attribution remains difficult
  - ▶ At the minimum, no evidence of any negative market reactions

- Economic stigma (if any) seems unwarranted
  - ▶ IMF could advertise more (relative) success of FCL, i.e., lack of negative market reactions
- Apparent link with political/economic interests of US not conducive to overcoming political stigma
  - ▶ More outreach by IMF (to less 'US-oriented' countries) may be helpful to widen participation in precautionary lending

Thank you for your attention!

Questions/comments?

¡Gracias por su atención!

¿Preguntas/comentarios?

## FCL qualification criteria/domains

1. Sustainable external position
2. Capital account position dominated by private flows
3. Track record of steady sovereign access to capital markets at favorable terms
4. Reserve position which, despite potential BoP pressures, remains relatively comfortable
5. Sound public finances, incl. a sustainable public debt position determined by a rigorous and systematic DSA
6. Low and stable inflation, in the context of a sound monetary and exchange rate policy
7. Sound financial system and the absence of solvency problems that may threaten systemic stability
8. Effective financial sector supervision
9. Data transparency and integrity

## FCL selectivity: Examples of stigma

*“South Koreans tremble and financial markets turn sensitive whenever they hear the word ‘IMF’, so it’s not easy for us to participate in the [FCL] program”*

– Lee Hyoung-Ryoul, senior Korean MoF official (WSJ, 21 March 2009)

*“The thing that I can say with a lot of pride is that Brazil needs no money from the IMF today”*

– Luiz Inacio Lula da Silva, Brazilian president (Reuters, 3 April 2009)



# Appendix: Sample countries

	ISO-3	IMF arrangement as of Mar 2009?		ISO-3	IMF arrangement as of Mar 2009?
<b>FCL</b>					
<i>Mexico</i>	MEX	No	<i>Jamaica</i>	JAM	No
<i>Poland</i>	POL	No	<i>Kazakhstan</i> <sup>o</sup>	KAZ	No
<i>Colombia</i>	COL	No	<i>Lebanon</i> *	LBN	No
<b>Non-FCL</b>					
<i>Argentina</i> <sup>o</sup>	ARG	No	<i>Malaysia</i> *	MYS	No
<i>Belize</i>	BLZ	No	<i>Pakistan</i> <sup>o</sup>	PAK	Yes, SBA since Nov 2008
<i>Brazil</i> * <sup>o</sup>	BRA	No	<i>Panama</i> * <sup>o</sup>	PAN	No
<i>Bulgaria</i> <sup>o</sup>	BGR	No	<i>Peru</i> * <sup>o</sup>	PER	No
<i>Chile</i> * <sup>o</sup>	CHL	No	<i>Philippines</i> * <sup>o</sup>	PHL	No
<i>China</i> * <sup>o</sup>	CHN	No	<i>Russia</i> * <sup>o</sup>	RUS	No
<i>Dominican Republic</i>	DOM	No	<i>Serbia</i>	SRB	Yes, SBA since Jan 2009
<i>Ecuador</i> <sup>o</sup>	ECU	No	<i>South Africa</i> * <sup>o</sup>	ZAF	No
<i>Egypt</i> *	EGY	No	<i>Sri Lanka</i> <sup>o</sup>	LKA	No
<i>El Salvador</i> * <sup>o</sup>	SLV	Yes, SBA since Jan 2009	Trinidad and Tobago	TTO	No
<i>Gabon</i>	GAB	Yes, SBA since May 2007	<i>Tunisia</i>	TUN	No
<i>Georgia</i>	GEO	Yes, SBA since Sep 2008	<i>Turkey</i> *	TUR	No
<i>Ghana</i>	GHA	No	<i>Ukraine</i>	UKR	Yes, SBA since Nov 2008
<i>Hungary</i> * <sup>o</sup>	HUN	Yes, SBA since Nov 2008	<i>Uruguay</i> * <sup>o</sup>	URY	No
<i>Indonesia</i> * <sup>o</sup>	IDN	No	<i>Venezuela</i> <sup>o</sup>	VEN	No
			<i>Vietnam</i> <sup>o</sup>	VNM	No

Notes: All countries included in JP Morgan EMBI Global index as of end March 2009. Countries in italics included in baseline model of FCL selectivity. Countries with \*/<sup>o</sup> included in synthetic controls for spreads/capital inflows

# Appendix: Matching quality synth controls for spreads

Tables below show pre-FCL values of EMBI spreads predictors (averaged over Jan 2005 - Mar/Apr 2009)

	Mexico	Synthetic Mexico (full donor pool)	Synthetic Mexico (regional donor pool)
EMBI spread	186.67	186.68	188.91
Real GDP growth	3.31	4.45	6.41
Reserves to GDP	8.29	12.05	10.25
Public debt to GDP	39.29	39.28	31.55
CAB to GDP	-1.27	-1.43	-1.99
RMSPE/Fit index		11.70/0.06	13.34/0.06
	Colombia	Synthetic Colombia (full donor pool)	Synthetic Colombia (regional donor pool)
EMBI spread	263.03	263.11	262.80
Real GDP growth	5.40	5.41	5.40
Reserves to GDP	10.03	11.19	10.02
Public debt to GDP	35.48	35.47	54.26
CAB to GDP	-2.14	-2.12	-2.14
RMSPE/Fit index		64.43/0.22	20.41/0.07
	Poland	Synthetic Poland (full donor pool)	Synthetic Poland (regional donor pool)
EMBI spread	100.43	111.01	133.42
Real GDP growth	5.09	7.84	2.56
Reserves to GDP	18.32	31.39	17.85
Public debt to GDP	46.47	45.69	65.04
CAB to GDP	-4.23	2.42	-6.84
RMSPE/Fit index		17.55/0.13	66.09/0.50

# Appendix: Matching quality synth controls for cap. inflows

Tables below show pre-FCL values of capital inflow predictors (averaged over 2005Q4 - 2009Q1)

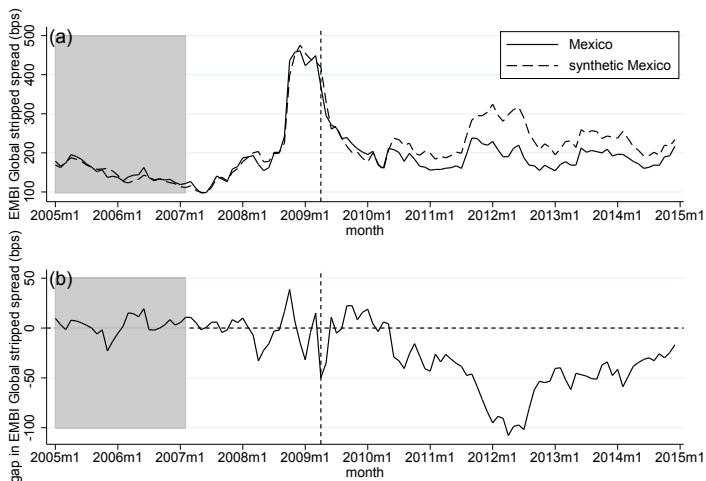
	Mexico	Synthetic Mexico (full donor pool)	Synthetic Mexico (regional donor pool)
Capital inflows to GDP	4.26	4.26	4.26
Real GDP growth	2.47	6.01	3.77
KA openness index	0.70	0.70	0.91
EIU risk rating	35.31	41.50	50.84
RMSPE/Fit index		1.01/0.23	1.50/0.34
	Colombia	Synthetic Colombia (full donor pool)	Synthetic Colombia (regional donor pool)
Capital inflows to GDP	6.26	6.29	6.07
Real GDP growth	5.07	5.09	5.32
KA openness index	0.48	0.48	0.50
EIU risk rating	43.60	43.79	44.33
RMSPE/Fit index		1.29/0.20	1.79/0.28
	Poland	Synthetic Poland (full donor pool)	Synthetic Poland (regional donor pool)
Capital inflows to GDP	13.34	13.35	13.40
Real GDP growth	5.23	5.22	5.43
KA openness index	0.45	0.51	0.47
EIU risk rating	36.31	36.24	43.12
RMSPE/Fit index		2.83/0.20	1.47/0.10

## Appendix: Alternative, cross-validation approach to SCM

- Rather than taking  $V$  as matrix that minimises RMSPE of outcome variable over *entire* pre-treatment period, one can follow 'cross-validation' approach (Abadie *et al.* 2015):
  1. Split pre-treatment period into 'training period' and 'validation period'
  2. Using optimal donor unit weights  $W$  based on training period values of predictors, select  $V$  that minimises out-of-sample RMSPE over validation period
  3. Use just-selected  $V$  to find new optimal country weights  $W'$  that minimise differences between treated unit and its synthetic control over validation period
- Cross-validation approach may reduce concerns about overfitting, but also has disadvantages:
  - ▶ Little practical guidance on how to split training and validation periods
  - ▶ Only feasible if number of pre-treatment observations is sufficiently large
  - ▶ Cross-validation solutions may not be uniquely defined (Kloessner *et al.* 2017)

# Appendix: FCL effect on Mexican EMBI spreads (full donor pool; cross-validation)

Shaded area is training period (Jan 2005 – Feb 2007)



Note: Synth Mexico: Chile (0.400), Brazil (0.262), Hungary (0.226), El Salvador (0.112)

## Avenues for further research

- Estimate effects of FCL on other variables: exchange rates, international reserves, domestic/corporate bond spreads, subcomponents of capital inflows
- Estimate effects of FCL renewals and (eventual) FCL exits
- Study other precautionary lending instruments of IMF (PCL/PLL, SBA-HAPAs, new types of arrangements)