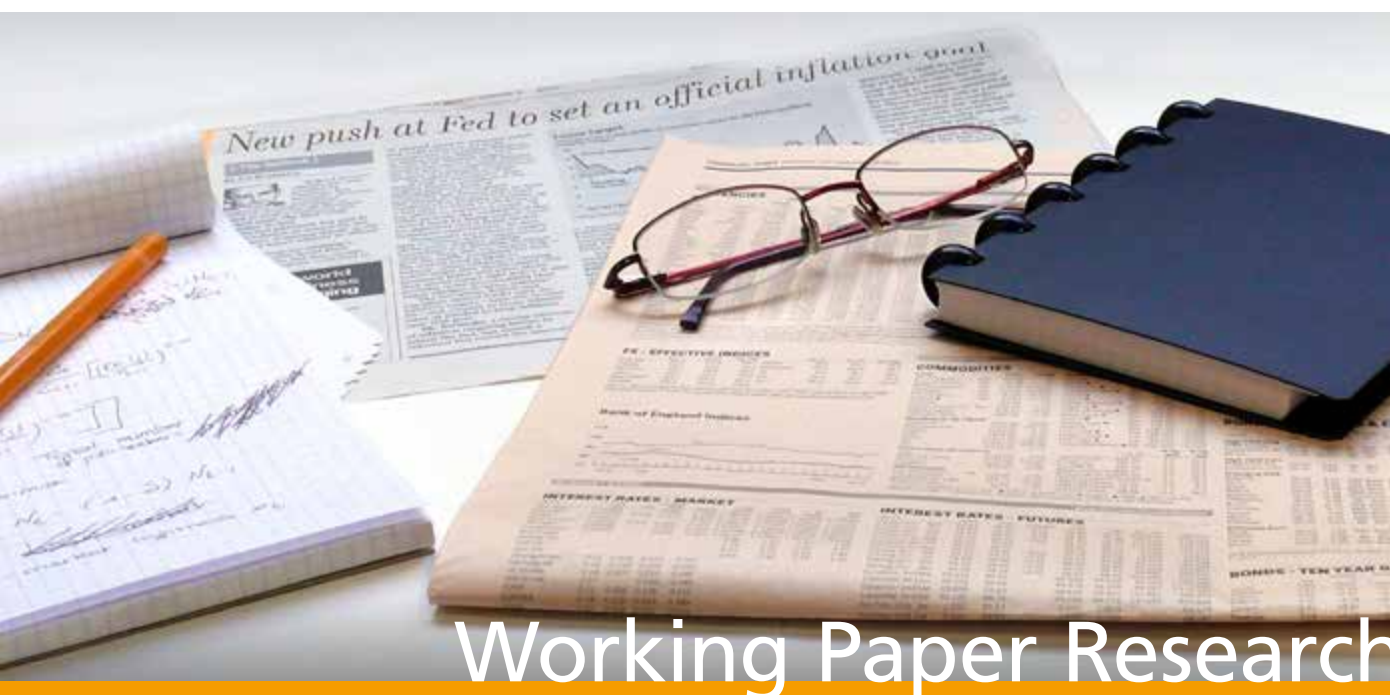


# The IMF and precautionary lending : An empirical evaluation of the selectivity and effectiveness of the flexible credit line



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## **Abstract**

This paper provides an empirical evaluation of the Flexible Credit Line (FCL), the IMF's prime precautionary lending instrument since 2009 to which so far only three emerging market economies have subscribed: Mexico, Colombia and Poland. We consider both questions of selectivity and effectiveness: first, which factors explain the three FCL countries' participation in such arrangements? And second, to which extent have the FCL arrangements delivered on their promise of boosting market confidence in their respective users? Based on a probit analysis we show that FCL selectivity can be explained by both demand- and supply-side factors. The probability of participation in the FCL was greater in countries that experienced larger exchange market pressures prior to the creation of the instrument, that had lower bond spreads and inflation, that accounted for higher shares in US exports, and that exhibited a higher propensity of making political concessions to the US. Our estimation of the effects of the FCL employs the 'synthetic control' methodology, a novel counterfactual approach. We find evidence for some but not spectacular beneficial effects on sovereign bond spreads and gross capital inflows in FCL countries. Overall, our results suggest that any economic stigma eligible countries still attach to entry into an FCL arrangement is unwarranted. Conversely, the apparent link of FCL participation with US interests may not be conducive to overcoming political stigma.

JEL classification: F33; F34; F55.

Keywords: Flexible Credit Line; IMF; global financial safety net; emerging markets; synthetic control.

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# 1 Introduction

In recent years we have observed an intense debate on the adequacy of the so-called ‘global financial safety net’ (GFSN), i.e., the set of instruments and mechanisms that play a role in preventing and/or dampening the effects of financial and economic crises with important cross-border and spill-over impact on individual countries or regions. By all standards, the GFSN has grown significantly since the global financial crisis, both in size and diversity. It now comprises four main components: countries’ self-accumulated international reserves, bilateral central bank swap arrangements, regional financing arrangements (RFAs), and IMF resources provided through various instruments. Each of those components has advantages and disadvantages for their users in terms of the certainty of availability, speed of disbursement, magnitude and duration, costs, and the conditions attached (Denbee et al., 2016; IMF, 2016; Scheubel and Stracca, 2016). Most agree that the GFSN remains fragmented, due to its decentralised and uncoordinated nature, and that its coverage has important gaps, especially for financially integrated and exposed emerging market economies.

The IMF is often seen as having a unique position within the GFSN because of its global mandate, near-universal membership, long-term experience in crisis resolution and pooling of funds (Fischer, 1999). Denbee et al. (2016, p. 26), for example, contend that “... while swap lines and RFAs can play an important role ... they are not a substitute for having a strong, well resourced IMF at the centre [of the GFSN]”.<sup>1</sup> This paper focuses on one element of the GFSN, i.e., the IMF’s Flexible Credit Line (FCL), introduced in March 2009 as part of a larger set of reforms to the IMF lending framework. The FCL allocates large amounts of resources to eligible countries with strong macroeconomic fundamentals and solid policy track records on which, in case a need emerges, they can draw unconditionally and at their own discretion. This makes the FCL the IMF’s first genuine precautionary lending instrument, something the IMF has tried but failed to establish at least since the early 1990s. Subscription to this new instrument has been limited however, with only Mexico, Colombia and Poland having entered into FCL arrangements so far.

The key contribution of this paper is to bring more empirical rigour to the ongoing discussions about the FCL on two fronts. First we address the selectivity of the FCL, i.e., using parsimonious probit models we aim to determine which variables explain the three FCL countries’ participation in such arrangements. To the best of our knowledge, formal empirical analysis of this issue is lacking; previous studies of FCL selectivity have been exclusively narrative. Second, we measure the effectiveness of the FCL, i.e., the extent to which the arrangements have delivered on their promise of boosting market confidence in the participating countries. We employ the ‘synthetic control method’, a novel counterfactual approach pioneered by Abadie and Gardeazabal (2003), to evaluate the longer-term effects of the FCL on Mexican, Colombian and Polish sovereign bond spreads and gross capital inflows, proxies of investors’ perceptions of those countries.<sup>2</sup>

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<sup>1</sup>This is no consensus view, however. Some argue for a GFSN centred on central banks rather than on the IMF. Truman (2013), for example, claims that central banks are ‘where the money is’; only they have sufficient balance sheet elasticity to mobilise the necessary funds to counter large capital flow shocks. Cordella and Levy Yeyati (2010) propose the IMF could operate as a ‘central bank swap clearing house’.

<sup>2</sup>Whereas we have attempted to make maximum use of the available data, it should be noted that our empirical analysis is necessarily constrained by the limited experience of countries with the FCL, i.e., only

To preview our main results, we first find that FCL selectivity can be explained by both demand- and supply-side factors. On the side of the prospective applicants we show that exchange market pressure in the run-up to the creation of the FCL is correlated positively with the probability of entry into an FCL arrangement. On the other hand, also lower bond spreads, lower inflation, a higher share in US exports and a higher propensity of making political concessions to the US (the IMF's largest shareholder) were associated with a greater likelihood of obtaining an FCL arrangement. Second, our counterfactual approach to estimating the effects of the FCL on bond spreads and capital flows suggests that such effects have been beneficial but not spectacularly so. Some of the effects we document only became visible with a considerable lag.

The paper is structured as follows. Section 2 provides a short history of the IMF's precautionary lending and gives further details on the respective FCL arrangements of Mexico, Colombia and Poland. Section 3 starts off with a literature review on the selectivity of the FCL and of IMF lending more generally. A second subsection presents our empirical strategy to gauge FCL selectivity and the variables considered. A third subsection discusses the probit estimation results. Similarly, in Section 4 we summarise the existing evidence on FCL effectiveness, describe the synthetic control method, and apply it to our three FCL cases. Section 5 concludes.

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three countries have participated in FCL arrangements and not a single drawing has been made so far.

## 2 The IMF’s precautionary lending arrangements

### 2.1 A short history

IMF lending has historically been much more concerned with ‘crisis resolution’, i.e., the provision of financing to help rectify existing balance of payment problems conditional on an ex post adjustment programme, than with ‘crisis prevention’, i.e., making available upfront sizeable resources that can be called upon immediately in case a stress situation would emerge in the future (Boughton, 2000).<sup>3</sup> Whereas the IMF’s Stand-By Arrangement (SBA), its main non-concessional financing vehicle, was originally established in 1952 to be used as precautionary lending, in practice member countries applied for an SBA mostly once financing needs had already materialised (Reichmann and de Resende, 2014). Surveillance, including through regular Article IV consultations, has been (and remains) the IMF’s central crisis prevention tool (Ostry and Zettelmeyer, 2005). This is not to say that there have been no attempts to integrate more precautionary arrangements in the IMF’s lending portfolio.

In the early 1990s the IMF contemplated a Short-Term Financing Facility (STFF) on which member countries with a strong policy framework but nonetheless facing short-term external stress could draw unconditionally. The STFF was however never adopted due to concerns in the IMF’s Executive Board about eligibility and the risks of committing resources to counter severe financial pressures without a conditionality framework (IMF, 2003). End-1998 the proposal for contingent IMF lending was reconsidered, spurred by the Asian and Russian financial crises which affected many emerging economies through the contagion channel. The Contingent Credit Line (CCL), launched in April 1999, was intended to assure pre-screened countries (satisfying ex ante eligibility criteria) of access to IMF resources in the event of exceptional capital account pressures due to external contagion; all the while incentivising policy and institutional improvements. Since there were no requests for the CCL in its original form, the instrument was revised in November 2000 to water down initial monitoring requirements, simplify activation, and reduce costs (IMF, 2003). IMF staff commenced discussions with potentially eligible countries, but again no requests were made and the CCL was allowed to expire in November 2003.<sup>4</sup> The IMF (2003) itself identified a number of reasons for the very limited interest in the CCL, including ‘stigma’, i.e., concerns that a CCL request would be perceived negatively, by domestic actors and/or external market participants (see Section 3.1); the increasing popularity of alternative preventive strategies (such as reserves accumulation or exchange rate flexibility); and global economic recovery. Another key factor that reduced the attractiveness of the CCL was its lack of automaticity (Marino and Volz, 2012). Access to a large part of CCL funds remained conditional upon Executive Board approval of an ‘activation review’, creating uncertainty for prospective borrowers. Subsequent debates centred around an instrument tentatively named the Reserve Augmentation Line (RAL), which would address some of the problems with the CCL. Ul-

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<sup>3</sup>According to Reichmann and de Resende (2014, p. 1), the distinction between crisis resolution and prevention was “... already evident in the position of Keynes, who envisaged the IMF as somewhat akin to a lender of last resort with large resources automatically available in cases of need, and that of Harry White, who advocated a smaller Fund that would lend on a discretionary basis subject to policy conditionality”.

<sup>4</sup>Allegedly, only two strong candidate countries expressed a genuine interest in the CCL (IMF, 2003). Interestingly, Mexico was the only country that came close to actually applying for a CCL, but in the end it decided not to, mainly because of exchange rate appreciation pressures.

imately it proved difficult to balance the twin goals of designing a sufficiently attractive credit facility for potential users and safeguarding IMF resources (Reichmann and de Resende, 2014). A global climate of abundant liquidity further reduced the urgency to reach an agreement on the RAL.

The 2008 global financial crisis made clear that the IMF's "...ability to mount a preventative and systemic response was hampered by the inadequacy of its precautionary lending instruments and a resource base that had not kept up with the rapid increase in global trade and capital flows" (IMF, 2010, p. 5). The latter was dealt with during the April 2009 London summit of the G20, where it was agreed to triple the IMF's non-concessional lending resources to US\$750 billion. Even before that, in October 2008, the IMF quickly approved a new Short-Term Liquidity Facility (SLF). Once more, the SLF found no users, as its access limits and repayment periods were judged insufficient and it had to compete with the bilateral swap lines the US Federal Reserve and other advanced economy central banks established around that time.

On 24 March 2009 the IMF announced the introduction of the Flexible Credit Line (FCL), as part of a broader overhaul of its lending toolkit.<sup>5</sup> The FCL incorporates several elements prospective users of precautionary IMF lending had been advocating for a long time (see IMF, 2015, for details). It is designed to provide large, upfront financing to countries with strong fundamentals and proven sustained policy track records. The FCL relinquishes all ex post conditionality. To avoid moral hazard it instead entails strict ex ante conditionality, embodied in nine core qualification criteria: a sustainable external position; a capital account dominated by private flows; a track record of steady and favourable sovereign access to capital markets; a comfortable reserves position; sound public finances; low and stable inflation in the context of sound monetary and exchange rate policies; a sound financial system; effective financial sector supervision; and data transparency and integrity.<sup>6</sup> In case a country (confidentially) expresses interest in requesting an FCL and the IMF management deems this request may be appropriate, IMF staff should prepare a concise note for an informal Executive Board discussion in which the country is preliminarily assessed against the above qualification criteria. If the country later decides to make a formal FCL request to the Board, its appeal should be accompanied by a more comprehensive staff report, including a detailed qualification assessment and a justification of the proposed access level.

Thanks to its exigent qualification standards the FCL's operational modalities have been kept 'flexible' indeed. One distinctive feature is that access under the FCL is uncapped, although originally an implicit limit of 1000% of a country's IMF quota applied (IMF, 2010). Also, unlike the CLL for example, the FCL can be requested either on a precautionary basis or to address actual financing needs and can be (fully or partially) drawn upon at the borrower's own discretion, without the need for separate Board approval. Initially countries could choose between six-month and one-year FCLs without restrictions on the number of successor agreements, provided they continue to meet the qualification criteria. The grace and repayment periods of the FCL are relatively long and equal to those of the standard SBA (borrowed amounts are due within three years and three months to five years after

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<sup>5</sup>See the press release at <http://www.imf.org/external/np/sec/pr/2009/pr0985.htm>.

<sup>6</sup>For a detailed description of these qualification criteria and suggested indicators, see IMF (2009), or its latest update, IMF (2015). It should be noted that there are no strict numerical cut-offs for FCL qualification. Judgement forms an essential part of the qualification assessment by IMF staff.



disbursement, compared to a nine-month roll-over in the SLF). Upon approval of an FCL, countries pay a commitment fee which rises progressively with the level of access (between 15 and 60 basis points) and is refunded pro rata if drawings are made or the FCL is cancelled. The costs of drawing are again equal to those of the SBA and increase with size and time, to discourage borrowing beyond what is needed. Concurrent with the introduction of the FCL, the IMF enhanced the SBA and its High-Access Precautionary variant (HAPA) by increasing options to frontload assistance and widening eligibility. The ex post conditionality of the SBA and SBA-HAPA, i.e., the need to negotiate an adjustment programme with the IMF, and the IMF Board’s control over SBA(-HAPA) drawing could not be eliminated however (Reichmann and de Resende, 2014).

In August 2010 the FCL was modified to further boost its attractiveness. The implicit cap of 1000% of quota was removed and FCL arrangements could now be approved for either one year (with no interim review of continued qualification) or two years (with a mid-term review). The IMF moreover introduced the Precautionary Credit Line (PCL).<sup>7</sup> This ‘light’ version of the FCL would provide upfront access of up to 500% of quota on approval, in the absence of actual balance of payments needs, and combined ex ante qualification criteria similar to the FCL’s (although somewhat less strict) with targeted ex post conditionality (focused on tackling remaining vulnerabilities). In November 2011 the PCL was relabelled Precautionary and Liquidity Line (PLL) and broadened in scope: a six-month arrangement was added to the menu of options and PLL access could from then on also be granted to countries with present rather than potential financing needs.<sup>8</sup>

## 2.2 Current FCL arrangements<sup>9</sup>

Since the FCL’s creation in March 2009 three countries have entered into FCL arrangements with the IMF. Mexico was the first country to access the FCL on 17 April 2009, an occasion described by John Lipsky, First Deputy Managing Director of the IMF, as “represent[ing] the consolidation of a major step in the process of reforming the IMF and making its lending framework more relevant to member countries’ needs”.<sup>10</sup> Mexico’s example was soon followed by Poland on 6 May and by Colombia on 11 May 2009. According to IMF (2014), additional countries have expressed potential interest in the FCL since its inception, but ultimately, no other formal requests were made.

As can be seen from Table 1, Mexico, Colombia and Poland have had six consecutive FCL arrangements each as of April 2017.<sup>11</sup> All of these arrangements have been treated as strictly precautionary, with not a single drawing since 2009. It also appears that the original cap of 1000% of quota and one-year duration were constraining factors, since Mexico and Poland requested larger arrangements and all three FCL countries switched to two-

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<sup>7</sup>See the press release at <http://www.imf.org/external/np/sec/pr/2010/pr10321.htm>.

<sup>8</sup>See the press release at <http://www.imf.org/en/news/articles/2015/09/14/01/49/pr11424>.

<sup>9</sup>An analysis of the PCL/PLL arrangement of Macedonia (agreed in January 2011 and terminated in January 2013) and of the (ongoing) PLL arrangement of Morocco (agreed in August 2012 and renewed in July 2014 and July 2016) falls outside the scope of the current paper.

<sup>10</sup>See the press release at <http://www.imf.org/external/np/sec/pr/2009/pr09130.htm>.

<sup>11</sup>In January 2016 Poland reduced the size of its fifth FCL from SDR15.5 billion to SDR13 billion. This was not considered a new arrangement.

year arrangements once the August 2010 reforms opened up the possibility to do so. With SDR31.5 billion (or about US\$47 billion) Mexico’s first FCL constituted the largest ever individual commitment of IMF resources in nominal terms. As of April 2017, the FCLs of Mexico, Colombia and Poland together accounted for about two-thirds of total committed IMF resources (SDR77.1 billion out of SDR115.1 billion).<sup>12</sup>

Whereas the multiple renewals of arrangements can partly be explained by the protracted nature of the global financial and economic crisis and may suggest FCL users attach great value to the instrument, it could also reflect difficulties with exiting the FCL. Indeed, Reichmann and de Resende (2014, p. 24) rightly point out that “...there is the tension between a facility intended to be of strictly temporary use and a reality in which risks are never absent”. Moreover, any positive signalling benefits from satisfying the FCL’s strict qualification criteria could be reversed if the market (mis)interprets a country’s exit from the FCL as a failure to remain eligible. The IMF is well aware of such ‘exit problems’. The latest operational guidelines emphasise the need to clearly articulate country authorities’ exit strategies, contingent on the abatement of external risks, in FCL request or review documents (IMF, 2015).<sup>13</sup> IMF staff has also proposed introducing a time-based element into the FCL commitment fees to incentivise timely exit (IMF, 2014).

Table 1: FCL arrangements from March 2009 to April 2017

	<b>FCL-1</b>	<b>FCL-2</b>	<b>FCL-3</b>	<b>FCL-4</b>	<b>FCL-5</b>	<b>FCL-6</b>
<b>Mexico</b>	17 Apr 2009	25 Mar 2010	10 Jan 2011	30 Nov 2012	26 Nov 2014	27 May 2016
<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>	6 May 2009	2 Jul 2010	21 Jan 2011	18 Jan 2013	14 Jan 2015	13 Jan 2017
<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>	11 May 2009	7 May 2010	6 May 2011	24 Jun 2013	17 Jun 2015	13 Jun 2016
<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

Source: Authors’ compilation based on IMF press releases and country reports.

Notes: Duration and IMF quota are evaluated at the time the respective FCL arrangements were approved. IMF quota revisions occurred in April 2008 (on an ad hoc basis, effective from 3 March 2011) and in December 2010 (under the 14<sup>th</sup> General Review, effective from 26 January 2016). Mexico’s quota increased from SDR3.2 billion to SDR3.6 billion under the first revision and to SDR8.9 billion under the second revision; Colombia’s quota remained unchanged at SDR774 million under the first revision and increased to just over SDR2 billion under the second; Poland’s quota increased from SDR1.4 billion to SDR1.7 billion under the first revision and to SDR4.1 billion under the second.

<sup>12</sup>These figures are based on the IMF’s own data on lending arrangements.

<sup>13</sup>In the latest review of their FCL arrangement the Polish authorities state: “On balance, we consider that a new two-year FCL arrangement, albeit at a substantially lower access, would provide additional insurance against adverse external shocks, while conveying a strong signal of Poland’s commitment to exit the facility as soon as external conditions permit. In this context, we have continued our efforts to communicate our intention to proceed with a smooth and gradual exit strategy to market participants and the broader public. Our outreach has met only muted market reaction” (IMF, 2017, p. 56).

## 3 What explains the selectivity of FCL arrangements?

### 3.1 Literature review

Given that to date only three countries have availed themselves of the FCL, the question that naturally arises is why the uptake of this seemingly attractive instrument has been so limited. The IMF itself and a handful of external studies have advanced a number of potential reasons.<sup>14</sup>

First of all, although the abandoning of ex post conditionality in the FCL was meant to reduce the stigma associated with IMF programmes, countries may still have been reluctant to approach the IMF, especially in the absence of acute financing problems (IMF, 2011; John and Knedlik, 2011; Marino and Volz, 2012; IMF, 2014). This lingering political stigma is a legacy of past, often painful experiences with IMF structural adjustment programmes and is thought to be particularly elevated in Asia and Latin America (Ito, 2012; IEO, 2013). Hence, some countries have preferred to self-insure through previously accumulated reserves or to rely on bilateral central bank swap lines, both alternatives to the FCL that also have no ex post conditionality attached to them. Surveys of country authorities indeed confirm the importance of political stigma and preference for self-insurance as factors inhibiting FCL demand (IMF, 2011, 2014).<sup>15</sup>

Second, economic stigma may have been an issue too. Countries may fear that a request for IMF financing, even if precautionary and subject to strict qualification criteria, would be interpreted as signalling hidden vulnerabilities and therefore harm market confidence (Marino and Volz, 2012; Prasad, 2014)<sup>16</sup>; *a fortiori*, they may fear the market reaction of being denied access by the IMF's Executive Board after a formal request. Although there is some support for the existence of such fears from IMF surveys, the nature of stigma is thought to be mostly political (IMF, 2014). Third, several emerging market economies have expressed their dissatisfaction with the qualification criteria, perceiving them as overtly strict, unclear and/or subjective (for example, with respect to what defines a 'strong' policy track record). Fourth, perhaps the mere existence of the FCL provides sufficient insurance to countries that investors believe would qualify for the FCL, obviating the need for actual requests. An alternative view is that demand may not have been that weak after all in view of the limited number of potentially eligible countries, due to the very high qualification bar (Keller et al., 2009). Among those potential qualifiers some already had relatively high external buffers (IMF, 2011, 2014).

On the supply side, the IMF has not actively promoted the FCL, Marino and Volz (2012) argue. To be sure, a proliferation of large (and longer-term) precautionary arrange-

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<sup>14</sup>Several of the following arguments are reminiscent of the debates surrounding earlier precautionary IMF arrangements, such as the CCL (see IMF, 2003, and Section 2.1).

<sup>15</sup>Further anecdotal evidence can be found in the media. For example, a few days before the official announcement of the FCL a senior official in the South Korean Ministry of Finance was quoted in the Wall Street Journal as saying that "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" (Kong and Venkat, 2009). For Indonesia and Brazil too political considerations have been reported as precluding FCL requests (The Economist, 2009).

<sup>16</sup>As Marino and Volz (2012) note, this is in part a first-mover problem which would be greatly diminished by other countries' positive experiences with the FCL (see Section 4).

ments could crowd out resources for crisis resolution. Initially the first FCL arrangements with Mexico, Poland and Colombia reduced the IMF's forward commitment capacity (FCC), i.e., the resources it has available for new financial commitments in the next 12 months, by nearly half. However, the IMF's FCC was later substantially increased by expanded New Arrangements to Borrow (NAB) established with individual member countries (Reichmann and de Resende, 2014). Finally, the IMF may also have interpreted the qualification criteria very strictly in order to strengthen the signalling function of the FCL and to reduce moral hazard concerns. In case weaknesses would emerge in an FCL country, the IMF might find it very difficult not to continue or roll-over the FCL agreement, for fear of negative market reactions; a problem Reichmann and de Resende (2014) refer to as 'reverse stigma'.

Beyond the specifics of the FCL instrument, there is a large academic literature studying the determinants of countries' participation in IMF lending more generally (see, a.o., Steinwand and Stone, 2008; Moser and Sturm, 2011, for reviews), on which we can draw to further inform our variable selection.<sup>17</sup>

Early studies focused mainly on variables linked to the macroeconomic-financial situation of the borrowing country, such as the level of international reserves, public debt or prior economic growth, to explain the incidence of IMF lending (Bird and Orme, 1981; Joyce, 1992; Conway, 1994; Knight and Santaella, 1997). The more recent literature points to the importance of economic, but also political links with the IMF's main shareholders. However, no absolute consensus exists on this and results tend to vary along with sample and variable definitions and methodological approaches. Barro and Lee (2005), for example, find that bilateral trade with the US (but not with major European countries) raises the probability of a country entering an IMF loan programme, presumably because the IMF's dominant Executive Board member advances its commercial interests in lending decisions. Likewise, Breen (2010) uncovers a positive correlation between the incidence of IMF borrowing and G5 exports. Others however fail to confirm the significance of US/European trade links, suggest the effects are region- and period-specific, or even find negative associations with IMF loans (Bird and Rowlands, 2001; Sturm et al., 2005; Eichengreen et al., 2008; Pop-Eleches, 2009). Similarly, several studies show that countries on which US and/or European banks have larger claims are more likely to borrow from the IMF (Broz and Hawes, 2006; Breen, 2010) or at least receive larger loans when they do so (Oatley and Yackee, 2004; Copelovitch, 2010; Presbitero and Zazzaro, 2012). Again, other studies have not been able to reproduce such results using alternative specifications (Sturm et al., 2005; Eichengreen et al., 2008).

Next to case study evidence (see, e.g., Stiles, 1990; Killick, 1995), there is substantial econometric support for the assertion that the political interests of major IMF shareholders matter for access to (and the design of) IMF loans. Numerous papers have documented positive associations between measures of alignment with the US and other G7 countries in UN General Assembly (UNGA) voting and IMF loan participation.<sup>18</sup> The underlying

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<sup>17</sup>Often the determinants of IMF loan participation are studied not as a stand-alone topic but rather to derive instrumental variables whose exogenous variation can be used to isolate the effects of IMF loans on economic growth or other outcomes. Such an approach however differs from what we intend to do in this paper (see Section 4).

<sup>18</sup>Besides similarity in UNGA voting patterns, the econometric literature has considered UN Security Council membership (Dreher et al., 2009); US (military) aid (Oatley and Yackee, 2004; Eichengreen et al., 2008); peace treaties with Israel (Harrigan et al., 2006); and an index based on energy resources, nuclear and

argument here is that the G7 countries exchange their votes on IMF programmes in the Executive Board for the backing of their interests during UNGA voting sessions. Estimates by [Barro and Lee \(2005\)](#) show the incidence and size of IMF borrowing to be positively correlated with the fraction of UNGA votes that a country casts in accordance with the UNGA votes of the US and of major European IMF shareholders (see also [Oatley and Yackee, 2004](#); [Copelovitch, 2010](#); [Dreher and Walter, 2010](#); [Papi et al., 2015](#)). [Thacker \(1999\)](#) argues that what really augments the probability of receiving an IMF loan is a country's alignment on UNGA votes that the US State Department identifies as 'important' and, more specifically, changes over time in such alignment, towards the US stance (see also [Pop-Eleches, 2009](#)).<sup>19</sup> Alternatively, [Barnebeck Andersen et al. \(2006\)](#) claim that a more theoretically sound and empirically better-performing measure is the difference between alignment with the US on all UNGA votes and alignment on UNGA votes important to the US; a variable which proxies the extent to which a country is prepared to make foreign policy concessions to the US (see also [Kilby, 2009](#); [Presbitero and Zazzaro, 2012](#)). Investigating the role of political alignment seems particularly interesting in the context of the FCL. As [Marino and Volz \(2012, p. 27\)](#) point out, "[i]t is . . . not surprising to hear allegations that only countries whose governments are seen as relatively cozy with the US - namely Mexico, Colombia and Poland - have requested an FCL".<sup>20</sup>

There is also general econometric evidence that past IMF borrowing explains re-engagement with the IMF ([Przeworski and Vreeland, 2002](#); [Sturm et al., 2005](#); [Bird et al., 2015](#)). According to [Vreeland \(2007, p. 59\)](#), one way to interpret this is in line with the political stigma hypothesis cited above: "in a country where IMF programs have become business as usual. . . the costs of 'selling out' are smaller. . . [I]t is difficult for opposition to claim that the current leadership is selling out by signing an IMF arrangement if many previous leaders have also done so".<sup>21</sup> Another political cost-related determinant of IMF loan participation for which empirical support has been found is recent elections. The intuition is that government officials are more likely to negotiate an agreement with the IMF early on in their electoral term, so as to reduce the possibility that any stigma effects disadvantage them in the next election ([Przeworski and Vreeland, 2000](#); [Papi et al., 2015](#)).

Finally, both conceptually and methodologically our study of FCL selectivity is closely related to two evaluations of the bilateral central bank swaps signed in the wake of the global financial crisis. Based on single- and multi-regressor probit regressions and a sample of 27 emerging markets, [Aizenman and Pasricha \(2010\)](#) identify the exposure of US banks to individual countries as the single most important criterion explaining the selective extension

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military power, and strategic location ([Reynaud and Vauday, 2009](#)) as potential geo-political determinants of the likelihood of signing an IMF agreement.

<sup>19</sup>In its annual *Voting Practices in the United Nations* reports to US Congress the US State Department identifies key votes for each UNGA session. These are votes on issues directly affecting US interests and on which the US lobbied extensively (see [Thacker, 1999](#)).

<sup>20</sup>[Krueger \(1998, pp. 2014-2015\)](#) reports that in response to the 1994 Mexican peso crisis the US (Clinton) Administration lobbied fiercely to get the IMF aboard in a record-size rescue package for its Mexican ally; to the extent even that the usual minimal notice to Executive Directors for consulting with their governments before voting was discarded.

<sup>21</sup>Of course, the duration of (or recidivism in) past IMF borrowing is likely also the result of other factors, not the least structural economic and institutional weaknesses in borrowing countries (see e.g., [Bird et al., 2004](#)).



of swap lines by the US Federal Reserve to the central banks of Brazil, Mexico, South Korea and Singapore. This should not come as a surprise given the domestic mandate of the Federal Reserve. [Aizenman et al. \(2011\)](#) extend the analysis to the prevalence and size of swaps between the Federal Reserve, European Central Bank and People’s Bank of China, on the one hand, and the central banks of all remaining countries (among which 21 actual swap recipients), on the other hand. The results show that countries which are larger export destinations for the US or China tend to receive larger swaps from them. An important drawback to both studies is the very limited number of potential swap determinants they take into consideration. In our assessment of FCL selectivity, on the contrary, we will draw on a much wider-ranging list of variables, inspired by the FCL qualification framework and the just-reviewed literature.

## 3.2 Empirical strategy and data description

### 3.2.1 Sample and variable selection

As our sample of potential FCL candidates we take the group of emerging markets included in JP Morgan’s Emerging Market Bond Index Global (EMBI Global hereafter) as of end-March 2009, when the IMF officially introduced the FCL instrument. Inclusion of countries in the EMBI Global is based on World Bank-defined per capita income brackets, countries’ debt restructuring history and the issuance of large, longer-term US dollar-denominated debt instruments (with an outstanding face value of at least US\$500 million and minimum 2.5 years until maturity) for which reliable daily prices are available. In short, the EMBI Global group consists of non-advanced countries with recent, sizeable access to US dollar debt markets.<sup>22</sup> Excluding conflict-stricken Iraq from this group (for reasons of data availability), we end up with a sample of 37, of which three FCL and 34 non-FCL comparator countries (see Appendix Table A1).

In order to empirically establish which variables explain whether or not a country enters into a FCL arrangement with the IMF we need to decide ex ante on a list of potential correlates of the IMF’s FCL supply and/or countries’ FCL demand. The content of the official FCL qualification framework (Section 2.1) and the preceding literature review (Section 3.1) help us to derive a first, extensive list of candidate variables. Below we briefly discuss the sort of variables we take up in our analysis. Appendix Table A2 provides a detailed overview of all 86 individual variables, their definitions and sources.

To begin with, in its operational guidelines the IMF itself proposes an elaborate set of relevant indicators for each of the nine FCL qualification criteria/domains (see [IMF, 2009](#), Annex I, Table 1). From this set of indicators we select those that are expressed as quantitative macroeconomic-financial measures and that are available for all or most of our sample countries; including various debt and reserves ratios, bond spreads, and fiscal balance, inflation, exchange rate and financial sector indicators (mostly collected from IMF

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<sup>22</sup>By focusing on EMBI Global constituents we already ‘pre-select’ countries on their (recent) sovereign access to international capital markets, which is one of the nine official FCL qualification criteria. Indeed, EMBI bond spreads (and their averages) are among the indicators proposed by the IMF to evaluate the criterion ‘track record of steady sovereign access to capital markets at favorable terms’ ([IMF, 2009](#), Annex I, Table 1). Our EMBI Global sample is the largest set of countries for which EMBI spreads were available as of March 2009.

databases). To evaluate the ‘[a]ccountability, transparency, and communication regarding [monetary] policy objectives’ (IMF, 2009, p. 13), we take the central bank independence and transparency indices from [Dincer and Eichengreen \(2014\)](#).<sup>23</sup>

Additional supply-side variables we consider include government effectiveness and control of corruption scores from the World Bank’s Worldwide Governance Indicators (WGI) and different measures of democratic strength from the Center for Systemic Peace Polity IV Project database and the World Bank and Inter-American Development Bank’s Database of Political Institutions (DPI). These are deemed to capture the overall quality and credibility of countries’ institutional frameworks, on which IMF staff is asked to make a (qualitative) judgement too.<sup>24</sup> We also add the Economist Intelligence Unit’s (EIU) overall country risk rating, a very broad summary indicator of economic, financial and political risks. Excessive risks would discourage the IMF from extending an FCL.

Next, we measure the economic interests of the IMF’s main shareholders in prospective FCL countries. In a similar fashion as [Thacker \(1999\)](#), [Barro and Lee \(2005\)](#), [Sturm et al. \(2005\)](#), [Presbitero and Zazzaro \(2012\)](#) and others, we calculate each country’s imports from and bilateral trade with the US, major European countries (Germany, UK, France and Italy) and the G7 as a share of total (worldwide) US/European/G7 exports or trade; individual countries’ FDI and portfolio investment liabilities to the US/Europe/G7 as a share of total US/European/G7 FDI or portfolio investment assets; and the consolidated claims of US/European/G7 banks on each country divided by total consolidated banking claims of the US/Europe/G7.<sup>25</sup>

To approximate political alignment with the IMF’s main shareholders, we follow [Presbitero and Zazzaro \(2012\)](#) and construct different indicators based on countries’ similarities in voting patterns in the UNGA (cf. Section 3.1). A first subset of measures uses the fraction of all UNGA votes by a country that is aligned with votes by the US, major European countries or the G7.<sup>26</sup> Alternative measures consider alignment with the US only on important UNGA votes, or the difference between alignment on all votes and alignment on important votes.

On the demand side, we expect countries that were more exposed to potential external shocks, or that were already experiencing crisis pressures, at the time the FCL instrument

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<sup>23</sup>The FCL qualification criteria also include data transparency and integrity, as measured by subscription to the IMF’s Special Data Dissemination Standard (SDDS). We disregard this variable in our analysis as there is no variation between the three FCL countries. Mexico, Colombia and Poland all three subscribed to the SDDS in 1996 and met its specifications in 2000.

<sup>24</sup>Initially, the IMF (2009) did not prescribe using any quantitative indicators of institutional strength for staff assessments of FCL qualification. In its 2015 operational guidelines, however, the IMF explicitly proposed government effectiveness and control of corruption from the WGI to inform judgment (see IMF, 2015, p. 17).

<sup>25</sup>Following [Aizenman and Pasricha \(2010\)](#) and [Aizenman et al. \(2011\)](#), we scale our bilateral trade and investment variables by total trade/investment of the US, Europe or G7, rather than by the total trade/investment or GDP of our sample countries (like, e.g., [Barro and Lee, 2005](#); [Sturm et al., 2005](#)). We believe this helps keeping the focus on the supply side, i.e., the relative exposure of the IMF’s main shareholders to each sample country.

<sup>26</sup>In line with the literature, we assign an alignment score of 1 if two countries both vote ‘yes’ on a UNGA resolution, both vote ‘no’, both abstain, or both are absent; a score of 0.5 if one country votes and the other abstains or is absent; and a score of 0 if countries oppose each other. To assess alignment with European countries or the G7 we average the pairwise scores.

was launched to be more inclined to enter into an FCL arrangement with the IMF. We evaluate the exposure to shocks using indicators of trade openness and of *de facto* and *de jure* financial openness, such as the presence of capital controls as codified by [Chinn and Ito \(2006\)](#) and [Fernández et al. \(2015\)](#). Actual crisis pressures are proxied by changes in real GDP growth relative to the (three) previous year(s); changes in the net barter terms of trade; changes in the value of exports; the range (i.e., the difference between maximum and minimum values) of JP Morgan EMBI country spreads over the past year; and exchange market pressure indices (EMPIs).<sup>27</sup> In the spirit of [Kaminsky and Reinhart \(1999\)](#) and [Eichengreen et al. \(1995\)](#) we create EMPIs as the weighted average of, respectively, two or three components: real exchange rate depreciation, the rate of international reserves depletion, and positive changes in short-term interest rates (i.e., the three main channels through which countries can meet excess demand for foreign exchange). To prevent any single component from dominating the EMPI, we choose the weights so that the two/three components have equal (country-specific) sample volatilities.

We also look at countries' past experiences with IMF programmes, as these may hold information about possible political stigma. We first take the time countries have spent under previous IMF programmes (as a share of total time since their accession to the IMF) and the number of years that have passed since countries' last IMF programme as (admittedly very rough) gauges of the domestic political costs of signing a new arrangement. *Ceteris paribus*, we expect political stigma to be inversely related with the time countries have spent under IMF arrangements, and positively with the numbers of years since the last arrangement (cf. Section 3.1; [Vreeland, 2007](#)). In addition, we try to take into consideration countries' historical record of non-compliance with IMF programme conditionality, a proxy for antagonism between the IMF and the borrowing country (government and/or citizens). We hypothesise that countries which had a contentious relationship with the IMF in the past would be less likely to enter into an FCL arrangement (even if it does not involve ex-post conditionality), because of higher political stigma on the demand side and greater reticence on part of the IMF to make available large credits. Since the IMF's Monitoring Fund Arrangements (MONA) database on programme conditions and their implementation record has several problems, which lead it to overstate compliance ([Arpac et al., 2008](#)), we opt for the approach proposed by [Killick \(1995\)](#), [Joyce \(2006\)](#) and [Dreher and Walter \(2010\)](#). These last authors suggest labelling a country as compliant with conditionality when no more than 25% of the amount originally agreed under an IMF arrangement remained undrawn at programme expiration. Because typical IMF loans are payable in tranches, whereby disbursement depends on the fulfilment by the borrower of different performance criteria, it is believed that non-compliance and programme interruptions are important causes of large unused IMF funds. A drawback to this approach is that IMF credit lines may also remain undrawn because of improvements in the borrower's economy or when the borrower uses (part of) such credit line as a precautionary instrument ([Arpac et al., 2008](#)). Our variable of choice is the share of IMF arrangements since 1990 on which a country was 'non-compliant' (as just defined), excluding arrangements that were ongoing at the time the FCL was launched and arrangements that the IMF itself explicitly classifies as having been

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<sup>27</sup>Since the seminal work of [Girton and Roper \(1977\)](#), EMPIs have been widely used in the empirical literature on identifying currency crises and speculative attacks.



approved on a precautionary basis.<sup>28</sup>

To test the hypothesis that recent elections reduce politicians' worries about the political costs of engaging with the IMF in the particular context of the FCL, we construct a variable counting the number of years since the last legislative/executive election with data from the World Bank's DPI.

Lastly, we include GDP and GDP per capita, both measured in purchasing power parity (PPP) terms, as two extra control variables.

All of the foregoing variables are evaluated before the IMF's FCL press release on 24 March 2009, in order to reduce endogeneity concerns. For the majority of variables, only available at yearly or quarterly frequency, we take end-2008 values; for series with monthly (daily) frequency we use values up to February 2009 (23 March 2009). In some cases we calculate averages or other transformations over longer pre-FCL periods (see Appendix Table A2 for more details).

### 3.2.2 Descriptives

Before moving to a more formal analysis, we inspect our potential correlates of FCL participation graphically. Appendix Figure A1 presents bar charts for (a selection of) the variables we consider, enabling us to locate the three FCL countries within the distribution of these variables over our sample countries.<sup>29</sup>

#### *Macroeconomic and financial qualification criteria*

The bar charts of Appendix Figure A1 first of all confirm the assertion that FCL qualifiers should have very strong macroeconomic fundamentals. At the eve of the FCL announcement Mexico and Colombia had some of the lowest external debt burdens among our sample countries, whereas Poland's external debt-to-GDP ratio of 41% was just below the sample mean (see Figure A1, panel (a)). All three FCL countries had modest current account deficits (panel (b)). In Mexico and Colombia short-term external debt was very low relative to GDP; in Poland this ratio was high compared to most other sample countries, but not nearly as elevated as in Bulgaria or Hungary (panel (c)). FCL countries' external debt did not seem to be overly concentrated with one particular sector of the economy, according to the World Bank-IMF Quarterly External Debt Statistics (QEDS) database.

FDI and portfolio inflows dominated overall capital inflows in Mexico and Colombia but not in Poland. Mexico and Poland had the highest shares of private holdings of external debt among the countries for which this indicator was available from Arslanalp and Tsuda (2014) (panel (d)). Likewise, according to World Bank data on long-term external debt, private holdings were relatively large in Mexico and Poland and above the sample average in Colombia. Foreign holdings of local currency Mexican and Polish government debt securities were considerable but certainly not exceptional.

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<sup>28</sup>Whereas our data on IMF disbursements go all the way back to 1952, the indicator of whether an IMF arrangement was approved on a precautionary basis is only available from May 1984 onwards.

<sup>29</sup>For reasons of space, we do not present bar charts for all 86 variables listed in Appendix Table A2. The omitted bar charts are available upon request.

The FCL countries' track record of capital market access compares very favourably to the rest of the sample. Poland, Mexico and Colombia found themselves in the bottom of the distribution of 30-day, one-year and five-year average EMBI Global country yield spreads prior to the launch of the FCL (panel (e)). Only Chinese spreads were slightly below Polish spreads at the time. One-year maximum country spreads tell a very similar story.<sup>30</sup>

Notwithstanding the fact that the relative international reserves positions of the three FCL countries could not compete with those of China, Russia, and a number of smaller economies, they remained comfortable. In Mexico and Colombia total reserves stood at roughly 400% of short-term debt (on an original maturity basis) and in Poland at 96% (panel (f)); ratios to short-term debt plus the current account deficit were 214%, 194% and 62%, respectively.<sup>31</sup> Reserves also covered more than the commonly advised 20% of M2 (panel (g)) and three months of import, but did not appear to be 'excessive'. From this point of view at least, there was still room for an extra liquidity backstop under the form of an FCL in the three countries.

Public finances seemed sound in Mexico, Poland and Colombia, with close-to-average public debt-to-GDP ratios (panel (h)) and moderate overall and structural fiscal deficits (panel (i)). Colombia and Mexico ran small primary fiscal surpluses over 2008, while Poland had only a minor primary fiscal deficit. Again, however, quite a few countries, most notably commodity exporters, outperformed the FCL countries in these dimensions.

Furthermore, the three FCL countries were characterised by lower inflation (panel (j)) and inflation volatility than the large majority of our sample. Poland and Colombia were among the best-ranked countries in terms of central bank transparency but not central bank independence (where Mexico received a much better score).<sup>32</sup> Real exchange rate volatility over the 12 months before the FCL's launch was relatively high in the three FCL countries (panel (k)). This can be partly explained by the high degree of *de facto* flexibility in the exchange rate regimes of these countries, which could be an indication of shock absorption rather than a sign of vulnerability.<sup>33</sup>

Financial sector indicators too looked rather auspicious in the FCL countries, in spite of clear differences between them and with the caveat that the IMF Financial Soundness Indicators (FSI) were only available for a limited number of comparator countries. On the aggregate, the Colombian and Mexican banking systems were well-capitalised (panel (l)), liquid and profitable (panel (m)). Capital adequacy and liquidity were considerably lower in Poland, but still comfortably above conventional international standards.<sup>34</sup> Overall bank

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<sup>30</sup>Benchmark domestic (local currency) government bond yields were not readily available for most of our sample and are therefore not included in our analysis. Limited data retrieved from Datastream suggests that five- and ten-year Treasury bond yields of Poland and Mexico were, on average, lower than bond yields of, among others, Turkey, Russia, Hungary, Brazil, Indonesia and Vietnam, but higher than bond yields of China, Malaysia and Chile.

<sup>31</sup>Ideally, we would look at the ratio of reserves to short-term debt on a *remaining maturity* basis, including amortisation on medium- and long-term debt. Again, such data were not readily available.

<sup>32</sup>It should be noted, however, that the US Federal Reserve is classified by [Dincer and Eichengreen \(2014\)](#) as one of the least independent central banks.

<sup>33</sup>[Ilzetzi et al. \(2017\)](#) classify the *de facto* exchange rate regimes of Mexico and Poland as 'managed floats' and Colombia's as a 'broad crawl' in February 2009.

<sup>34</sup>For example, Basel II standards prescribe a minimum (Tier-1) regulatory capital to risk-weighted assets ratio of 8% (6%). End-2008 this ratio stood at 11% (10.7%) for the Polish banking system (panel (l)).

funding risks seemed manageable in Mexico, Poland and Colombia, with customer deposit to loan ratios roughly between 85% and 100% and foreign currency shares of bank liabilities all below 30% (panel (n)). Regarding asset quality, non-performing loans (NPL) were 3-4% of gross loans in the FCL countries (panel (o)). Private sector credit to GDP was greater in Poland (48%) than in Colombia and Mexico, but arguably still at a sustainable level.

### *Institutional quality and governance*

Judging from the World Bank's WGI, the FCL countries' institutional quality was above sample average, but not outstanding. Poland was clearly rated higher than Mexico and Colombia on dimensions of government effectiveness (panel (p)) and control of corruption. Similar observations can be made with respect to the FCL countries' 'Polity' scores, which aggregate information on executive recruitment, constraints on executive authority and political participation. In terms of checks and balances, an indicator counting the number of independent 'veto players' in a country's political system (i.e., decision makers whose agreement is needed to change policy), Mexico was ranked first, together with Argentina and Brazil. Colombia and Poland followed closely with just one veto player less, as did several other countries (panel (q)).

More noticeably, in the months prior to the launch of the FCL the EIU placed Mexico, Poland and Colombia among the countries with the lowest combined economic, financial and political risks (panel (r)). Only Chile received an overall risk rating that was markedly lower than Mexico's.

### *Economic and political interests of main IMF shareholders*

Figure A1 further shows that, in relative terms, both Mexico and Poland were economically and financially important to the IMF's main shareholders. A clear outlier, Mexico accounted for almost 12% of the total value of exports by the US (panel (s)) and for 11% of total US trade in 2008. Only China was more important to US trade, thanks to large Chinese exports to the US. Poland, on the other hand, was the most prominent importer of European goods in our sample, receiving nearly 3% of all exports from Germany, the UK, France and Italy combined; if total trade with these European countries is considered, only China and Russia trumped Poland. Along the same lines, Mexico and Poland were, respectively, the second and fourth largest import and trading partners of the G7 bloc (panels (t) and (u)). Similarly, Mexico had the largest stock of inward FDI from the US (over 2% of total US FDI assets) (panel (v)) and Poland the largest FDI stock from Europe (over 1% of the total) among sample countries. China and Brazil were the only two countries with larger FDI liabilities to the G7 than Mexico and Poland (panel (w)). Comparable rankings apply to sample countries' portfolio investment liabilities to the US, Europe and the G7. Mexico was also home to more than 5% of the consolidated foreign claims by US banks, putting it far ahead of the rest of the sample (panel (x)). The exposure of European banks was relatively large in Poland (about 0.6% of their foreign claims). On the whole, Mexico and Poland constituted the second and fifth largest exposures of G7 banks, flanked by China, Russia and Brazil (panel (y)). Colombia seems much less important from the perspective of US/European/G7 exporters, investors and banks; only its share in total US exports exceeded the sample average.

Our UNGA voting-based measures point to strong political alignment of the FCL countries with major IMF shareholders. When all 2008 UNGA votes are considered, Poland was the sample country most aligned with the US, together with Ukraine (panel (z)), and the third-most aligned with major European countries or the G7, preceded merely by Bulgaria and Hungary (by a very small margin) (panel (aa)). Mexico’s and Colombia’s 2008 political alignment with IMF heavyweights was less strong than Poland’s but still close to or above the sample average. With respect to UNGA votes that the US identified as ‘important’, Poland was the US’s closest ally. Interestingly, Poland and Mexico were among the top-ranked when it came to political concessions to the US, proxied by the difference between alignment on all UNGA votes and on important votes; Colombia too is found in the upper half of the sample distribution of this variable (panel (ab)). The high degree of political alignment and, more so, of voting concessions to the US in the FCL countries is also evident when we take five-year averaged scores.<sup>35</sup>

### *Crisis exposure and pressures*

The FCL countries did not stand out with respect to trade or financial openness. The exports to GDP ratios of Colombia (18%) and Mexico (28%) were far below that of Poland (39%) and the sample average. The extent of capital account restrictions was moderate in comparison to non-FCL sample countries according to the indices constructed by [Chinn and Ito \(2006\)](#) (panel (ac)) or [Fernández et al. \(2015\)](#). Also the *de facto* financial openness of Poland, Mexico and Colombia, as measured by total financial liabilities or the net foreign asset (NFA) position to GDP, was less than or not too far removed from sample means.

As documented in the IMF staff reports accompanying their FCL applications, Mexico, Poland and Colombia already felt the pressures of the global financial and economic crisis end-2008/early 2009; but so did most other countries. Real GDP growth in Mexico, Poland and Colombia was about 2-3 percentage points lower in 2008 than the year before, and 1.5-2.5 percentage points below the average of the three previous years (panel (ad)). However, in several non-FCL countries growth fell more than 5 percentage points. Year-on-year changes in the net barter terms of trade were still positive in Colombia and Mexico end-2008 and only slightly negative in Poland (-1.8%). The total value of Mexican, Polish and Colombian exports shrank by -35%, -33% and -19%, respectively, between February 2008 and February 2009, but more than a third of the sample countries recorded export declines in excess of 40% over the same period. One-year ranges in EMBI spreads testify to the relative resilience of FCL countries’ financing costs prior to the introduction of the FCL. The differences in minimum and maximum country spreads over the year running up to 23 March 2009 were limited to 314, 479 and 586 basis points in Poland, Mexico and Colombia. Only China and Chile fared better than Poland. As per the two-component EMPIs, weighted sums of percentage exchange rate depreciation and percentage declines in international reserves stocks, Poland experienced the most severe exchange market pressure among sample countries during the six months between September 2008 and February 2009 (panel (ae)). Also Mexico and Colombia underwent relatively large exchange market pressures according to this indicator.<sup>36</sup>

<sup>35</sup>Sample countries that consistently had the lowest scores for political alignment and/or concessions to the US include Venezuela, China, Vietnam, Indonesia, Sri Lanka and Egypt.

<sup>36</sup>Average EMPI values over September 2008 - February 2009 are elevated for Poland, Mexico and Colombia

Three-component EMPs, which take into account interest rate changes in addition to exchange rate and reserves changes, put Ukraine, Russia and Serbia before Poland in terms of exchange market pressure (due to a comparatively large interest rate decline in the latter).

### *Prior experiences with IMF arrangements*

We do not discern any clear association between our indicators of historical experiences with IMF programmes and FCL participation. Between joining the IMF and the introduction of the FCL, Colombia, Mexico and Poland had spent 38%, 31% and 25% of their time under IMF arrangements, which puts them roughly between the first quartile and the median of our country sample (panel (af)). In terms of years since their last experiences with an IMF programme, the FCL countries are quite heterogeneous (panel (ag)). At the eve of the FCL, Poland had exited its previous IMF arrangement, an SBA that was in force between August 1994 and March 1996, almost exactly 13 years. The SBA that Mexico concluded with the IMF in July 1999 expired in November 2000, roughly eight years before the launch of the FCL. And in Colombia memories of engagement with the IMF were even more vivid, as its SBA of May 2005 came to an end only in November 2006.<sup>37</sup>

Based on the share of previous IMF arrangements with large amounts of undrawn SDRs at expiration, an oft-used proxy for non-compliance with IMF conditionality, Mexico and Colombia were ranked among the least ‘compliant’ sample countries (panel (ah)). This seems to run counter to our hypotheses about the influence of prior non-compliance on the likelihood of an FCL arrangement. However, a closer look at IMF country reports and press releases reveals that Mexican authorities left about 37% of the SDRs available under their 1999-2000 SBA undrawn because of improvements in Mexico’s external position, rather than conditionality breaches. Likewise, Colombia did not make any SDR purchases under its 1999-2002 Extended Fund Facility (EFF) since authorities themselves decided to treat the EFF as a precautionary arrangement (even if the IMF does not classify it as such in its own database). We therefore conclude that the SDR-based indicator of ‘non-compliance’ is too noisy a measure to be useful for our purposes and exclude it from the rest of our analysis.

### *Elections*

In Mexico and Colombia legislative and executive elections had taken place about two years before the IMF’s new FCL modality was announced, whereas in Poland only one (full) year had passed since its latest parliamentary election and three years since the election of president Kaczyński. The three FCL participants do not seem to stand out in this regard, as several non-FCL countries too had elections around the same time.

### *Economic size and development*

Lastly, in terms of economic size and overall level of economic development, the FCL mostly because of large exchange rate depreciations. Poland and Mexico also saw relatively large reserves losses during the first two months of this period.

<sup>37</sup>A number of countries were already engaged in IMF programmes at the time the FCL was announced; see Appendix Table A1.

countries are no outliers in our sample (panels (ai) and (aj)). Mexico's (PPP-based) GDP was surpassed by that of Russia, Brazil and Indonesia and dwarfed by China's, which *is* a clear outlier. Poland and Colombia had economies that represented roughly 40% and 25% of Mexican GDP, respectively, but were still well above the sample median. At just over 19,000 international dollars, Poland's (PPP-based) GDP per capita was about 23% higher than Mexico's and 88% higher than Colombia's.

### *Univariate tests*

Appendix Table A2 reports the sample means of all variables we have just discussed, separate for the three FCL and 34 comparator countries. It also presents the results of simple one-tailed t-tests of the null hypothesis that the mean value of a particular variable is equal in FCL and non-FCL countries, as well as the rank-sum test due to [Wilcoxon \(1945\)](#) and [Mann and Whitney \(1947\)](#).<sup>38</sup> The latter is a non-parametric test of the null that the two samples come from populations with the same distribution, which does not require the assumption that variables are normally distributed. Although one should be careful not to draw too strong conclusions from these univariate tests, we find that several of the differences between Mexico, Poland and Colombia and the rest of the sample we pointed out above are indeed statistically significant.

In terms of macroeconomic-financial and institutional factors, the FCL countries were, above all, marked by significantly lower EMBI spreads, lower and less volatile inflation, more checks and balances and lower overall risk ratings, in line with the supply-side arguments we postulated above. The tests further suggest lower external debt, higher bank shares of total external debt, higher private holdings of debt, lower reserves to M2 ratios, greater central bank transparency, higher returns on bank equity and assets, less foreign currency bank liabilities and non-performing bank loans, greater control of corruption and government effectiveness, and a higher degree of democracy in FCL countries, although significance levels and/or sample sizes are smaller for these variables. Trade, investment and banking links with major IMF shareholders, in particular the US; most measures of political alignment with the US, Europe and the G7; and concessions to the US were also significantly stronger in FCL countries, again supporting arguments advanced in the literature on IMF lending. Exchange rate volatility and exchange market pressures were found to be higher in Mexico, Poland and Colombia, which could explain their demand for an FCL arrangement.

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<sup>38</sup>Since standard Student's t-tests assume that the two populations from which samples are drawn have equal variances, we have also run alternative t-tests which drop this assumption and use the approximation of [Satterthwaite \(1946\)](#) to calculate degrees of freedom. The results are qualitatively very similar to those presented in Appendix Table A2 and are available upon request.



### 3.2.3 Model specification and selection

To evaluate the influence of the foregoing variables on the probability of participation in an FCL arrangement we estimate probit models of the following form using maximum likelihood:

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

where  $FCL_i$  is a dummy variable that takes a value one for FCL countries Mexico, Colombia and Poland and a value zero otherwise;  $\Phi$  is the standard normal cumulative distribution function;  $X_i$  is a vector of potential correlates of FCL participation;  $\beta$  is a vector of model parameters to be estimated; and subscript  $i$  refers to the  $i^{th}$  country.

Reduced-form model specification (1) does not explicitly distinguish between factors determining FCL demand by governments on the one hand and determinants of FCL supply by the IMF on the other. In practice, like any other IMF arrangement, an FCL is the joint outcome of both a government's wish to seek such an arrangement and the IMF Executive Board's willingness to approve the request. Unfortunately, we only observe the *final* FCL arrangements to which governments and the IMF mutually agreed. We do not have any data on unsuccessful FCL applications by countries (or on unreciprocated solicitations of governments by the IMF to accept an FCL), information which is kept strictly confidential (as prescribed by IMF policy). Some studies looking into participation in IMF arrangements have suggested estimating bivariate probit models with partial observability, which attempt to disentangle demand and supply effects in a system of two equations (Knight and Santaella, 1997; Przeworski and Vreeland, 2000, 2002; Stone, 2008). Important drawbacks to this kind of models include the need for multiple restrictions to achieve identification (see Poirier, 1980, for technical details) and difficulties with maximum likelihood convergence in small samples (Presbitero and Zazzaro, 2012). Hence, we prefer to follow the large majority of the literature and stick to single-equation probit models. We bear in mind the caveat that, strictly speaking, our estimated parameters should be interpreted as reflecting a mix of demand and supply factors.<sup>39</sup>

Moreover, since only three countries entered into an FCL arrangement, we estimate very parsimonious models. To avoid overfitting our models we only include a limited number of explanatory variables. As a first step, we estimate models where each of the explanatory variables discussed above is introduced individually. On the basis of these single-regressor probits and the foregoing statistical tests, we will then proceed with selecting a list of well-performing variables to be included together in a multi-regressor probit.<sup>40</sup> Data availability,

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<sup>39</sup>Another assumption we make here is that the participation of Mexico, Colombia and Poland in the FCL were independent events. Especially on the supply side, this seems like a reasonable assumption. Granting an FCL arrangement to, say, Mexico, should not make IMF staff more or less likely to favourably assess the applications of particular other countries (or would make the IMF Executive Board more or less likely to approve other applications). On the demand side, it could be that, after Mexico had overcome the 'first mover' problem, other countries became more inclined to apply for an FCL arrangement too. But even then, it is unclear which countries would be more (or less) sensitive to Mexico's move.

<sup>40</sup>We acknowledge that using the significance of coefficients estimated in single-variable regressions to select variables to be included in multi-variable regressions does not guarantee that we end up with the best possible model. Therefore, as a robustness test, we will attempt a number of variations on our baseline specification.

the relation of variables to theory and the existing empirical literature, and the strength of correlation between variables (to avoid problems of collinearity) will be used as additional criteria to narrow down the list of variables.

### 3.3 Probit estimation results

#### 3.3.1 Single-regressor probits

Appendix Table A3 shows the estimation results of the single-regressor probit models for each of the 86 explanatory variables considered, together with a number of statistics commonly used to evaluate model performance, such as the Akaike and Bayesian information criteria (AIC and BIC) and McFadden pseudo  $R^2$ s. Next to the fitted probit coefficients, we present average marginal effects, the interpretation of which is more straightforward and similar to that of the coefficients produced by standard OLS.<sup>41</sup> To judge statistical significance, we employ Huber-White robust standard errors for the probit coefficients and standard errors calculated using the delta method for the marginal effects.

The results are broadly in line with the statistical tests of Appendix Table A2. When evaluated independently, greater private holdings of debt, lower EMBI spreads, lower reserves to M2, lower and less volatile inflation, greater central bank transparency, higher exchange rate volatility, higher checks and balances, lower risk ratings, stronger trade, investment and banking links with important IMF shareholders (again especially with the US), political alignment and concessions on important US foreign policy issues, and greater exchange market pressures significantly increased the likelihood of FCL participation.<sup>42</sup> The influence of most of the statistically significant variables is economically important too. For example, according to the marginal effects, a 100 basis point decrease in the one-year averaged EMBI spread would increase a country’s chances of FCL involvement with about 6.7% on average. A 1% lower inflation rate would boost this probability with 4.7%. And 1% increases in a country’s share in total US exports, its share in the total outward FDI stock of the US, and its share in total US bank claims would add 2.9%, 11.4% and 7.7%, respectively, to the likelihood of FCL participation. Likewise, an increase of one standard deviation in the ‘political concessions to the US’ score (+0.11) would augment FCL likelihood by 11.5%. A one standard deviation rise in the six-month averaged, two-component EMPI (+3.5) would lead to a 9.4% higher probability of FCL participation.

Based on the AIC and BIC, the probit models of inflation and inflation volatility, the two-component EMPI, liabilities to US banks, checks and balances, one-year averaged EMBI spreads, and political concessions to the US have the best fit (making abstraction of the models with the smallest sample sizes). These are also the models with the highest explanatory power, according to the pseudo  $R^2$ s. However, if we take an estimated probability of 50% or more as indicating that the model predicts FCL participation for a particular country,

<sup>41</sup>In our probit models the marginal effect of a continuous variable  $x_1$  equals  $\partial P(FCL_i = 1|X_i)/\partial x_{1i} = \beta_1 \phi(X_i' \beta)$ , where  $\beta_1$  is the probit coefficient corresponding to  $x_1$  and  $\phi$  is the standard normal density function. Through  $\phi(X_i' \beta)$ , this marginal effect depends on  $X_i$ , i.e., the values of all regressors for country  $i$ . The ‘average marginal effects’ we present in the paper are simple averages of the marginal effects over all sample countries, holding all regressors fixed at their sample values.

<sup>42</sup>Somewhat counterintuitively, the single-regressor probits also suggest that more extensive capital controls and lower *de facto* financial openness were associated with a higher probability of entering an FCL.



then the predictive ability of our single-regressor probits appears to be far from satisfactory. By this standard, very few models perform better than the naive model that classifies all countries as FCL non-participants. Exceptions include the probits of the country shares in US exports, FDI and bank claims, which result in predicted FCL probabilities for Mexico well in excess of 50%; and the probit of the two-component EMPI, which correctly predicts Poland to be an FCL participant.<sup>43</sup> That said, while the 50% probability rule has intuitive appeal, it is not necessarily the most appropriate threshold in a unbalanced sample as ours, where there are many more non-FCL than FCL countries (Greene, 2012). In the last two columns of Appendix Table A3 we therefore evaluate the predictive ability of our probits employing an alternative, sample-based cut-off, i.e., countries are classified as FCL participants if their predicted probabilities are at least as high as the proportion of FCL countries actually observed in the sample (say, 3 out of 36 or 8.33% if external debt to GDP is the regressor). According to this new rule, several models now correctly classify two or even all three FCL countries, at the cost of an increased number of incorrectly classified non-FCL countries. Ultimately, every choice for a classification threshold implies trade-offs between making Type-1 errors (non-FCL countries classified as FCL) and Type-2 errors (FCL countries classified as non-FCL) (Greene, 2012). If we attach symmetric costs to both errors, the overall predictive performance using the sample-based cut-off is strongest for the probits of the trade, bank and FDI economic interest variables.

### 3.3.2 Multi-regressor probits

On the basis of the different criteria specified in Section 3.2.3 we select the following variables: one-year averaged EMBI spreads, three-year averaged inflation, the share in total US exports, political concessions to the US and the two-component EMPI. As can be seen from Appendix Tables A2 and A3, the difference-in-means t-statistics, Mann-Whitney-Wilcoxon z-statistics, the single-regressor-probit coefficients, and the average marginal effects of these five variables are all statistically significant at 10% (or lower) levels. Moreover, these variables are clearly grounded in theory and the relevant empirical literature. Taken together, they are available for 31 out of 37 sample countries (see Appendix Table A1). Other highly significant variables with wider availability are excluded because of their high pairwise correlation with US export shares (US FDI and bank claim shares) or EMBI spreads (overall country risk ratings).

Column (a) of Table 2 shows the results of the probit model that includes the five selected variables. All variable coefficients have the expected sign and, with the exception of inflation, are significant at the 20% level at the minimum. As in the single-regressor probits, countries with lower EMBI spreads, lower inflation, a higher share in US exports, more severe exchange market pressure, and countries that made more political concessions to the US had a greater likelihood of entering into an FCL arrangement. Whereas the influence of the two first variables is in line with supply-side arguments and the official qualification criteria, exchange market pressure is clearly a demand-side factor. The share of country exports in total US exports captures the relative exposure of US exporters to that country and is therefore labelled a supply-side factor. As the dominant shareholder the US administration has considerable room to exert influence on the IMF's lending decisions so as to protect the

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<sup>43</sup>Unsurprisingly, these are all variables in which Mexico or Poland lead the sample by a clear margin (see Appendix Figure A1).

interests of its exporting companies. In a similar vein, the political concessions variable can be considered supply side; the US may well reward its foreign policy allies with favourable votes in the IMF Executive Board. However, on the demand side, it is also conceivable that countries that are more friendly towards US foreign policy feel less stigma and are overall more comfortable in approaching the IMF for an FCL arrangement.<sup>44</sup> The estimated average marginal effects indicate that a 1% increase in the US exports share would increase the probability of FCL entry with an average of 0.8%. A one standard deviation change in the political concessions variable (+0.11) raises the likelihood with 4.4%. While these effects are clearly smaller than in the single-regressor probits, they still seem economically meaningful.

According to the pseudo  $R^2$ , the explanatory power of the multi-regressor probit model is considerably higher than that of any of the single-regressor models. More importantly, the multi-regressor probit has superior predictive ability. If we employ 50% as our predicted probability threshold, the model succeeds in correctly classifying two out of three FCL (Poland and Mexico) and all non-FCL countries. With a sample-based cut-off (here: 3/31 or 9.67%), all three FCL countries are classified as such and only three non-FCL countries (Brazil, Peru and Bulgaria) are incorrectly labelled FCL participants.<sup>45</sup>

Next, we subject the variables of the baseline probit model to two algorithms of stepwise selection. The first algorithm starts with an empty model and iteratively adds the most significant excluded variable, with possible re-exclusion of previously included variables. Conversely, the second algorithm takes the full model and iteratively drops the most insignificant included variable, with possible re-inclusion of previously excluded variables.<sup>46</sup> Taking 20% as the significance threshold level for inclusion/exclusion, both algorithms converge to a model without the inflation variable. Column (b) of Table 2 shows that in such a model the coefficients and average marginal effects are of the same order of magnitude but statistically more significant than in the baseline model. The new model is very similar in terms of explanatory power and predictive ability; employing a sample-based cut-off, all three FCL countries are correctly classified and the number of false positives is now four instead of three (the same non-FCL countries as before plus Hungary). When we set the significance threshold level for baseline variable inclusion/exclusion at 10% or 5%, the selection algorithms suggest a model including inflation but excluding the EMBI spread. The estimated coefficients and marginal effects of such a model are again qualitatively similar to those of the baseline model (Table 2, column (c)). Predictive power is slightly improved under a sample-based classification cut-off, with only two misclassified non-FCL countries

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<sup>44</sup>As Bird et al. (2015, p. 223) put it, "...there may be considerable self-selection on the demand side for IMF programs; governments on good terms with the US may quickly turn to the Fund, while less favored governments may not bother to approach the IMF expecting that an agreement will be opposed".

<sup>45</sup>In the model of column (a) of Table 2 the predicted probabilities of FCL participation are 99.8% for Poland, 98.4% for Mexico, and 13.6% for Colombia. This puts the latter behind Brazil (38.1%) and Peru (18.2%) and just before Bulgaria (12.1%). Interestingly, a note by investment bank Barclays dated 30 March 2009 also lists Brazil and Peru among the potential candidates for an FCL (next to Mexico, Poland, Colombia and a few others), based on a subjective scoring of countries on the nine official qualification criteria (Keller et al., 2009).

<sup>46</sup>Note that these algorithms are not without problems and, again, do not necessarily result in the best possible model given the list of possible variables (see e.g., Derksen and Keselman, 1992). Moreover, forward and backward selection procedures may well result in different final models.

Table 2: Multi-regressor probits

	(a)		(b)		(c)	
	Probit coef- ficient	Average marginal effect	Probit coef- ficient	Average marginal effect	Probit coef- ficient	Average marginal effect
<i>1-y average EMBI spread</i>	-0.0032+ [0.0024]	-0.0002 [0.0002]	-0.0051*** [0.0015]	-0.0003+ [0.0002]		
<i>3-y average inflation</i>	-0.1394 [0.1940]	-0.0071 [0.0118]			-0.2496** [0.1036]	-0.0128 [0.0109]
<i>Share US exports</i>	0.1637+ [0.1011]	0.0083*** [0.0025]	0.2109* [0.1135]	0.0110+ [0.0076]	0.1721** [0.0861]	0.0089*** [0.0033]
<i>Political concessions to US</i>	7.8400*** [2.2456]	0.3978+ [0.2819]	8.2064*** [2.2029]	0.4293+ [0.2927]	7.4575*** [1.9559]	0.3840+ [0.2566]
<i>2-component EMPI</i>	0.3204** [0.1270]	0.0163 [0.0136]	0.2883*** [0.0689]	0.0151+ [0.0102]	0.3141*** [0.0982]	0.0162+ [0.0121]
Constant	-1.6789* [1.0146]		-1.7439* [0.9307]		-2.1961*** [0.7750]	
N	31	31	31	31	31	31
AIC	18.0669		16.1914		16.2523	
BIC	26.6708		23.3614		23.4223	
McFadden pseudo $R^2$	0.6922		0.6859		0.6828	
FCL countries correctly clas- sified (50% cut-off)	2/3: POL, MEX		2/3: POL, MEX		2/3: POL, MEX	
Non-FCL countries correctly classified (50% cut-off)	28/28		28/28		28/28	
FCL countries correctly clas- sified (sample-based cut-off)	3/3		3/3		3/3	
Non-FCL countries correctly classified (sample-based cut- off)	25/28: not BRA, PER, BGR		24/28: not BRA, BGR, PER, HUN		26/28: not BRA, PER	

Notes: Sample countries and ISO-3 codes as defined in Appendix Table A1 and variables as defined in Appendix Table A2. Significance of probit coefficients based on Huber-White robust standard errors and significance of average marginal effects based on delta-method standard errors. Number of correctly classified FCL and non-FCL countries based on two alternative classification rules: in the first case a country is classified as FCL participant (non-participant) if predicted probability from the model is greater (smaller) than 50%; in the second case a country is classified as FCL participant (non-participant) if predicted probability from the model is greater (smaller) than proportion of FCL countries actually observed in sample. + $p < 0.2$ ; \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

(Brazil and Peru).

In Appendix Table A4 we report a number of additional variations on the baseline multi-regressor probit model. These confirm our main results.

Having addressed the selectivity of the FCL by looking into the most important correlates of FCL participation, we now turn to an empirical evaluation of the FCL's effectiveness. In the remainder of the paper we attempt to shed light on the extent to which the FCL arrangements of Mexico, Colombia and Poland have been successful in boosting market confidence in these countries.

## 4 How effective have FCL arrangements been?

### 4.1 Literature review

As explained in Section 2.1, the FCL is the IMF's first genuine precautionary lending instrument. Rather than to address actual balance of payment problems, it was designed to provide large, upfront financing to countries with strong fundamentals and ditto policies that could nonetheless be vulnerable to adverse market conditions. Together with the strict pre-set qualification criteria, the assured access to funds under the FCL serves to signal the IMF's confidence in the participating country's policies and in its ability to take corrective measures when needed; which in turn is meant to ease investors' minds. As such, to evaluate the FCL's success one should, above all, look into the impact on market perceptions of its takers, as proxied, for example, by external financing costs (bond spreads) or capital flows. The IMF's factsheet on the FCL asserts that "[w]hile none of the three countries [i.e., Mexico, Colombia and Poland] have so far drawn down on these lines, the FCL has provided valuable insurance to these countries and helped boost market confidence during the period of heightened risks".<sup>47</sup> There is however surprisingly little systematic evidence to back up this claim.

Most of the analysis of the macroeconomic-financial effects of the FCL has been conducted by the IMF itself and can be found in its 2011 and 2014 review reports of the instrument. IMF (2011) employs an event study whereby the individual EMBI spreads of Mexico, Colombia and Poland are first regressed on the overall EMBI Global spread and the residual is then examined in a ten-day window around the date of each country's public announcement of interest in the FCL. This exercise shows a drop in country-specific spreads of about 30 basis points for Mexico, 20 basis points for Colombia and 15 basis points for Poland in the immediate aftermath of countries' announcement. IMF (2011) also finds that exchange rate volatility in Mexico, Colombia and a number of potential FCL-qualifying countries declined around the time of the creation of the FCL; with further reductions for Mexico and Colombia after their expression of interest in the FCL and for Poland after the approval of its FCL in the Executive Board. IMF (2014) runs a set of panel regressions with country fixed effects in a sample of emerging markets where the dependent variables are either EMBI spreads or bond fund inflows and the independent variables include a dummy for having an active FCL arrangement, next to global and country-specific controls. The results suggest a sizeable and (generally) statistically significant decrease in spreads and increase in bond flows in both FCL-participating and -qualifying countries. In separate panel regressions it is also found that, whereas EMBI spreads increased overall in the four weeks following US Federal Reserve Chairman Ben Bernanke's 22 May 2013 tapering speech, the rise in spreads was lower in the three FCL countries than in their emerging market peers.

Conversely, after graphically comparing the EMBI spreads of Mexico, Colombia and Poland with those of other emerging market economies with similar prior spreads, Fernández Arias and Levy Yeyati (2012) find the benefits of the FCL to be muted and short-lived, much more so than the influence of central bank swap lines with the US Federal Reserve. Moreover, they show that in the months after the creation of the FCL the cumula-

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<sup>47</sup>See <http://www.imf.org/external/np/exr/facts/pdf/fcl.pdf>.

tive changes in EMBI spreads of FCL countries and potential qualifiers (defined as countries with initial spreads lower than Colombia's) are 'indistinguishable' from such spreads changes in the other EMBI Global constituents. [Fernández Arias and Levy Yeyati \(2012\)](#) conclude that the general improvement in bond spreads in the wake of the April 2009 London G20 summit should not be attributed to the availability of the FCL (or bilateral central bank swaps for that matter). [John and Knedlik \(2011\)](#) and [Marino and Volz \(2012\)](#) present simple graphs exhibiting narrowing sovereign and corporate bond spreads, exchange rate appreciation and stock market recovery in the FCL countries following the approval of their respective FCL arrangements, but are equally quick to stress the difficulties with interpreting such trends as beneficial impacts of the FCL.

In view of the above we think there is ample room left for a more rigorous empirical evaluation of the effectiveness of the FCL. First of all, none of the foregoing studies has attempted to construct a proper counterfactual, i.e., what the bond spreads or other outcomes for Mexico, Colombia and Poland would have been in case they had not concluded FCL arrangements with the IMF. Indeed, FCL countries' spreads are compared against EMBI Global averages ([IMF, 2011](#)) or against countries with similar spreads at one point in time ([Fernández Arias and Levy Yeyati, 2012](#)), without further examination of whether these are valid comparisons. The panel regression approach of [IMF \(2014\)](#) at least controls for the effect of other variables and time-invariant country-specific factors on outcomes, but the composition of the counterfactual it produces remains implicit and could be distorted by extrapolation outside the support of the data at hand. As explained in the next section, our 'synthetic control' approach aims to further objectivise and make explicit the selection of comparator countries.<sup>48</sup>

Second, the focus of the assessments so far has principally been on the short-term effects of the FCL, i.e., in the days/months right after the inception of the three arrangements. However, *a priori*, there is no apparent reason why any immediate beneficial FCL effect should be assumed to disappear over time ([Fernández Arias and Levy Yeyati, 2012](#)). One would rather expect to see the FCL's largest impact on market confidence during periods of heightened global risks ([IMF, 2014](#)). Hence, we consider a much longer time horizon than previous studies, encompassing among other events the intensification of the Eurozone crisis, the US Federal Reserve's 'taper tantrum' and the more recent fall in oil and other commodity prices.

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<sup>48</sup>A recent study by [Newiak and Willems \(2017\)](#) applies the same methodology to evaluate the impact of Policy Support Instruments (PSIs), non-disbursing IMF instruments whose main purpose is to signal to investors (and donors) the IMF's endorsement of the participating country's policies, on growth, inflation and investment in seven African PSI countries. This enables [Newiak and Willems \(2017\)](#) to isolate the contribution of IMF involvement (through advice, monitoring and approval) from the effects of direct financial assistance. Since there have been no disbursements under the FCL arrangements either and given the FCLs stated goal of boosting market confidence, our analysis can be seen in a similar light (although, unlike a PSI, an FCL does imply direct access to financial assistance if needed).

## 4.2 Empirical strategy and data description

### 4.2.1 Synthetic control methodology

To evaluate the effects of the FCL arrangements on Mexican, Colombian and Polish external financing costs and capital inflows we adopt a counterfactual approach, using the so-called ‘synthetic control method’ developed and described in detail by [Abadie and Gardeazabal \(2003\)](#), [Abadie et al. \(2010\)](#) and [Abadie et al. \(2015\)](#).<sup>49</sup> In essence, this method measures the impact of a specific intervention (the agreement on an FCL arrangement in our case) as the difference between the post-intervention outcomes (like bond spreads or capital inflows) for the ‘treated’ country (one of the three FCL countries) and the same outcomes for a ‘synthetic control group’. The latter is constructed as a weighted combination of untreated countries out of a larger ‘donor pool’ whose outcomes are deemed to be governed by the same structural processes as the treated country (say, other emerging markets). Country weights are chosen so that the characteristics of the synthetic control (both outcomes and important determinants of those outcomes) over a pre-intervention period match as closely as possible those of the treated country.

More formally, let  $y_{it}^{FCL}$  be the outcome variable of interest at time  $t$  if country  $i$  was under an FCL arrangement and  $y_{it}^{NFCL}$  the outcome of interest for country  $i$  in the absence of an FCL. The dynamic effect of the FCL,  $\tau_{it}$ , is then given by:

$$\tau_{it} = y_{it}^{FCL} - y_{it}^{NFCL} \quad (2)$$

Further suppose we have a sample of  $N + 1$  countries, where country  $i = 1$  is an FCL country and countries  $i = 2$  to  $i = N + 1$  constitute the donor pool of  $N$  potential comparator (non-FCL) countries. All countries are observed over  $T = T_0 + T_1$  periods, with  $T_0$  and  $T_1$  the number of pre- and post-FCL periods, respectively. The actually observed outcome  $y_{it}$  for country  $i$  at time  $t$  is therefore:

$$y_{it} = y_{it}^{NFCL} + \tau_{it}D_{it} \quad (3)$$

with

$$D_{it} = \begin{cases} 1 & \text{if } i = 1 \text{ and } t > T_0 \\ 0 & \text{otherwise} \end{cases}$$

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<sup>49</sup>[Abadie and Gardeazabal \(2003\)](#) use their synthetic control method to evaluate the influence of ETA terrorism on economic growth in the Basque Country, whereas [Abadie et al. \(2010\)](#) estimate the effect of a Californian tobacco control programme on cigarette sales and [Abadie et al. \(2015\)](#) the growth impact of the reunification of East and West Germany. Other notable studies applying the same methodology to topics in international economics and beyond include [Castaneda and Vargas \(2012\)](#), [Cavallo et al. \(2013\)](#), [duPont and Noy \(2015\)](#) and [Pinotti \(2015\)](#) on the economic costs of conflicts and natural disasters; [Nannicini and Billmeier \(2011\)](#), [Billmeier and Nannicini \(2013\)](#) and [Campos et al. \(2014\)](#) on the consequences of economic liberalisation and integration; and [Jinjarak et al. \(2013\)](#) and [Chamon et al. \(2015\)](#) on the effects of capital controls and foreign exchange interventions.



under the assumption that the FCL has neither an effect on outcomes before the signing of the FCL arrangement in period  $T_0 + 1$ , nor on non-FCL countries. Our aim is to estimate, for  $t > T_0$ :

$$\tau_{1t} = y_{1t}^{FCL} - y_{1t}^{NFCL} = y_{1t} - y_{1t}^{NFCL} \quad (4)$$

whereby  $y_{1t}$  is observed but counterfactual  $y_{1t}^{NFCL}$  is not. [Abadie et al. \(2010\)](#) show how to identify the vector  $(\tau_{1T_0+1}, \tau_{1T_0+2}, \dots, \tau_{1T})$  when  $y_{it}^{NFCL}$  can be described by a general factor model of the following form:

$$y_{it}^{NFCL} = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \quad (5)$$

where  $\delta_t$  is a time-varying factor common across countries;  $Z_i$  is a vector of observed time-varying and/or time-invariant covariates (unaffected by the FCL);  $\theta_t$  is a vector of unknown parameters;  $\mu_i$  is a time-varying country-specific term;  $\lambda_t$  is a vector of unobserved common factors; and error terms  $\varepsilon_{it}$  are zero-mean transitory shocks. Now define a generic  $N \times 1$  vector of weights  $W = (w_2, w_3, \dots, w_{N+1})'$  with  $w_i \geq 0$  for  $i = 2, 3, \dots, N+1$  and  $\sum_{i=2}^{N+1} w_i = 1$ . Each possible vector  $W$  corresponds to a potential synthetic control, i.e., a weighted average of control countries for country  $i = 1$ . Also, consider  $\bar{y}_i^k = \sum_{s=1}^{T_0} k_s y_{is}$  to be a generic linear combination of pre-FCL outcomes. [Abadie et al. \(2010\)](#) demonstrate that if one chooses weights  $w_2^*, w_3^*, \dots, w_{N+1}^*$  so that

$$\sum_{i=2}^{N+1} w_i^* \bar{y}_i^k = \bar{y}_1^k \quad (6)$$

and

$$\sum_{i=2}^{N+1} w_i^* Z_i = Z_1 \quad (7)$$

then

$$\hat{\tau}_{1t} = y_{1t} - \sum_{i=2}^{N+1} w_i^* y_{it} \quad (8)$$

is an unbiased estimator of the dynamic effect of the FCL on country  $i = 1$  ( $\tau_{1t}$ ) for  $t = T_0 + 1, T_0 + 2, \dots, T$ . Generally, however, no weights exist such that equations (6) and (7) hold exactly and the goal thus becomes to construct a synthetic control so that they hold approximately. [Abadie et al. \(2010\)](#) propose minimising, in a non-parametric fashion and with respect to  $W^*$ , the distance between a vector of pre-FCL characteristics of the FCL country and a vector of pre-FCL characteristics of the synthetic control. More specifically,

if  $X_1$  is a vector of  $m$  pre-FCL characteristics of the FCL country and  $X_0$  a matrix that collects the vectors of the same  $m$  pre-FCL characteristics of all  $N$  non-FCL countries in the donor pool, the objective is to set  $W^*$  optimally so as to minimise

$$\| X_1 - X_0W \|_V = \sqrt{(X_1 - X_0W)' V (X_1 - X_0W)} \quad (9)$$

where  $V$  is a  $m \times m$  symmetric and positive semidefinite matrix whose diagonal elements reflect the relative importance attached to the pre-FCL variables in  $X_0$  and  $X_1$ . There are different possible ways of choosing  $V$ , including a subjective, theory-based assessment of the predictive power for the outcome of interest of each of the pre-FCL characteristics. The most intuitive (and most commonly employed) approach is to let the data speak and select the  $V$  that minimises the root mean squared prediction error (RMSPE) of the outcome variable over the pre-FCL periods, defined as:

$$RMSPE = \sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} \left( y_{1t} - \sum_{i=2}^{N+1} w_i^* y_{it} \right)^2} \quad (10)$$

In other words, we look for the  $V$  that delivers the best fit between the path of outcomes for the FCL country and for the synthetic control before the FCL arrangement was agreed upon.<sup>50</sup> To facilitate comparison of the various synthetic control experiments we conduct across countries and outcome variables we employ a normalised ‘fit index’, as suggested by [Adhikari and Alm \(2016\)](#) and [Newiak and Willems \(2017\)](#):

$$Fit\ index = \frac{\sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} \left( y_{1t} - \sum_{i=2}^{N+1} w_i^* y_{it} \right)^2}}{\sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} (y_{1t})^2}} \quad (11)$$

where the numerator is the standard pre-treatment RMSPE of equation (10) and the denominator is the RMSPE derived from the zero-fit model, basically measuring the time variability of the observed outcome of interest in the FCL country. This fit index has a very intuitive interpretation. In case of a perfect fit the index would be zero, whereas an index of one or more would indicate a particularly poor fit ([Adhikari and Alm, 2016](#)). Generally, however,

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<sup>50</sup>An alternative approach, referred to by [Abadie et al. \(2015\)](#) as ‘cross-validation’, splits the pre-treatment period into a so-called ‘training’ period and a ‘validation’ period and then proceeds in two steps. First, using optimal donor unit weights  $W$  based on the training period values of the predictor variables, matrix  $V$  is selected to minimise the out-of-sample RMSPE over the validation period. In a second step, the just-selected  $V$  is used as an input to find a new set of optimal country weights  $W'$  that minimises the differences in predictor variables between the treated unit and its synthetic control over the validation period. In spite of some concerns with this approach (see [Klößner et al., 2017](#)), we have also run, as a robustness check, all our synthetic control experiments using cross-validation. The estimated FCL effects are broadly similar to those presented in Sections 4.3.1 and 4.3.2. All additional results are available from the authors upon request.



the fit index yields a number  $q$  between zero and one, which is equivalent to a fit whereby the difference in the outcome variable between the treated and synthetic control unit is  $q \times 100\%$  in each pre-treatment period.

An interesting feature of the synthetic control method is that it makes explicit the relative contributions of the different control units to the synthetic counterfactual, as well as the similarities in characteristics between the treated country and the counterfactual (allowing one to judge the degree to which equations (6) and (7) are satisfied). Whereas standard regression estimators also (implicitly) rely on weighting untreated countries with coefficients that sum to one, individual regression weights are unrestricted and can take on negative values or values exceeding one (see Abadie et al., 2015). By restricting country weights to lie between zero and one, the synthetic control estimator avoids extrapolation outside the support of the data. It is a comparative case study methodology that can be implemented without the need for large cross-sectional samples or a minimum frequency of interventions. Furthermore, the synthetic control method extends the traditional difference-in-differences panel estimator by permitting the effects of confounding, unobserved variables to vary over time.<sup>51</sup>

There are, however, also limitations to this methodology (see Abadie, 2011, for a summary). Proper identification under the synthetic control estimator requires the effect of the intervention to be large relative to the idiosyncratic volatility of the outcome variable. We have no clear priors about the order of magnitude of potential FCL effects vis-à-vis outcome variations due to other factors, but remove excessive volatility by monthly averaging daily bond spreads and by taking four-quarter moving sums of capital inflows (see further). Restricting the donor pool to countries that resemble the FCL country in the determinants of bond spreads and capital inflows and that were not subject to structural shocks to these outcome variables over the sample period further limits the role of idiosyncratic volatility. Removing (extreme) outliers from the donor pool also helps to mitigate *interpolation* biases, which may be substantial when the synthetic control matches the FCL country by averaging away large differences between the characteristics of the FCL country and of the non-FCL countries constituting the control.

As stated above, the synthetic control estimator assumes that economic agents do not act in anticipation of the intervention under study and that there are no spill-over effects from the intervention to the comparator countries. In our case, anticipation effects by investors are believed to have been limited, since the FCL arrangements of Mexico, Colombia and Poland were signed shortly after the FCL instrument was created by the IMF. Any remaining anticipation effects in the intervening periods should lead us to underestimate

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<sup>51</sup>In fact, the synthetic control method can be regarded as a generalisation of the typical difference-in-differences (DID) model. By taking time differences the DID estimator eliminates the effect of time-invariant unobserved confounders on the outcome variable. However, it is not well-suited to deal with any remaining time-varying unobserved heterogeneity (non-parallel trends in the outcomes of treated and control units), i.e.,  $\lambda_t \mu_i$  in the factor model described by equation (5). The synthetic control estimator overcomes this problem by searching for a weighted combination of untreated units that fits, as closely as possible, the observed pre-treatment characteristics *and* a long set of pre-treatment outcomes. Abadie et al. (2010) formally show that, under relatively mild conditions, such a fit can only be achieved if the synthetic control matches well both the observed covariates and the unobserved time-varying component of the treated unit's outcome variable. See also Athey and Imbens (2017), which situate synthetic control methods within the broader family of econometric techniques used for policy evaluation.

the true effect of the FCL. The IMF itself argues that the FCL had beneficial spill-overs to a select number of countries beyond Mexico, Colombia and Poland that market participants perceived as potential FCL qualifiers (on EMBI spreads, see [IMF, 2011](#); on EMBI spreads and bond fund flows, see [IMF, 2014](#)). To neutralise the impact of spill-overs we can exclude particular countries from our donor pools. However, such exclusions could come at a cost. Some of the non-FCL countries that are most likely to experience spill-over effects may be those whose pre-FCL characteristics are closest to the characteristics of the FCL countries (because that is why market participants regard them as FCL qualifiers). In our analysis we will experiment with different donor pools. We keep in mind that in the presence of positive spill-overs our synthetic controls will again result in lower-bound, conservative estimates of the genuine effects of the FCL.

A last drawback of the synthetic control method is that the significance of the estimated effects cannot be readily assessed based on standard, large-sample techniques of inference. However, as demonstrated by [Abadie et al. \(2010\)](#), ‘placebo’ tests can be employed to make inferences instead. The idea is to construct a separate synthetic control for each country in the donor pool (as if it were the FCL country of interest), contrast the trajectories of the observed and synthetic outcomes per country, and then compare the estimated placebo treatment effects  $\tau_{it}$  (for  $i = 2, 3, \dots, N + 1$ ) with the treatment effect  $\tau_{1t}$  for the actual FCL country. Confidence that a large  $\tau_{1t}$  reflects the impact of the FCL would shrink if its size falls well inside the distribution of placebo effects  $\tau_{it}$ , obtained by artificially reassigning the FCL arrangement to non-FCL countries.

#### 4.2.2 Variable and donor pool selection

We use the synthetic control methodology to estimate the effect of the FCL arrangements of Mexico, Colombia and Poland on two proxies of market confidence: first, external financing costs as measured by monthly-averaged EMBI Global country stripped spreads (in basis points); and second, four-quarter moving sums of gross capital inflows, expressed as a percentage of GDP.<sup>52</sup>

Our choice of pre-treatment characteristics, which should ideally be strong predictors of post-FCL outcomes, is informed by the literatures on the domestic determinants of bond spreads and capital inflows (as well as data availability in our samples). As potential drivers of EMBI spreads we select year-on-year real GDP growth, international reserves to GDP, general government gross debt to GDP, and the current account balance to GDP (see, e.g., [Dailami et al., 2008](#); [Martinez et al., 2013](#); [Csonto, 2014](#); [Kennedy and Palerm, 2014](#)); all of which are monthly interpolated from yearly or quarterly data available in the World Economic Outlook (WEO), International Financial Statistics (IFS) and Thomson Reuters International Comparable Economics (TRICE) databases. Year-on-year real GDP growth, the Chinn-Ito index of capital account openness and the EIU overall country risk rating, all at quarterly frequency, are taken as drivers of capital inflows (see, e.g., [Forbes and Warnock, 2012](#); [Erce and Riera-Crichton, 2015](#)). Similar to most other synthetic control studies and

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<sup>52</sup>Gross capital inflows are defined as in [Forbes and Warnock \(2012\)](#) and [Broner et al. \(2013\)](#), i.e., the net purchases of domestic assets by non-residents (or, the sum of all increases in direct investment, portfolio and other investment liabilities). Information on gross asset trades by foreigners is not systematically available from centralised balance of payments statistics.

to improve the pre-treatment fit, we augment the lists of predictors with pre-FCL values of the outcome variables. In the optimisation of objective function (9) we average the different predictors over all pre-intervention periods.<sup>53</sup>

Balancing data availability on the outcome variables with the need to have a sufficient number of pre-intervention periods, we begin our series of EMBI spreads and capital inflows, for which RMSPEs should be minimised, in January 2005 and 2005Q4, respectively. April 2009 (2009Q2) is taken as the period in which the Mexican FCL arrangement was agreed (i.e., the first post-intervention period or  $T_0 + 1$ ). The agreement on the FCL arrangements of Colombia and Poland is dated May 2009 (also 2009Q2). We will compare the actual and synthetic outcome variables all the way up to December 2014 (2014Q4) to study possible longer-term effects.

For the construction of our donor pools we start again from the group of emerging markets included in the EMBI Global at the time the FCL was introduced by the IMF, minus the FCL countries themselves. Countries whose EMBI spreads (capital inflow data) could not be retrieved for the whole January 2005-December 2014 (2005Q4-2014Q4) time span are dropped. We further exclude Argentina, the Dominican Republic, Ecuador, Pakistan, Ukraine and Venezuela from the EMBI spread donor pools, as all of these countries registered spreads well in excess of 1000 basis points at some point in the sample period (largely because of idiosyncratic reasons). For each FCL country and each outcome variable we conduct two synthetic control experiments: one with the full donor pool as just described, and one with the donor pool restricted to regional comparator countries only. Appendix Table A5 gives the full composition of donor pools for our 12 synthetic controls.

## 4.3 Results from synthetic controls<sup>54</sup>

### 4.3.1 Effects of the FCL on EMBI spreads

#### *Mexico*

Figure 1 and Table 3 present the results of the synthetic control methodology applied to Mexican EMBI spreads. Panel (a) of Figure 1 shows the trajectory of EMBI spreads for Mexico and its synthetic counterpart constructed from the full donor pool. It is clear that the synthetic Mexico, which is a combination of Chile (with weight 0.359), Brazil (0.293), Hungary (0.201), South Africa (0.086) and El Salvador (0.061), mimics the real Mexico very well in terms of pre-FCL spreads. Table 3 demonstrates that there is also a good match with

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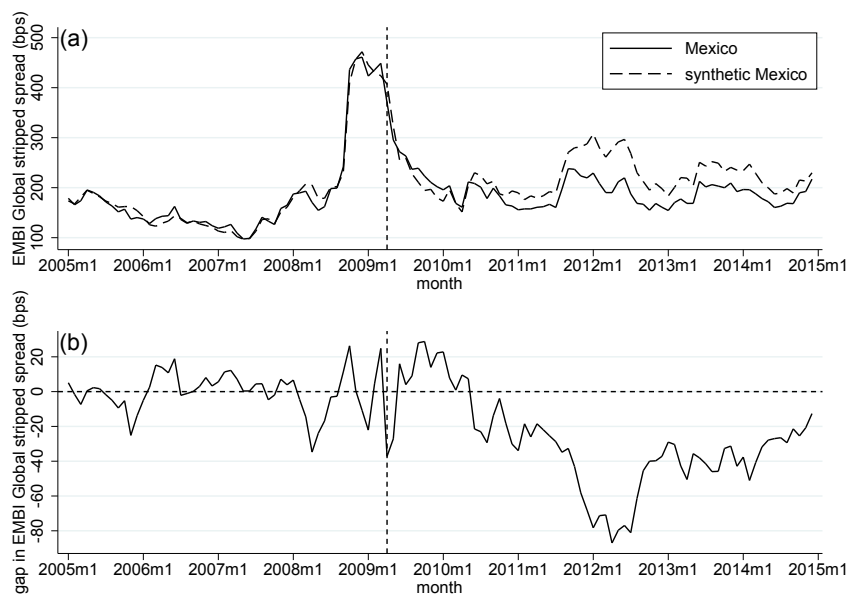
<sup>53</sup>Some studies employing synthetic controls, including Nannicini and Billmeier (2011) and Billmeier and Nannicini (2013), use *all* pre-treatment values of the outcome variable as *separate* predictor variables in the optimisation, to improve the fit (i.e., to minimise the RMSPE). We refrain from this practice as including the entire pre-treatment path of outcomes renders all other covariates irrelevant and may lead to significant bias in the estimator (see Kaul et al., 2016). Instead, we include *averages* of pre-treatment EMBI spreads/capital inflows as one single predictor.

<sup>54</sup>All results were obtained using Stata’s *synth* command, written by Alberto Abadie and his collaborators. We use the *nested* and *alloyd* options, which deliver the most statistically robust results. *Nested* employs a fully nested optimisation procedure that searches among all possible  $V$ s and sets of  $W$  for the best-fitting convex combination of control countries. *Alloyd* provides an extra robustness check in running the nested optimisation for three different starting points of  $V$  (so as to increase chances of finding global rather than local optima) and returns the best result (with the lowest RMSPE) of all three attempts.

respect to spread predictors, although averaged reserves are somewhat higher in the synthetic Mexico. Our estimate of the effect of the FCL on Mexican EMBI spreads is given by the gap between actual Mexican spreads and their synthetic version, as visualised in panel (b) of Figure 1. The Mexican spread first went about 37 basis points below its counterfactual when the FCL was signed in April 2009, but then exceeded it by a small margin in the months thereafter. From June 2010 onwards, however, actual Mexican spreads always remained below the synthetic spreads. The largest gaps, around 70-80 basis points, are observed from end-2011 to mid-2012, which coincides with an intensification of the Eurozone crisis. We will check the significance of these effects when discussing our placebo tests (see further).

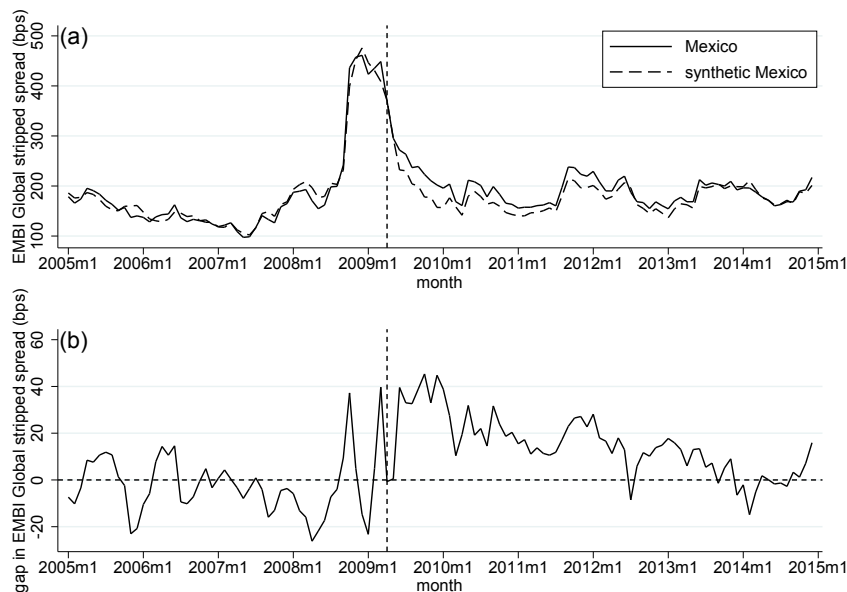
Figure 2 and the last column of Table 3 contain the synthetic control results for Mexican EMBI spreads when the donor pool is restricted to Latin American countries. Again we see a close pre-FCL match in spreads between Mexico and the synthetic control (which now consists of Chile, Panama, Brazil and El Salvador, in decreasing order of weights). That said, the pre-FCL RMSPE and fit index are somewhat (14%) higher than when the donor pool was unrestricted and also the matching of covariates is less strong. Moreover, taking the regional synthetic control results at face value, the Mexican FCL arrangement does not seem to have lowered the country’s spreads; on the contrary, Mexican spreads are slightly higher than the estimated synthetic spreads over the post-FCL period.

Figure 1: Evolution of and gap between EMBI spreads of Mexico and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Chile (0.359), Brazil (0.293), Hungary (0.201), South Africa (0.086) and El Salvador (0.061). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Mexican FCL arrangement was agreed (April 2009).

Figure 2: Evolution of and gap between EMBI spreads of Mexico and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Chile (0.493), Panama (0.378), Brazil (0.067) and El Salvador (0.062). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Mexican FCL arrangement was agreed (April 2009).

Table 3: Pre-FCL match of EMBI spreads and covariates between Mexico and synthetic controls (full and regional donor pools)

	Mexico	Synthetic Mexico (full donor pool)	Synthetic Mexico (regional donor pool)
<i>EMBI spread (bps)</i>	186.67	186.68	188.91
<i>Real GDP growth (%)</i>	3.31	4.45	6.41
<i>Reserves (% of GDP)</i>	8.29	12.05	10.25
<i>Public debt (% of GDP)</i>	39.29	39.28	31.55
<i>Current account balance (% of GDP)</i>	-1.27	-1.43	-1.99
RMSPE		11.70	13.34
Fit index		0.06	0.06

Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 1 and 2. Variables as defined in Section 4.2.2. Values shown for EMBI spreads and covariates are averages over January 2005 - March 2009. RMSPE and fit index as defined in Section 4.2.1.

## Colombia

Applied to the full donor pool the synthetic control algorithm has greater difficulties with approximating Colombia’s EMBI spreads before its first FCL arrangement, although on average spread covariates are very similar (see Figure 3 and Table 4).<sup>55</sup> Observed spreads are up to 125 basis points lower than synthetic spreads in the years following Colombia’s signing of its FCL, but so are they in the months running up to the global financial and economic crisis. It therefore seems not much can be learned from this particular experiment.

Restricting the donor pool to the Latin American region enables a more successful matching of Colombian EMBI spreads; the fit index is reduced by two-thirds to 7% (see Figure 4 and Table 4), approaching those of the Mexican synthetic controls (in Table 3).<sup>56</sup> With the exception of public debt, average values of the covariates are very similar between Colombia and its synthetic control composed of Brazil, Panama, El Salvador, Chile and Peru (again in decreasing order of weights). The results suggest a divergence between actual and synthetic spreads, but only from mid 2010 onwards. The estimated effect of the FCL goes up to 80-90 basis points around mid-2012 and early 2014.

Table 4: Pre-FCL match of EMBI spreads and covariates between Colombia and synthetic controls (full and regional donor pools)

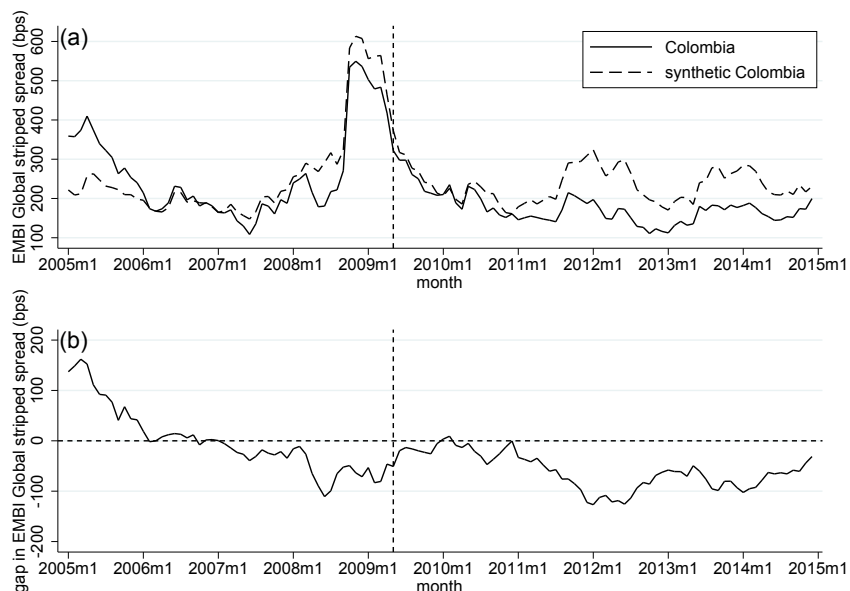
	Colombia	Synthetic Colombia (full donor pool)	Synthetic Colombia (regional donor pool)
<i>EMBI spread (bps)</i>	263.03	263.11	262.8
<i>Real GDP growth (%)</i>	5.40	5.41	5.40
<i>Reserves (% of GDP)</i>	10.03	11.19	10.02
<i>Public debt (% of GDP)</i>	35.48	35.47	54.26
<i>Current account balance (% of GDP)</i>	-2.14	-2.12	-2.14
RMSPE		64.43	20.41
Fit index		0.22	0.07

Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 3 and 4. Variables as defined in Section 4.2.2. Values shown for EMBI spreads and covariates are averages over January 2005 - April 2009. RMSPE and fit index as defined in Section 4.2.1.

<sup>55</sup>The fact that 14 out of 16 countries in the donor pool get assigned positive but (mostly) very small weights testifies to the difficulty of matching in this case.

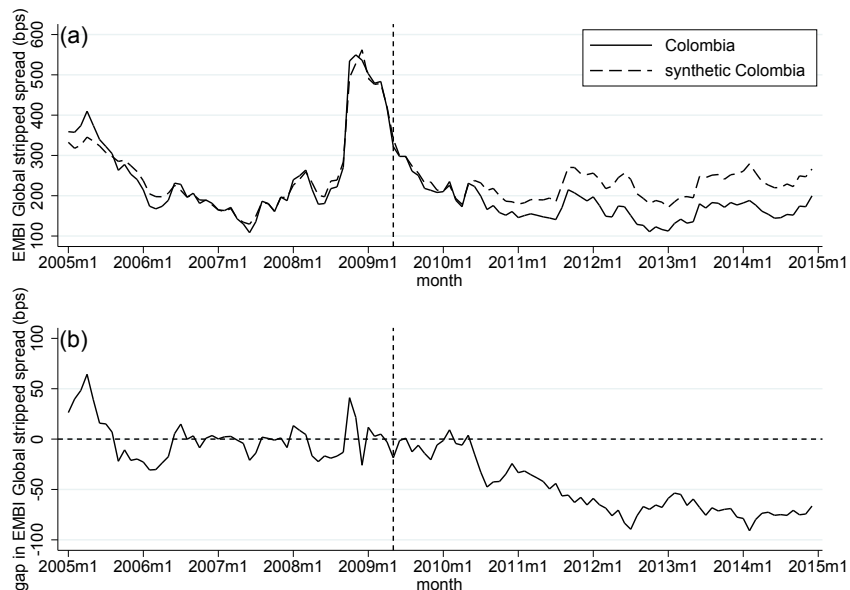
<sup>56</sup>In theory, optimisation in the full set of donor pool countries, which encompasses the regional donor pool, should result in a better fit (i.e., a lower RMPSE and fit index). In practice this is not always the case, however (see also Billmeier and Nannicini, 2013, p. 991, Tables 8-9), because of the relatively challenging optimisation problem the synthetic control methodology postulates (which involves the optimisation of both country and variable weights; see Section 4.2.1). According to preliminary work by Becker and Klößner (2017), the optimising algorithms designed by Alberto Abadie and his collaborators cannot guarantee finding the true global optimum. Here the synthetic control results for Colombia’s full donor pool thus represent a local optimum.

Figure 3: Evolution of and gap between EMBI spreads of Colombia and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Turkey (0.511), Indonesia (0.216), Chile (0.212), El Salvador (0.047) and ten other countries (with weights of maximum 0.003). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Colombian FCL arrangement was agreed (May 2009).

Figure 4: Evolution of and gap between EMBI spreads of Colombia and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Brazil (0.491), Panama (0.237), El Salvador (0.168), Chile (0.062) and Peru (0.041). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Colombian FCL arrangement was agreed (May 2009).

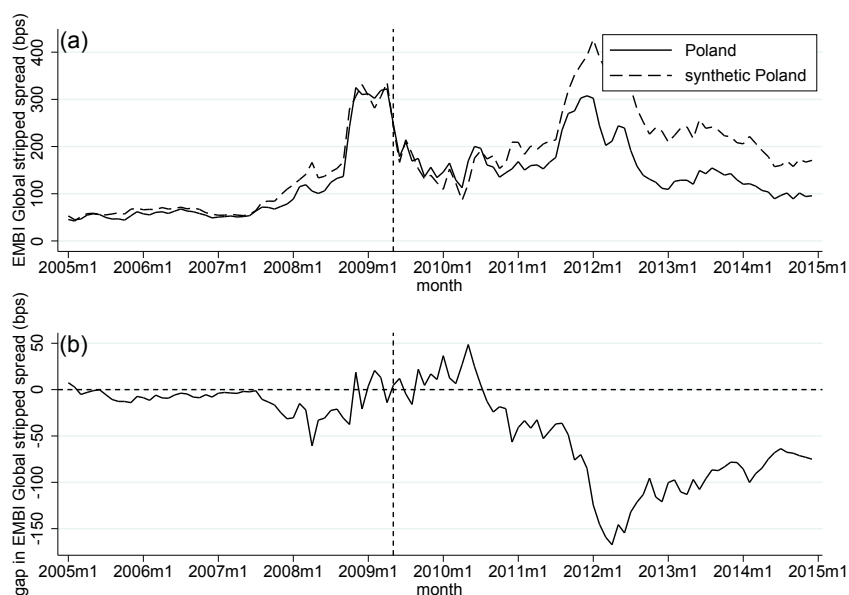


## Poland

In a full donor pool the synthetic control algorithm approximates Polish EMBI spreads with a weighted average of Chinese (0.613) and Hungarian (0.387) spreads. Whereas the matching of pre-FCL spreads appears to be relatively close (with a fit index of 13%), differences in other spread predictors between Poland and its synthetic version are considerable (see Figure 5 and Table 5). Due to the inclusion of China, average growth, reserves and the current account balance of the synthetic Poland are much higher than those of actual Poland, which could complicate the comparison of post-FCL outcomes (if growth, reserves and the current account position are indeed important predictors of EMBI spreads in the post-FCL period). We see Polish spreads dive below their estimated counterfactual mid-2010. The gap reaches its maximum (of more than 150 basis points) early 2012, when the Eurozone crisis came to a boiling point.

For the regional donor pool of Poland we are restricted by data availability and consider only Hungary, Turkey (emerging European countries) and Russia (a CIS country) as potential controls. The algorithm selects Hungary as a single comparator. Matching of pre-FCL spreads is very poor, however (especially during the peak of the global crisis), so we discard the estimated effects (Figure 6 and Table 5).

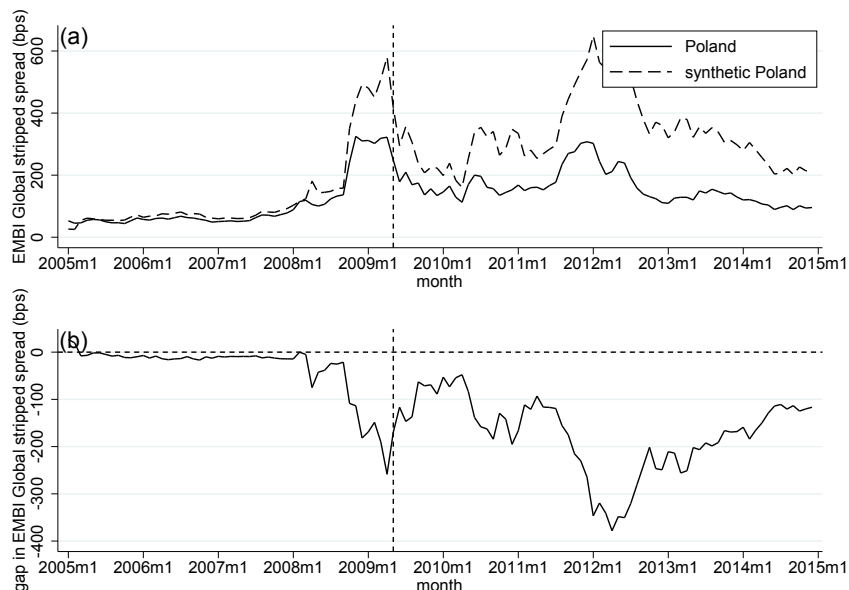
Figure 5: Evolution of and gap between EMBI spreads of Poland and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are China (0.613) and Hungary (0.387). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Polish FCL arrangement was agreed (May 2009).



Figure 6: Evolution of and gap between EMBI spreads of Poland and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Hungary is the only control country (with a weight of 1). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A6. Vertical dashed line indicates month first Polish FCL arrangement was agreed (May 2009).

Table 5: Pre-FCL match of EMBI spreads and covariates between Poland and synthetic controls (full and regional donor pools)

	Poland	Synthetic Poland (full donor pool)	Synthetic Poland (regional donor pool)
<i>EMBI spread (bps)</i>	100.43	111.01	133.42
<i>Real GDP growth (%)</i>	5.09	7.84	2.56
<i>Reserves (% of GDP)</i>	18.32	31.39	17.85
<i>Public debt (% of GDP)</i>	46.47	45.69	65.04
<i>Current account balance (% of GDP)</i>	-4.23	2.42	-6.84
RMSPE		17.55	66.09
Fit index		0.13	0.50

Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 5 and 6. Variables as defined in Section 4.2.2. Values shown for EMBI spreads and covariates are averages over January 2005 - April 2009. RMSPE and fit index as defined in Section 4.2.1.

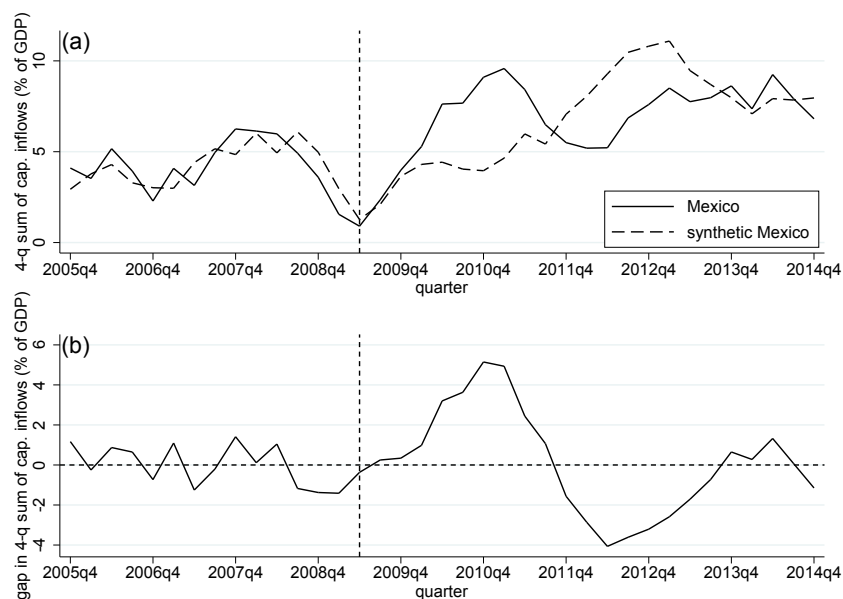
### 4.3.2 Effects of the FCL on gross capital inflows

#### Mexico

Figure 7 and Table 6 show the synthetic control outcomes for gross capital inflows into Mexico when considering the full donor pool. Pre-FCL capital inflows into synthetic Mexico, a weighted average of Sri Lanka (0.542), Chile (0.280) and Peru (0.178), fit the observed capital inflows reasonably well (despite the fit index of 23% being significantly higher than the corresponding indices in the EMBI spread synthetic controls). And with the exception of real GDP growth, the average pre-FCL values of capital flow predictors are very similar too between Mexico and its synthetic version. The effects of the FCL on capital inflows are estimated to be positive between end-2009 and end-2011 (up to an extra five percentage points of GDP in 2010Q4) and, surprisingly, negative between end-2011 and end-2013. The significance of these effects will again be evaluated against placebo effects (see further).

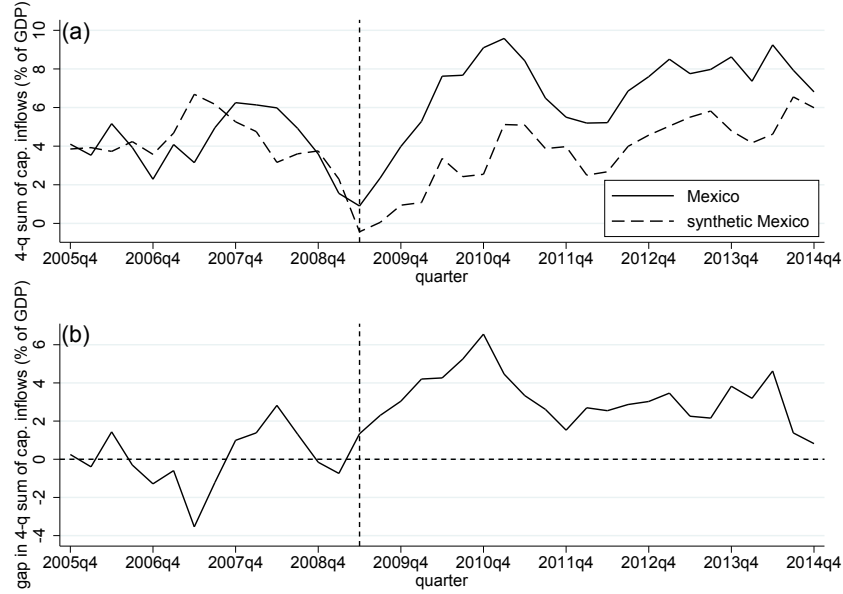
Restricting the donor pool to the Latin American region results in a considerably worse match of pre-FCL capital flows (with an increase in the fit index of almost 50%) (see Figure 8 and Table 6). We still observe the largest positive effects of the FCL over 2010-2011, but no longer the unexpected negative effects over 2012-2013.

Figure 7: Evolution of and gap between gross capital inflows into Mexico and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Sri Lanka (0.542), Chile (0.280) and Peru (0.178). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Mexican FCL arrangement was agreed (2009Q2).

Figure 8: Evolution of and gap between gross capital inflows into Mexico and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Ecuador (0.434), El Salvador (0.358) and Brazil (0.208). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Mexican FCL arrangement was agreed (2009Q2).

Table 6: Pre-FCL match of gross capital inflows and covariates between Mexico and synthetic controls (full and regional donor pools)

	Mexico	Synthetic Mexico (full donor pool)	Synthetic Mexico (regional donor pool)
<i>4-quarter gross capital inflows (% of GDP)</i>	4.26	4.26	4.26
<i>Real GDP growth (%)</i>	2.47	6.01	3.77
<i>Capital account openness index</i>	0.70	0.70	0.91
<i>Overall country risk rating</i>	35.31	41.5	50.84
RMSPE		1.01	1.50
Fit index		0.23	0.34

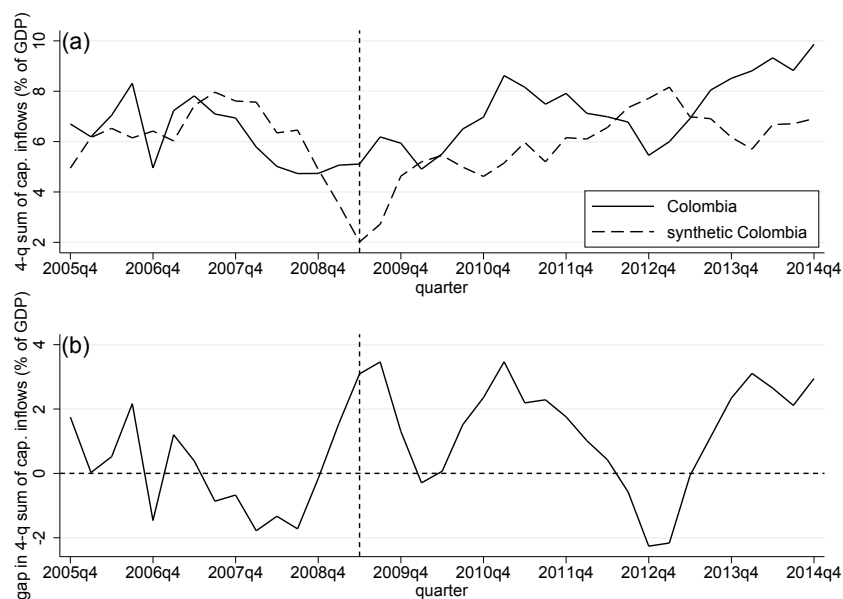
Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 7 and 8. Variables as defined in Section 4.2.2. Values shown for capital inflows and covariates are averages over 2005Q4 - 2009Q1. RMSPE and fit index as defined in Section 4.2.1.

## Colombia

Similar as with Colombia's EMBI spreads the synthetic control algorithm has some difficulties with finding a good weighted country combination that closely tracks Colombia's pre-FCL capital inflows, in spite of very similar average values for the covariates and an acceptable (20%) overall fit index (see Figure 9 and Table 7).<sup>57</sup> The results indicate that capital inflows into Colombia exceeded their estimated counterfactual for most of the post-FCL quarters, except for 2012Q3-2013Q2, with peaks up to 3.5 percentage points of GDP.

The matching worsens in the regional donor pool (with a 40% higher fit index), where a weighted combination of Argentina and Chile is selected to approximate pre-FCL Colombia (see Figure 10 and Table 7). Nevertheless, the estimated effects of the FCL on Colombian capital inflows follow a similar trajectory as in the full donor pool experiment.

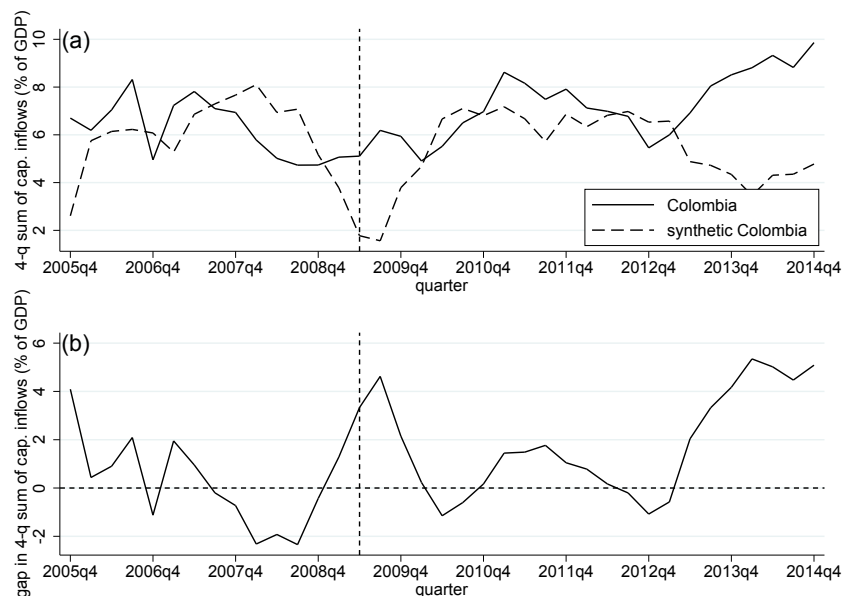
Figure 9: Evolution of and gap between gross capital inflows into Colombia and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Sri Lanka (0.244), Chile (0.197), South Africa (0.185), Pakistan (0.117), Philippines (0.065), China (0.035), Brazil (0.031), Argentina (0.022) and 12 other countries (with weights of maximum 0.017). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Colombian FCL arrangement was agreed (2009Q2).

<sup>57</sup>In this case *all* countries in the donor pool get assigned (mostly small) positive weights.

Figure 10: Evolution of and gap between gross capital inflows into Colombia and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Argentina (0.686) and Chile (0.314). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Colombian FCL arrangement was agreed (2009Q2).

Table 7: Pre-FCL match of gross capital inflows and covariates between Colombia and synthetic controls (full and regional donor pools)

	Colombia	Synthetic Colombia (full donor pool)	Synthetic Colombia (regional donor pool)
<i>4-quarter gross capital inflows (% of GDP)</i>	6.26	6.29	6.07
<i>Real GDP growth (%)</i>	5.07	5.09	5.32
<i>Capital account openness index</i>	0.48	0.48	0.50
<i>Overall country risk rating</i>	43.60	43.79	44.33
RMSPE		1.29	1.79
Fit index		0.20	0.28

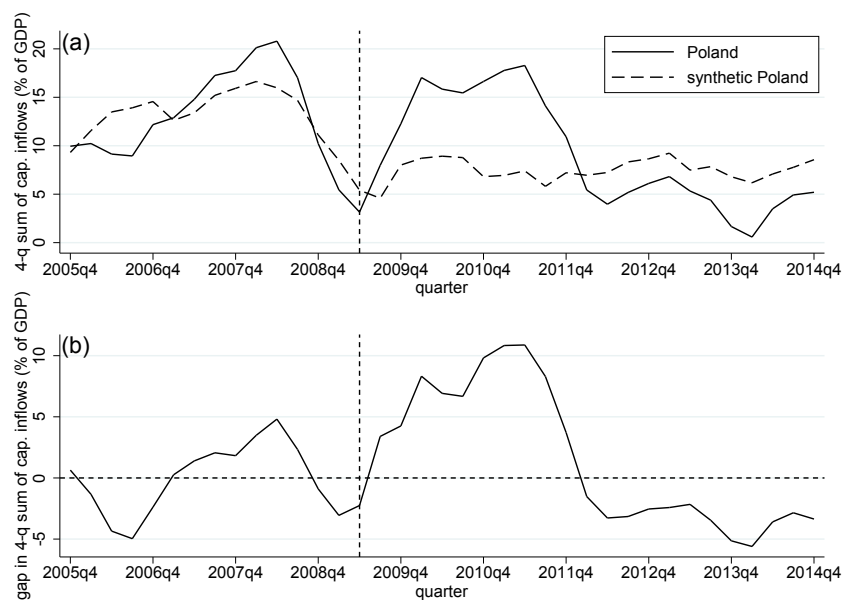
Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 9 and 10. Variables as defined in Section 4.2.2. Values shown for capital inflows and covariates are averages over 2005Q4 - 2009Q1. RMSPE and fit index as defined in Section 4.2.1.

## Poland

Pre-FCL capital inflows into Poland are reasonably well matched by a synthetic control of inflows into South Africa, Chile, Bulgaria and China (and a number of other countries with very small weights), and so are Poland's other pre-FCL characteristics (see Figure 11 and Table 8). The estimated effect of the FCL on capital inflows is positive from 2009Q3 to 2011Q4 and large, up to 11 percentage points of GDP in 2011Q1 and 2011Q2. From 2012 onwards, in the wake of the Eurozone crisis, the differences between observed and synthetic Polish capital inflows are estimated as being negative, albeit smaller in absolute value than the earlier positive differences.

The regional donor pool of Poland is limited to Bulgaria, Hungary (both emerging Europe), Kazakhstan and Russia (both CIS), again due to data availability. Russia (0.875) and Bulgaria (0.125) are now selected to form the regional synthetic control for Poland. The result is a much improved pre-FCL fit (with a fit index that is reduced by half, to 10%) (see Figure 12 and Table 8). Again a large positive FCL effect is estimated for the periods up to early 2012. The subsequent negative effects are less pronounced than in the case of the full donor pool.

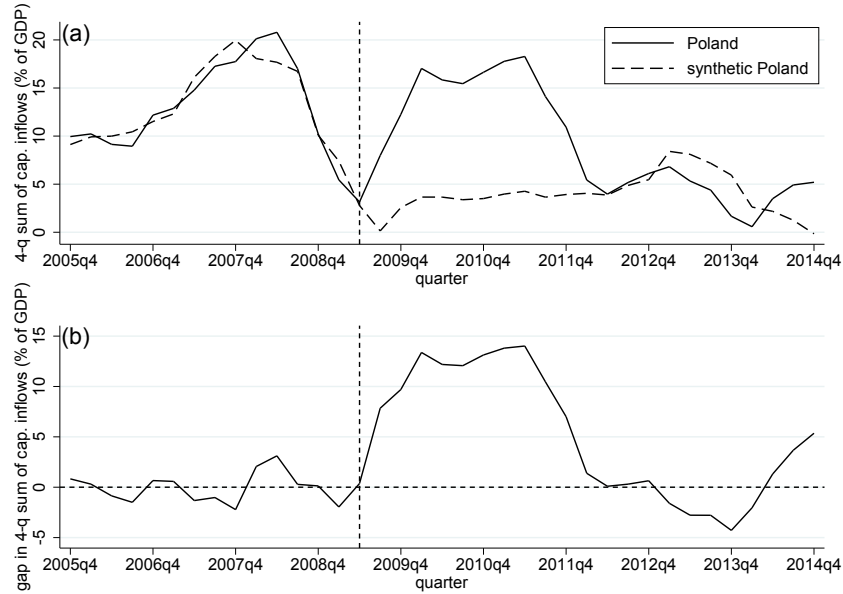
Figure 11: Evolution of and gap between gross capital inflows into Poland and synthetic control (full donor pool)



Notes: Composition of full donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are South Africa (0.444), Chile (0.267), Bulgaria (0.172), China (0.104) and 8 other countries (with weights of maximum 0.003). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Polish FCL arrangement was agreed (2009Q2).



Figure 12: Evolution of and gap between gross capital inflows into Poland and synthetic control (regional donor pool)



Notes: Composition of regional donor pool as presented in Appendix Table A5. Countries included in the synthetic control (and their respective weights) are Russia (0.875) and Bulgaria (0.125). Predictor variable weights (diagonal elements of  $V$ ) as listed in Appendix Table A7. Vertical dashed line indicates quarter first Polish FCL arrangement was agreed (2009Q2).

Table 8: Pre-FCL match of gross capital inflows and covariates between Poland and synthetic controls (full and regional donor pools)

	Poland	Synthetic Poland (full donor pool)	Synthetic Poland (regional donor pool)
<i>4-quarter gross capital inflows (% of GDP)</i>	13.34	13.35	13.40
<i>Real GDP growth (%)</i>	5.23	5.22	5.43
<i>Capital account openness index</i>	0.45	0.51	0.47
<i>Overall country risk rating</i>	36.31	36.24	43.12
RMSPE		2.83	1.47
Fit index		0.20	0.10

Notes: Composition of full and regional donor pools as presented in Appendix Table A5. Countries included in the synthetic controls (and their respective weights) same as in Figures 11 and 12. Variables as defined in Section 4.2.2. Values shown for capital inflows and covariates are averages over 2005Q4 - 2009Q1. RMSPE and fit index as defined in Section 4.2.1.

### 4.3.3 Placebo tests

To further investigate whether the estimated effects of the FCL on Mexican, Colombian and Polish EMBI spreads and capital inflows are statistically significant or rather coincidental, we run a series of placebo experiments. As described above, placebos for the FCL's effects on FCL participants are constructed by iteratively applying the synthetic control method to all other, non-FCL countries in the donor pool.<sup>58</sup> If the post-FCL gaps between actual and synthetic EMBI spreads/capital inflows for Mexico/Colombia/Poland, estimated in the previous sections, are large relative to the corresponding gaps for countries that did not enter into FCL arrangements, then this would strengthen our interpretation of the first gaps as evidence of the effects of the FCL.

Figures 13 and 14 collect the results of our placebo tests. We conduct such tests for the cases where the closest matching between actual and synthetic pre-FCL outcome variables was achieved (i.e., where we observed the lowest pre-FCL RMSPEs and fit indices): Mexican and Polish EMBI spreads with the full donor pool; Colombian spreads with the regional donor pool; Mexican and Colombian capital inflows with the full donor pool; and Polish capital inflows with the regional donor pool. As [Abadie et al. \(2010\)](#) point out, for the purpose of evaluating the relative rarity of large post-intervention gaps it makes little sense to compare between cases with a good pre-intervention fit and placebos with a very poor fit. Therefore, we exclude from Figures 13 and 14 the placebos that have a pre-FCL RMSPE that is much larger than the pre-FCL RMSPE of the synthetic control for the FCL country in question.<sup>59</sup>

Panel (a) of Figure 13 indicates that the estimated effects of the FCL on Mexican EMBI spreads are not significant, as we find several placebo effects of similar or even greater magnitude when assigning the FCL intervention to the non-FCL countries in the donor pool. Especially Panama and South Africa exhibit large placebo effects, which are unlikely to be just the result of beneficial spill-overs from the availability of the FCL. Conversely, from panel (b) of Figure 13 it seems that the downward effect of the FCL on Colombian spreads from mid-2010 onwards is comparatively large, emulated only by the placebo effect on Panamanian spreads. The small number of regional placebos makes it however difficult to properly evaluate the significance of this result. Panel (c) shows that the estimated effects on Polish spreads are also relatively large, but not before early 2011. Hence there is a real possibility that other factors, like policy actions taken in the wake of the Eurozone crisis, may account for this 'FCL effect'.<sup>60</sup>

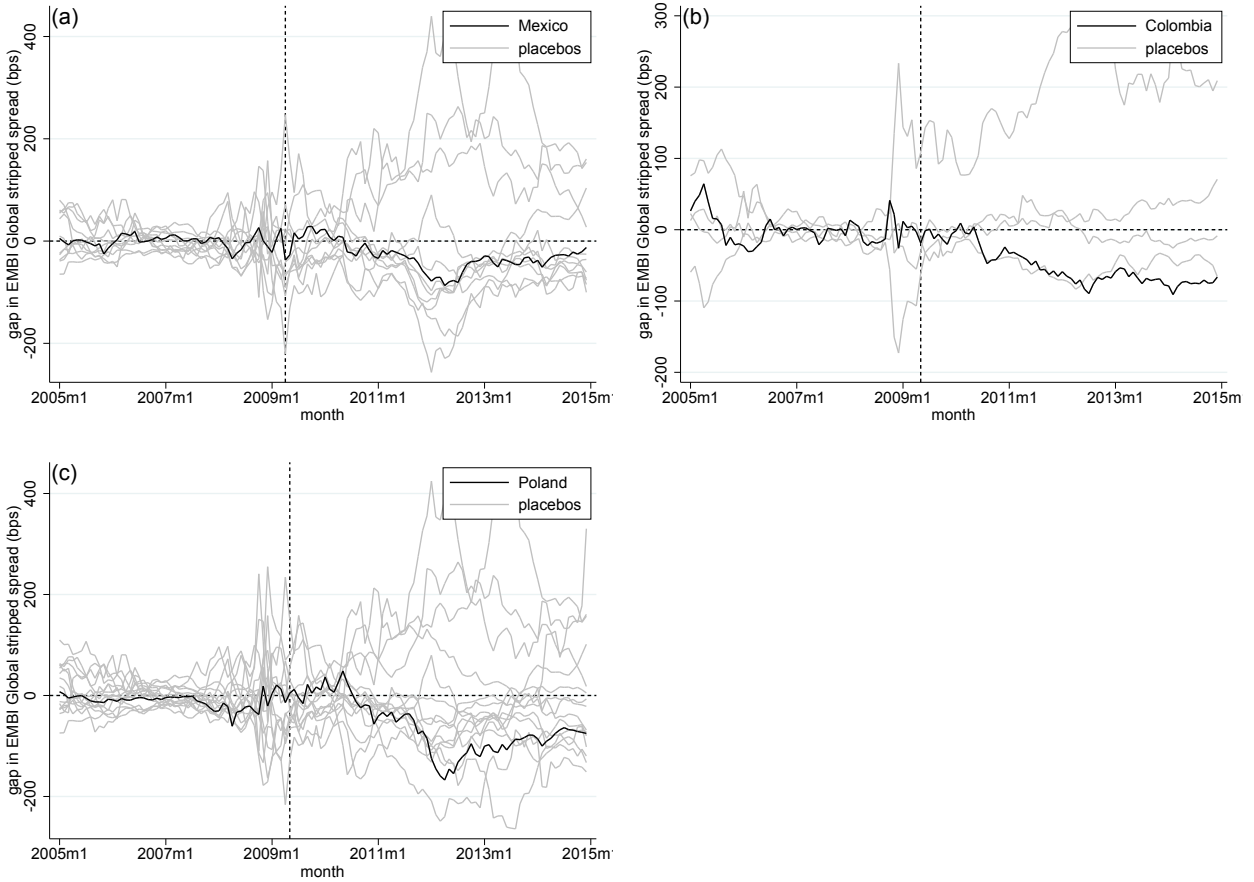
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<sup>58</sup>The donor pools for each of the placebo tests again exclude Mexico, Colombia and Poland, so that the synthetic non-FCL countries are composed of other non-FCL countries only (following [Abadie and Gardeazabal, 2003](#)). Leaving the FCL countries in the placebo donor pools produces similar results.

<sup>59</sup>To balance similarity in the degree of fit with keeping sufficient placebos for comparison, we define 'much larger' here as a pre-FCL RMSPE that is more than four times larger than that of the synthetic control for the FCL country in question. Excluding placebos with high fit indices (say, exceeding 20%) gives qualitatively similar results.

<sup>60</sup>Of course, it could be that the FCL arrangement enabled the Polish authorities to implement such policy actions.

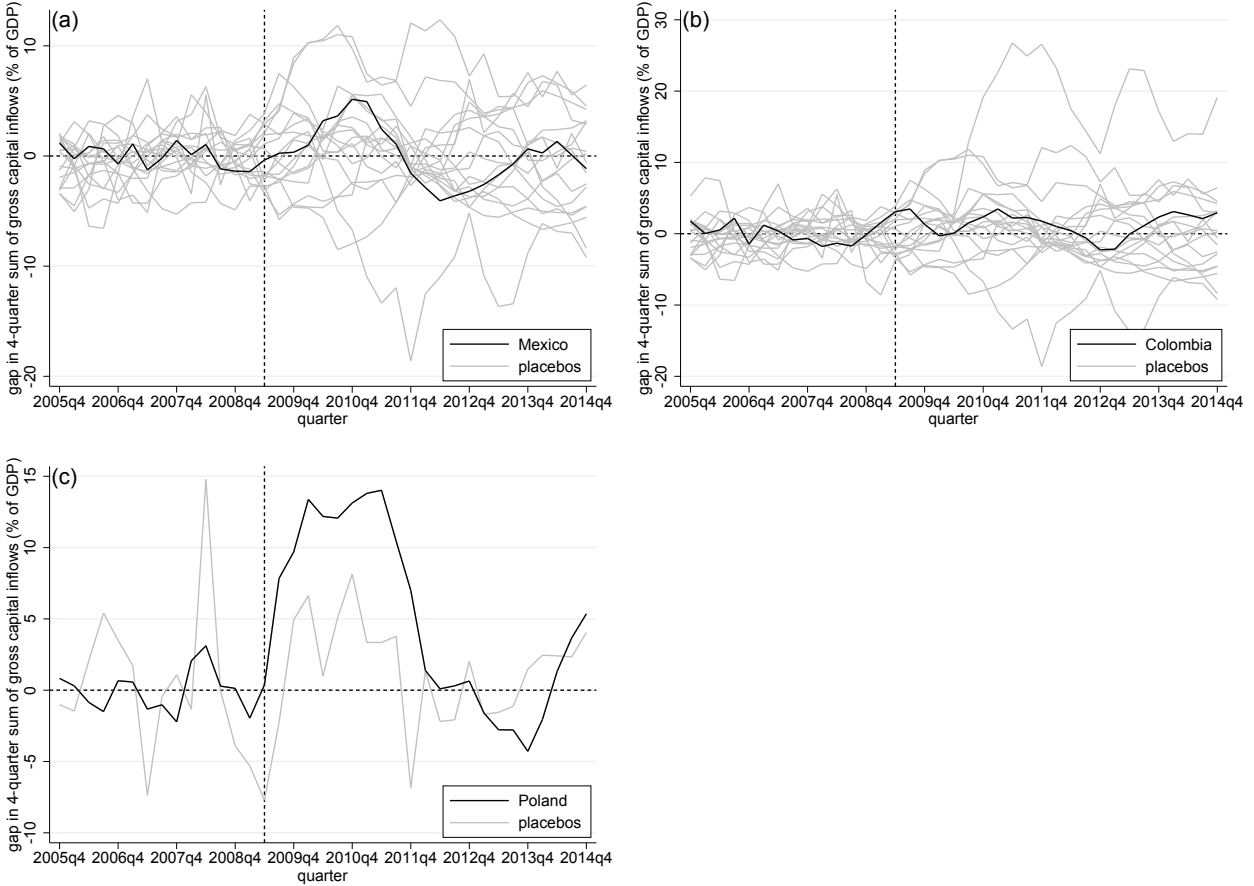
Figure 13: EMBI spread gaps for FCL countries and placebo gaps



Notes: Panels show the gaps between actual EMBI spreads and EMBI spreads in synthetic controls, for FCL countries (black lines) and their placebos, i.e., non-FCL donor pool countries (grey lines). Panels (a) and (c) use full donor pool and panel (b) regional donor pool, compositions of which are presented in Appendix Table A5. In each panel, placebos with pre-FCL RMSPE larger than four times pre-FCL RMSPE of synthetic control for FCL country are excluded.

Panel (a) of Figure 14 demonstrates that the estimated effects of the FCL on gross capital inflows into Mexico do not stand out particularly when compared to the placebo effects for donor pool countries. Even at their peak in 2010Q4-2011Q1 the Mexican effects are easily surpassed by the placebo effects for Chile and Vietnam and similar to those for Peru, Venezuela and the Philippines. Similar conclusions can be drawn for Colombia from panel (b), although in 2009Q2, when the first FCL was agreed, the estimated effect on Colombian capital inflows is on a par with the placebo effects for Chile, Uruguay, Indonesia and Pakistan and exceeds all 14 other placebos shown. Finally, panel (c) emphasises the magnitude of the estimated effects of the FCL on Polish capital inflows. Unfortunately only one placebo effect with a reasonable pre-FCL fit (that of Bulgaria) could be estimated for the regional donor pool. That said, the timing of the effects on Polish capital inflows, right after the country's entry into an FCL agreement, makes that they can be more plausibly attributed to the FCL than the effects estimated for Polish EMBI spreads.

Figure 14: Gross capital inflow gaps for FCL countries and placebo gaps



Notes: Panels show the gaps between actual gross capital inflows and gross capital inflows in synthetic controls, for FCL countries (black lines) and their placebos, i.e., non-FCL donor pool countries (grey lines). Panels (a) and (b) use full donor pool and panel (c) regional donor pool, compositions of which are presented in Appendix Table A5. In each panel, placebos with pre-FCL RMSPE larger than four times pre-FCL RMSPE of synthetic control for FCL country are excluded.

All in all, the results of our synthetic controls suggest that the FCL has had some but not spectacular effects on the bond spreads and gross capital inflows of its recipients. The beneficial effects on Colombian and Polish spreads seem to have been significant, but only with a considerable lag. This begs the question whether other, post-FCL factors played a role too. The positive effects on gross capital inflows into Colombia and Poland we uncovered were more immediate but either disappeared rather quickly over time (Colombia) or could not be tested for significance (Poland). At the minimum, the evidence shows that there have been no negative market reactions (in net terms) to Mexico, Colombia or Poland's entry into FCL arrangements, unlike what some country authorities that were reluctant to apply for an FCL may have feared.

## 5 Concluding remarks

To better fulfil its role in the GFSN in the wake of the global financial crisis, the IMF in March 2009 overhauled its lending framework. One of the most remarkable innovations was the introduction of the Flexible Credit Line (FCL), the IMF's first genuine precautionary lending instrument that allocates large amounts of resources to countries with strong fundamentals and solid policy track records. Other than with instruments the IMF created in the past, countries that decide to apply and, eventually, are deemed to qualify for the FCL can draw on it at their own discretion (should a financing need emerge) and without having to agree to an adjustment programme or other ex post conditionality.

This paper has provided an empirical evaluation of the FCL's selectivity and effectiveness. First, starting from the observation that to date only Mexico, Colombia and Poland have subscribed to FCL arrangements, we have attempted to identify which factors explain these three countries' participation. Our probit analysis has shown that both demand- and supply-side variables mattered, although one should be careful in making causal claims. On the side of the prospective applicants, we have found that exchange market pressure in the run-up to the FCL's creation is correlated positively with the probability of entry into an FCL arrangement. *Ceteris paribus*, such pressures increase countries' demand for foreign exchange, from the IMF or other sources. On the other hand, also initially lower bond spreads, lower inflation, a higher share in US exports and a higher propensity of making political concessions to the US (the IMF's largest shareholder) were associated with a greater likelihood of obtaining an FCL arrangement. The influence of bond spreads and inflation corresponds with the official qualification criteria against which IMF staff is supposed to assess the eligibility of FCL applicants. The US exports share and political concessions variables too fit supply-side arguments touted by a large empirical literature on IMF lending, i.e., that the US exerts (explicit or implicit) influence on IMF lending decisions to protect its (exporters') economic interests and rewards foreign policy allies with favourable Executive Board votes. That said, the political concessions variable may be demand-related as well. Possibly, countries that are more friendly towards US foreign policy feel less stigma and are overall more comfortable in approaching the IMF (widely regarded as a US/G7-dominated institution) for an FCL.

Second, we have evaluated the extent to which the FCL arrangements of Mexico, Colombia and Poland have delivered on their promise of boosting market confidence in their respective users. More specifically, we have employed the synthetic control method, a counterfactual approach, to assess the longer-term effects of the FCL on the three countries' EMBI spreads and gross capital inflows. The outcomes of our counterfactual exercises have pointed to some but generally not spectacular beneficial effects, which in the case of spreads became visible only a considerable time after the respective FCLs were first approved. These lags may be the result of the FCL's effectiveness depending on the changing external environment and/or reflect the influence of other, idiosyncratic factors (such as post-FCL policy changes) which we do not capture.

Possible avenues for further research include using a similar approach to estimate the effects of the FCL on other variables, such as exchange rates, international reserves, domestic/corporate bond spreads, or subcomponents of overall capital inflows. One could also apply the same methodology to evaluate the impact of the PCL/PLL. Finally, it would be

interesting to study the behaviour of bond spreads, capital flows and other indicators of market confidence once Mexico, Colombia and/or Poland decide to exit their current FCL arrangements.

At this point, we believe there are two main policy implications one can draw from our analysis. First of all, as we do not find evidence of negative market reactions to countries accessing the FCL, at least not in terms of EMBI spreads or capital inflows, any economic stigma that prevents eligible countries from applying for an FCL arrangement seems unwarranted. The IMF may want to stress this more in its communication about the FCL. Second, however, the apparent link of FCL participation with US economic and political interests seems not conducive to overcoming political stigma. Even if, in reality, Mexico, Colombia and Poland's entry into FCL arrangements had more to do with these 'US-oriented' countries feeling less inhibited in approaching the IMF than with US favouritism, it may not be perceived as such by other member countries. If the IMF wants to increase its clout in the GFSN by widening the appeal of and actual participation in precautionary lending instruments such as the FCL, it will have to engage in more and better-targeted outreach activities. For example, IMF staff could engage in in-depth discussions with country authorities on what exactly holds them back to seek precautionary IMF support, even if no ex post conditionality applies to that support. Perhaps a good place to start such discussions would be member countries that are less obviously aligned with the US in terms of economic relations and foreign policy.



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## Appendix Tables and Figures

Table A1: EMBI Global sample countries for FCL selectivity analysis

Country	ISO-3 code	Baseline multi-regressor probit	Ongoing IMF arrangement (other than FCL) as of 23 March 2009?
<b>FCL</b>			
Mexico	MEX	X	No
Poland	POL	X	No
Colombia	COL	X	No
<b>Non-FCL</b>			
Argentina	ARG		No
Belize	BLZ		No
Brazil	BRA	X	No
Bulgaria	BGR	X	No
Chile	CHL	X	No
China	CHN		No
Dominican Republic	DOM	X	No
Ecuador	ECU		No
Egypt	EGY	X	No
El Salvador	SLV	X	Yes, SBA approved on 15 January 2009
Gabon	GAB	X	Yes, SBA approved on 7 May 2007
Georgia	GEO		Yes, SBA approved on 15 September 2008
Ghana	GHA	X	No
Hungary	HUN	X	Yes, SBA approved on 6 November 2008
Indonesia	IDN	X	No
Jamaica	JAM	X	No
Kazakhstan	KAZ	X	No
Lebanon	LBN	X	No
Malaysia	MYS	X	No
Pakistan	PAK	X	Yes, SBA approved on 24 November 2008
Panama	PAN	X	No
Peru	PER	X	No
Philippines	PHL	X	No
Russia	RUS	X	No
Serbia	SRB	X	Yes, SBA approved on 16 January 2009
South Africa	ZAF	X	No
Sri Lanka	LKA	X	No
Trinidad and Tobago	TTO		No
Tunisia	TUN	X	No
Turkey	TUR	X	No
Ukraine	UKR	X	Yes, SBA approved on 5 November 2008
Uruguay	URY	X	No
Venezuela	VEN	X	No
Vietnam	VNM	X	No

Source: JP Morgan; IMF Financial Data.

Note: Listed countries are those included in JP Morgan EMBI Global as of end-March 2009, excluding Iraq. Third column indicates which countries are included in baseline multi-regressor probits of Table 2. SBA is Stand-By Arrangement.



Table A2: Potential correlates of FCL participation: Definitions, sources and descriptives

Variable	Definition	Source	N [FCL]	N [non-FCL]	Mean [FCL]	Mean [non-FCL]	t-statistic	MWW z-statistic
<i>External debt</i>	Gross external debt (% of GDP) at end-2008	IDS	3	33	26.008	44.306	-1.071+	-1.288+
<i>Current account balance</i>	Current account balance (% of GDP) at end-2008	WEO	3	34	-3.689	-3.277	-0.060	0.334
<i>Short-term external debt</i>	Short-term gross external debt (% of GDP) at end-2008Q4	IDS	3	33	5.582	6.858	-0.332	-0.429
<i>Public share external debt</i>	General government gross external debt (% of total external debt) at end-2008Q4	QEDS	3	18	36.542	35.261	0.083	0.402
<i>Bank share external debt</i>	Deposit bank gross external debt (% of total external debt) at end-2008Q4	QEDS	3	18	12.478	19.760	-0.905+	-0.905
<i>Non-bank share external debt</i>	Non-bank gross external debt (% of total external debt) at end-2008Q4	QEDS	3	17	50.981	43.581	0.733	0.688
<i>FDI and portfolio investment</i>	Gross FDI and portfolio investment inflows (% of total capital inflows) over 2008	IFS	3	30	63.026	92.35	-0.334	0.063
<i>Private holdings external public debt</i>	Private holdings of general government gross external debt (% of total government external debt) at end-2008Q4	Arslanahp and Tsuda (2014)	3	16	75.881	53.548	1.786*	1.789*
<i>Private holdings longer-term external debt</i>	Private holdings of longer-term external debt (% of total longer-term external debt) at end-2008	IDS	3	33	69.542	54.421	1.154+	1.231
<i>Foreign holdings local currency debt</i>	Foreign holdings of central government local currency debt securities (% of total government local currency debt securities) at end-2008Q4	Arslanahp and Tsuda (2014)	2	14	12.496	9.516	0.484	0.953
<i>30-d average EMBI spread</i>	30-day average of JPMorgan EMBI Global country stripped spreads (bps) at 23 March 2009	Datastream	3	32	415.967	1016.278	-1.259+	-1.650*
<i>1-y average EMBI spread</i>	One-year average of JPMorgan EMBI Global country stripped spreads (bps) at 23 March 2009	Datastream	3	32	290.945	666.195	-1.498*	-1.945*
<i>1-y max EMBI spread</i>	One-year maximum of JPMorgan EMBI Global country stripped spreads (bps) at 23 March 2009	Datastream	3	32	589.716	1333.048	-1.278+	-1.886*
<i>Reserves to short-term external debt</i>	International reserves (% of short-term external debt) at end-2008	IDS	3	32	302.003	439.027	-0.482	-0.354
<i>Reserves to short-term external debt and current account deficit</i>	International reserves (% of short-term external debt plus current account deficit) at end-2008	IDS; WEO	3	33	156.654	264.125	-0.510	-0.143
<i>Reserves to M2</i>	International reserves, excluding gold (% of M2) at end-February 2009	IFS	3	28	29.169	58.638	-0.996+	-0.735
<i>Reserves import cover</i>	Import cover by international reserves, excluding gold (in months of imports) at end-February 2009	IFS	3	32	6.508	10.080	-0.800	-0.412
<i>Public debt</i>	General government gross debt (% of GDP) at end-2008	WEO	3	34	40.67	43.598	-0.151	0.556
<i>Fiscal balance</i>	General government net lending/borrowing (% of GDP) at end-2008	WEO; FM	3	34	-1.544	-1.233	-0.118	-0.389
<i>3-y average fiscal balance</i>	Three-year average of post general government net lending/borrowing (% of GDP) at end-2008	WEO; FM	3	34	-1.637	-0.793	-0.329	-0.501
<i>Primary balance</i>	General government primary net lending/borrowing (% of GDP) at end-2008	WEO; FM	3	34	0.707	1.397	-0.319	-0.056
<i>Structural balance</i>	General government structural balance (% of potential GDP) at end-2008	WEO; FM	3	25	-2.282	-2.483	0.076	-0.557
<i>Inflation</i>	Year-on-year inflation of yearly averaged consumer prices (%) at end-2008	WEO	3	34	5.448	11.669	-1.669*	-2.337**
<i>3-y average inflation</i>	Three-year average of year-on-year inflation of yearly averaged consumer prices (%) at end-2008	WEO	3	34	4.145	8.418	-1.698**	-1.836*
<i>Inflation volatility</i>	12-month standard deviation of year-on-year inflation of monthly consumer prices over February 2008 - February 2009	IFS	3	28	0.672	2.097	-1.817**	-1.938*
<i>Central bank independence</i>	Central bank independence index (weighted) in 2008	Dincer and Eichengreen (2014)	3	20	0.413	0.505	-0.791	-0.594
<i>Central bank transparency</i>	Central bank transparency index (normalised 0-1) in 2008	Dincer and Eichengreen (2014)	3	28	0.511	0.388	1.178+	1.510+
<i>Real exchange rate volatility</i>	12-month standard deviation of month-on-month percentage changes in real exchange rate over February 2008 - February 2009	IFS	3	29	6.083	3.895	1.474*	1.455+
<i>Capital adequacy</i>	Regulatory capital to risk-weighted assets (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	14	14.427	14.984	-0.447	-0.126
<i>Tier-1 capital adequacy</i>	Regulatory Tier-1 capital to risk-weighted assets (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	14	12.477	12.629	-0.128	0.000
<i>Return on bank equity</i>	Return on equity (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	13	21.010	12.232	1.391*	1.547+
<i>Return on bank assets</i>	Return on assets (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	13	2.150	1.232	1.038+	1.144
<i>Bank liquidity</i>	Liquid assets to short-term liabilities (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	13	41.330	55.632	-0.610	-0.067

Table A2: *Continued*

Variable	Definition	Source	N [FCL]	N [non-FCL]	Mean [FCL]	Mean [non-FCL]	Mean [FCL]	Mean [non-FCL]	t-statistic	MW	z-statistic
<i>Deposits to bank loans</i>	Customer deposits to non-interbank loans (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	12	90.137	81.232	0.479	0.433			
<i>Foreign currency share bank liabilities</i>	Foreign currency liabilities to total liabilities (%) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	10	19.450	44.623	-1.397*	-1.521+			
<i>Non-performing share bank loans</i>	Non-performing loans (% of gross loans) of deposit takers at end-February 2009 (where available) or end-2008Q4	FSI	3	14	3.463	4.611	-0.975+	-0.882			
<i>Private sector credit</i>	Private sector credit by domestic financial sector (% of GDP) at end-2008	IFS; WDI	3	34	35.383	49.160	-0.754	-0.556			
<i>Control of corruption</i>	Control of corruption score (normalised 0-1) at end-2008	WGI	3	32	0.493	0.435	0.873+	1.267			
<i>Government effectiveness</i>	Government effectiveness score (normalised 0-1) at end-2008	WGI	3	32	0.542	0.486	0.873+	1.179			
<i>Democracy</i>	Revised Polity2 score, which combines institutionalised democracy and autocracy scores (normalised 0-1) at end-2008	Polity IV	3	33	0.917	0.764	0.988+	1.011			
<i>Checks and balances</i>	Checks and balances score, which counts the number of effective veto points in political system at start of 2009	DPI	3	32	4.333	2.844	2.070**	2.011**			
<i>Overall country risk rating</i>	12-month average of overall country risk rating, which considers economic, financial and political risks, at end-February 2009	EIU CRS	3	32	39.194	49.086	-1.750**	-1.827*			
<i>Share US exports</i>	Imports from US (% of total US exports) over 2008	DOTS	3	34	4.285	0.542	3.434***	1.725*			
<i>Share European exports</i>	Imports from Germany, UK, France and Italy (% of total German, UK, French and Italian exports) over 2008	DOTS	3	34	1.210	0.386	1.852**	1.391+			
<i>Share G7 exports</i>	Imports from G7 (% of total G7 exports) over 2008	DOTS	3	34	1.771	0.470	2.249**	1.892*			
<i>Share US trade</i>	Trade with US (% of total US trade) over 2008	DOTS	3	34	3.864	0.732	2.093**	1.558+			
<i>Share European trade</i>	Trade with Germany, UK, France and Italy (% of total German, UK, French and Italian trade) over 2008	DOTS	3	34	1.035	0.444	1.061+	1.280			
<i>Share G7 trade</i>	Trade with G7 (% of total G7 trade) over 2008	DOTS	3	34	1.757	0.579	1.338*	2.003**			
<i>Share US FDI</i>	FDI liabilities to US (% of total US FDI assets) at end-2009 (as 2008 data is not available)	CDIS	3	34	0.968	0.217	2.690***	1.948*			
<i>Share European FDI</i>	FDI liabilities to Germany, UK, France and Italy (% of total German, UK, French and Italian FDI assets) at end-2009 (as 2008 data is not available)	CDIS	3	34	0.550	0.161	2.085**	2.059**			
<i>Share G7 FDI</i>	FDI liabilities to G7 countries (% of total G7 FDI assets) at end-2009 (as 2008 data is not available)	CDIS	3	34	0.654	0.210	1.945**	1.781*			
<i>Share US portfolio investment</i>	Portfolio investment liabilities to US (% of total US portfolio investment assets) at end-2008	CPIS	3	32	0.624	0.222	1.412*	1.650*			
<i>Share European portfolio investment</i>	Portfolio investment liabilities to Germany, UK, France and Italy (% of total German, UK, French and Italian portfolio investment assets) at end-2008	CPIS	3	34	0.135	0.049	1.781**	1.558+			
<i>Share G7 portfolio investment</i>	Portfolio investment liabilities to G7 countries (% of total G7 portfolio investment assets) at end-2008	CPIS	3	34	0.274	0.094	1.659*	1.836*			
<i>Share US bank claims</i>	Consolidated liabilities to US-headquartered banks (% of total consolidated foreign claims by US banks) at end-2008Q4	CBS	3	33	2.163	0.293	3.928***	2.089**			
<i>Share European bank claims</i>	Consolidated liabilities to banks headquartered in Germany, UK, France or Italy (% of total consolidated foreign claims by German, UK, French and Italian banks) at end-2008Q4	CBS	3	34	0.350	0.154	1.450*	1.113			
<i>Share G7 bank claims</i>	Consolidated liabilities to banks headquartered in G7 countries (% of total consolidated foreign claims by G7 banks) at end-2008Q4	CBS	3	34	0.486	0.164	2.262**	1.781*			
<i>Alignment with US</i>	One-year average score for UNGA voting alignment with US over 2008	Voeten et al. (2015)	3	34	0.274	0.230	0.807	0.724			
<i>Alignment with Europe</i>	One-year average score for UNGA voting alignment with Germany, UK, France and Italy over 2008	Voeten et al. (2015)	3	34	0.796	0.734	1.120+	1.253			
<i>Alignment with G7</i>	One-year average score for UNGA voting alignment with G7 over 2008	Voeten et al. (2015)	3	34	0.716	0.660	1.082+	1.224			
<i>Alignment on important US issues</i>	One-year average score for UNGA voting alignment with US on 'important' votes over 2008	Voeten et al. (2015)	3	34	0.431	0.255	1.710**	1.676*			
<i>Political concessions to US</i>	Difference in one-year average scores for UNGA voting alignment with US on 'important' votes and on all votes over 2008	Voeten et al. (2015)	3	34	0.156	0.025	2.064**	2.115**			

Table A2: *Continued*

Variable	Definition	Source	N [FCL]	N [non-FCL]	Mean [FCL]	Mean [non-FCL]	t-statistic	MWW z-statistic
<i>5-y average alignment with US</i>	Five-year average score for UNGA voting alignment with US over 2004-2008	Voeten et al. (2015)	3	34	0.280	0.228	0.908+	0.890
<i>5-y average alignment with Europe</i>	Five-year average score for UNGA voting alignment with Germany, UK, France and Italy over 2004-2008	Voeten et al. (2015)	3	34	0.786	0.730	0.957+	1.057
<i>5-y average alignment with G7</i>	Five-year average score for UNGA voting alignment with G7 over 2004-2008	Voeten et al. (2015)	3	34	0.712	0.660	0.945+	1.168
<i>5-y average alignment on important US issues</i>	Five-year average score for UNGA voting alignment with US on 'important' votes over 2004-2008	Voeten et al. (2015)	3	34	0.434	0.299	1.467*	1.614+
<i>5-y average political concessions to US</i>	Difference in five-year average scores for UNGA voting alignment with US on 'important' votes and on all votes over 2004-2008	Voeten et al. (2015)	3	34	0.154	0.071	1.671*	1.781*
<i>Exports</i>	Exports of goods and services (% of GDP) over 2008	WDI	3	33	28.12	41.267	-1.043+	-1.002
<i>Capital account openness</i>	KAOPEN index of de jure capital account openness (normalised 0-1) at end-2008	Chinn and Ito (2006)	3	33	0.615	0.588	0.131	0.117
<i>Capital controls</i>	Overall index of controls on capital inflows and outflows at end-2008	Fernández et al. (2015)	3	30	0.600	0.466	0.666	0.721
<i>Total financial liabilities</i>	Total financial (FDI/portfolio investment/debt) liabilities (% of GDP) at end-2008	Lane and Milesi-Ferretti (2007)	3	34	60.061	90.117	-0.840	-0.890
<i>Net foreign assets</i>	Net foreign asset position (% of GDP) at end-2008	Lane and Milesi-Ferretti (2007)	3	34	-33.337	-35.943	0.102	-0.334
<i>Change in growth</i>	Change in real GDP growth (percentage points) between 2007 and 2008	WEO	3	34	-2.668	-1.711	-0.597	-0.946
<i>Change in growth from 3-y average</i>	Change in real GDP growth (percentage points) between 2005-2007 average and 2008	WEO	3	34	-2.112	-1.441	-0.408	-0.556
<i>Change in terms of trade</i>	Change in net barter terms of trade (%) between 2007 and 2008	WDI	3	34	3.135	2.343	0.124	0.278
<i>Change in exports</i>	Change in exports of goods (%) between February 2008 and February 2009	IFS	3	31	-29.321	-34.429	0.329	0.455
<i>1-y range EMBI spread</i>	One-year range (maximum-minimum) of past JP Morgan EMBI Global country stripped spreads (bps) at 23 March 2009	Datstream	3	32	459.699	1038.603	-1.115+	-1.827*
<i>2-component EMPI</i>	Six-month average of two-component, inverse standard deviation-weighted exchange market pressure index at end-February 2009	IFS	3	30	8.062	2.984	2.600***	2.067**
<i>3-component EMPI</i>	Six-month average of three-component, inverse standard deviation-weighted exchange market pressure index at end-February 2009	IFS	3	23	5.990	3.103	1.206+	1.405+
<i>Time under IMF arrangements</i>	Days under IMF arrangements since 1952 or accession (% of total days since 1952 or accession) at 24 March 2009	FD	3	34	31.437	33.321	-0.167	-0.501
<i>Years since last IMF arrangement</i>	Number of years since expiry of last IMF arrangement at 24 March 2009	FD	3	32	7.667	6.531	0.254	0.714
<i>Share IMF arrangements with non-compliance</i>	Post-1990 IMF arrangements where more than 25% of SDRs remained undrawn at expiration (share of all post-1990 IMF arrangements) at 24 March 2009	FD	3	26	0.833	0.527	1.557*	1.455+
<i>Years since legislative election</i>	Number of years since last legislative election at start of 2009	DPI	3	32	1.667	1.938	-0.337	-0.212
<i>Years since executive election</i>	Number of years since last executive election at start of 2009	DPI	3	24	2.333	2.667	-0.335	-0.635
<i>GDP</i>	GDP, PPP-based (international US\$ billion) at end-2008	WEO	3	34	979.386	752.165	0.217	1.669*
<i>GDP per capita</i>	GDP per capita, PPP-based (international US\$) at end-2008	WEO	3	34	15075.347	12176.832	0.793	1.057

Notes: IDS = World Bank International Debt Statistics; WEO = IMF World Economic Outlook; OEDS = World Bank/IMF Quarterly External Debt Statistics; IFS = IMF International Financial Statistics; Datstream = Thomson Reuters Datastream; FM = IMF Fiscal Monitor; FSI = IMF Financial Soundness Indicators; WDI = World Bank World Development Indicators; WGI = World Bank Worldwide Governance Indicators; Polity IV = Center for Systemic Peace Polity IV Project; DPI = World Bank/Inter-American Development Bank Database of Political Institutions; EIU CBS = Economist Intelligence Unit Country Risk Service; DOTs = IMF Direction of Trade Statistics; CDS = IMF Coordinated Direct Investment Survey; CPIS = IMF Coordinated Portfolio Investment Survey; CBS = BIS Consolidated Banking Statistics; FD = IMF Financial Data. T-statistics are for one-tailed test of null that mean values of variable are equal in FCL and non-FCL countries; z-statistics are for Mann-Whitney-Wilcoxon rank-sum test of null that FCL and non-FCL samples come from populations where variable has same distribution. + $p < 0.2$ ; \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Table A3: Single-regressor probits: Coefficients, average marginal effects and model performance

Variable	Probit coefficient	Average marginal effect	AIC	BIC	McFadden pseudo $R^2$	FCL fixed (50% cut-off)	Non-FCL classified (50% cut-off)	FCL correctly classified (sample-based cut-off)	Non-FCL classified based cut-off	correctly (sample cut-off)
<i>External debt</i>	-0.026	-0.004	22.732	25.899	0.093	0/3	33/33	2/3	18/33	
<i>Current account balance</i>	-0.002	0.000	24.819	28.041	0.000	0/3	34/34	1/3	14/34	
<i>Short-term external debt</i>	-0.021	-0.003	24.514	27.681	0.007	0/3	33/33	2/3	16/33	
<i>Public share external debt</i>	0.001	0.000	21.216	23.305	0.000	0/3	18/18	1/3	10/18	
<i>Bank share external debt</i>	-0.032	-0.007	20.153	22.242	0.062	0/3	18/18	2/3	11/18	
<i>Non-bank share external debt</i>	0.020	0.004	20.251	22.242	0.039	0/3	17/17	2/3	9/17	
<i>FDI and portfolio investment</i>	-0.002	0.000	23.888	26.881	0.011	0/3	30/30	1/3	15/30	
<i>Private holdings external public debt</i>	0.052+	0.010*	16.631	18.520	0.238	0/3	16/16	2/3	10/16	
<i>Private holdings longer-term external debt</i>	0.026+	0.004+	22.825	25.992	0.088	0/3	33/33	2/3	17/33	
<i>Foreign holdings local currency debt</i>	0.031	0.006	15.753	17.299	0.025	0/2	14/14	2/2	8/14	
<i>30-d average EMBI spread</i>	-0.002*	-0.000+	20.696	23.807	0.185	0/3	32/32	3/3	21/32	
<i>1-y average EMBI spread</i>	-0.006*	-0.001*	19.330	22.441	0.251	0/3	32/32	3/3	21/32	
<i>1-y max EMBI spread</i>	-0.002*	-0.000+	20.137	23.248	0.212	0/3	32/32	3/3	22/32	
<i>Reserves to short-term external debt</i>	-0.001	0.000	24.132	27.242	0.017	0/3	32/32	1/3	12/32	
<i>Reserves to short-term external debt and current account deficit</i>	-0.001	0.000	24.227	27.394	0.021	0/3	33/33	2/3	13/33	
<i>Reserves to M2</i>	-0.017**	-0.003+	21.915	24.783	0.091	0/3	28/28	3/3	14/28	
<i>Reserves import cover</i>	-0.060+	-0.009	23.505	26.615	0.047	0/3	32/32	2/3	15/32	
<i>Public debt</i>	-0.002	0.000	24.794	28.016	0.001	0/3	34/34	1/3	13/34	
<i>Fiscal balance</i>	-0.010	-0.001	24.807	28.028	0.001	0/3	34/34	1/3	17/34	
<i>3-y average fiscal balance</i>	-0.029	-0.004	24.689	27.911	0.006	0/3	34/34	1/3	17/34	
<i>Primary balance</i>	-0.034	-0.005	24.696	27.918	0.006	0/3	34/34	1/3	20/34	
<i>Structural balance</i>	0.007	0.001	23.061	25.725	0.000	0/3	25/25	2/3	10/25	
<i>Inflation</i>	-0.453*	-0.047**	17.775	20.997	0.339	0/3	34/34	3/3	26/34	
<i>3-y average inflation</i>	-0.257**	-0.031*	20.411	23.633	0.212	0/3	34/34	3/3	22/34	
<i>Inflation volatility</i>	-1.835***	-0.215**	17.264	20.132	0.327	0/3	28/28	3/3	21/28	
<i>Central bank independence</i>	-1.525	-0.311	21.133	23.404	0.038	0/3	20/20	2/3	12/20	
<i>Central bank transparency</i>	2.331+	0.364+	22.204	25.072	0.077	0/3	28/28	2/3	19/28	
<i>Real exchange rate volatility</i>	0.234**	0.034+	21.394	24.325	0.126	0/3	29/29	3/3	18/29	
<i>Capital adequacy</i>	-0.084	-0.021	19.641	21.307	0.013	0/3	14/14	1/3	7/14	
<i>Tier-1 capital adequacy</i>	-0.030	-0.008	19.824	21.490	0.001	0/3	14/14	1/3	7/14	
<i>Return on bank equity</i>	0.096+	0.021*	16.635	18.180	0.182	1/3	13/13	2/3	8/13	
<i>Return on bank assets</i>	0.430	0.105+	17.977	19.322	0.095	0/3	13/13	1/3	9/13	
<i>Bank liquidity</i>	-0.012	-0.003	18.840	20.385	0.039	0/3	13/13	2/3	5/13	
<i>Deposits to bank loans</i>	0.008	0.002	18.707	20.123	0.020	0/3	12/12	3/3	7/12	
<i>Foreign currency share bank liabilities</i>	-0.040+	-0.010*	15.142	16.272	0.207	0/3	9/10	3/3	6/10	
<i>Non-performing share bank loans</i>	-0.393	-0.092	18.330	19.996	0.096	0/3	14/14	2/3	7/14	
<i>Private sector credit</i>	-0.011+	-0.002	24.042	27.264	0.038	0/3	34/34	2/3	16/34	
<i>Control of corruption</i>	2.478+	0.370	23.667	26.778	0.039	0/3	32/32	1/3	22/32	
<i>Government effectiveness</i>	2.947+	0.439	23.589	26.699	0.043	0/3	32/32	2/3	20/32	

Table A3: *Continued*

Variable	Probit coefficient	Average marginal effect	AIC	BIC	McFadden pseudo $R^2$	FCL fitted (50% cut-off)	Non-FCL classified (50% cut-off)	FCL correctly classified (sample-based cut-off)	Non-FCL correctly classified (sample-based cut-off)
<i>Democracy</i>	3.217	0.456	22.927	26.094	0.084	0/3	33/33	2/3	17/33
<i>Checks and balances</i>	0.912**	0.107*	19.130	22.241	0.261	0/3	32/32	3/3	20/32
<i>Overall country risk rating</i>	-0.081***	-0.010*	20.778	23.889	0.181	0/3	32/32	3/3	22/32
<i>Share US exports</i>	0.249***	0.029**	20.196	23.418	0.222	1/3	34/34	1/3	32/34
<i>Share European exports</i>	0.486+	0.065+	22.561	25.783	0.109	0/3	34/34	1/3	28/34
<i>Share G7 exports</i>	0.407+	0.050+	21.716	24.938	0.149	0/3	33/34	2/3	30/34
<i>Share US trade</i>	0.133+	0.018+	22.432	25.654	0.115	0/3	33/34	1/3	31/34
<i>Share European trade</i>	0.262	0.037	23.915	27.137	0.044	0/3	34/34	1/3	28/34
<i>Share G7 trade</i>	0.184	0.025	23.505	26.727	0.063	0/3	34/34	2/3	31/34
<i>Share US FDI</i>	0.928**	0.114**	21.050	24.271	0.181	1/3	34/34	1/3	30/34
<i>Share European FDI</i>	1.303*	0.169*	21.976	25.197	0.137	0/3	34/34	2/3	29/34
<i>Share G7 FDI</i>	1.042*	0.133+	22.126	25.348	0.130	0/3	34/34	2/3	29/34
<i>Share US portfolio investment</i>	0.639	0.092	23.005	26.116	0.072	0/3	32/32	1/3	27/32
<i>Share European portfolio investment</i>	5.144+	0.679+	22.332	25.553	0.120	0/3	34/34	2/3	27/34
<i>Share G7 portfolio investment</i>	1.951+	0.260+	22.773	25.995	0.098	0/3	34/34	2/3	29/34
<i>Share US bank claims</i>	0.735***	0.077*	18.626	21.793	0.292	1/3	33/33	2/3	29/33
<i>Share European bank claims</i>	1.594+	0.219+	23.053	26.275	0.085	0/3	34/34	2/3	26/34
<i>Share G7 bank claims</i>	2.020*	0.254*	21.237	24.459	0.172	0/3	34/34	2/3	26/34
<i>Alignment with US</i>	2.333	0.341	24.244	27.466	0.028	0/3	34/34	1/3	27/34
<i>Alignment with Europe</i>	3.256	0.463	23.695	26.917	0.054	0/3	34/34	1/3	27/34
<i>Alignment with G7</i>	3.374	0.482	23.768	26.990	0.051	0/3	34/34	1/3	26/34
<i>Alignment on important US issues</i>	3.117**	0.405*	21.952	25.173	0.138	0/3	34/34	2/3	23/34
<i>Political concessions to US</i>	8.963**	1.041*	19.811	23.033	0.241	0/3	34/34	3/3	24/34
<i>5-y average alignment with US</i>	2.498	0.363	24.093	27.314	0.035	0/3	34/34	1/3	27/34
<i>5-y average alignment with Europe</i>	2.618	0.378	24.002	27.224	0.039	0/3	34/34	1/3	27/34
<i>5-y average alignment with G7</i>	2.759	0.399	24.018	27.240	0.039	0/3	34/34	1/3	27/34
<i>5-y average alignment on important US issues</i>	3.046*	0.409+	22.624	25.845	0.106	0/3	34/34	2/3	24/34
<i>5-y average political concessions to US</i>	7.940***	0.996*	21.559	24.781	0.157	0/3	34/34	3/3	23/34
<i>Exports</i>	-0.026+	-0.004	23.103	26.270	0.075	0/3	33/33	2/3	14/33
<i>Capital account openness</i>	0.141	0.022	24.631	27.798	0.001	0/3	33/33	2/3	17/33
<i>Capital controls</i>	0.781*	0.124+	23.551	26.544	0.028	0/3	30/30	3/3	16/30
<i>Total financial liabilities</i>	-0.010*	-0.001+	23.596	26.817	0.059	0/3	34/34	2/3	17/34
<i>Net foreign assets</i>	0.001	0.000	24.811	28.033	0.001	0/3	34/34	2/3	14/34
<i>Change in growth</i>	-0.082+	-0.012	24.389	27.611	0.021	0/3	34/34	2/3	21/34
<i>Change in growth from 3-y average</i>	-0.056	-0.008	24.618	27.839	0.010	0/3	34/34	2/3	19/34
<i>Change in terms of trade</i>	0.004	0.001	24.806	28.027	0.001	0/3	34/34	1/3	19/34
<i>Change in exports</i>	0.005	0.001	24.164	27.216	0.006	0/3	31/31	1/3	17/31
<i>1-y range EMBI spread</i>	-0.002*	-0.000+	20.725	23.835	0.183	0/3	32/32	3/3	19/32
<i>2-component EMPI</i>	0.228***	0.027**	18.572	21.565	0.275	1/3	30/30	2/3	23/30

Table A3: *Continued*

Variable	Probit coefficient	Average marginal effect	AIC	BIC	McFadden pseudo $R^2$	FCL field (50% cut-off)	FCL correctly classified (50% cut-off)	Non-FCL classified (50% cut-off)	FCL correctly sifted (sample-based cut-off)	FCL correctly classified (sample-based cut-off)	Non-FCL classified (sample-based cut-off)	correctly classified (sample-based cut-off)
<i>3-component EMPI</i>	0.111*	0.019+	20.997	23.514	0.086	0/3	23/23	23/23	2/3	16/23	16/23	
<i>Time under IMF arrangements</i>	-0.003	0.000	24.789	28.011	0.002	0/3	34/34	34/34	2/3	21/34	21/34	
<i>Years since last IMF arrangement</i>	0.012	0.002	24.402	27.513	0.004	0/3	32/32	32/32	2/3	21/32	21/32	
<i>Share IMF arrangements with non-compliance</i>	2.176+	0.339+	20.358	23.093	0.152	0/3	26/26	26/26	2/3	17/26	17/26	
<i>Years since legislative election</i>	-0.096	-0.015	24.335	27.446	0.007	0/3	32/32	32/32	1/3	18/32	18/32	
<i>Years since executive election</i>	-0.084	-0.016	22.695	25.286	0.008	0/3	24/24	24/24	2/3	14/24	14/24	
<i>GDP</i>	0.000	0.000	24.772	27.994	0.002	0/3	34/34	34/34	1/3	29/34	29/34	
<i>GDP per capita</i>	0.000	0.000	24.140	27.362	0.033	0/3	34/34	34/34	2/3	21/34	21/34	

Notes: Sample countries as defined in Appendix Table A1 and variables as defined in Appendix Table A2. Significance of probit coefficients based on Huber-White robust standard errors and significance of average marginal effects based on delta-method standard errors. Number of correctly classified FCL and non-FCL countries based on two alternative classification rules: in the first case a country is classified as FCL participant (non-participant) if predicted probability from single-regressor probit is greater (smaller) than 50%; in the second case a country is classified as FCL participant (non-participant) if predicted probability from single-regressor probit is greater (smaller) than proportion of FCL countries actually observed in sample.

+ $p < 0.2$ ; \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .



Table A4: Multi-regressor probits: Robustness

	(a)	(b)	(c)	(d)	(e)
	Probit coef- ficient	Probit coef- ficient	Probit coef- ficient	Logit coef- ficient	OLS coeffi- cient
<i>1-y average EMBI spread</i>	-0.0018 [0.0018]	-0.0001 [0.0001]	-0.0013 [0.0041]	-0.0067* [0.0040]	-0.0000 [0.0001]
<i>3-y average inflation</i>	-0.2358 [0.2800]	-0.0131 [0.0193]	-0.1390 [0.2289]	-0.2196 [0.3134]	-0.0061 [0.0092]
<i>Share US exports</i>		0.1852* [0.0947]	0.1534+ [0.0966]	0.2624 [0.2057]	0.0625*** [0.0137]
<i>Political concessions to US</i>	10.6192*** [3.7991]	0.5893+ [0.4279]	8.4077*** [1.9086]	15.4308*** [4.3665]	0.4929+ [0.3059]
<i>2-component EMPI</i>	0.4804* [0.2763]	0.0267 [0.0255]	0.3076*** [0.1029]	0.5960*** [0.2193]	0.0165 [0.0179]
<i>Share US bank claims</i>	0.0428 [0.3989]	0.0024 [0.0211]			
<i>Overall country risk rating</i>		0.0158 [0.0378]	0.0008 [0.0018]		
Constant	-2.4802*** [0.9583]	-2.7822+ [1.8726]	-2.2337*** [0.8451]	-3.0550+ [2.0548]	0.0159 [0.0812]
N	30	32	25	31	31
AIC	18.2290	18.2368	17.7387	18.2600	
BIC	26.6362	27.0312	25.0519	26.8639	
McFadden pseudo $R^2$	0.6806	0.6868	0.6872	0.6824	0.4856
FCL countries correctly classified (50% cut-off)	2/3: POL, MEX	2/3: POL, MEX	2/3: POL, MEX	2/3: POL, MEX	1/3: MEX
Non-FCL countries correctly classified (50% cut-off)	27/27	29/29	22/22	28/28	28/28
FCL countries correctly classified (sample-based cut-off)	3/3	3/3	3/3	3/3	3/3
Non-FCL countries correctly classified (sample-based cut-off)	24/27: not BRA, PER, BGR	27/29: not BRA, PER	19/22: not BRA, PER, BGR	25/28: not BRA, PER, BGR	18/28: not BRA, UKR, SRB, RUS, PER, BGR, MYS, HUN, TUR, IDN

Notes: Sample countries and ISO-3 codes as defined in Appendix Table A1 and variables as defined in Appendix Table A2. The model in column (c) excludes countries that had ongoing IMF arrangements as of 23 March 2009. Significance of probit/logit/OLS coefficients based on Huber-White robust standard errors and significance of probit/logit average marginal effects based on delta-method standard errors. In column (e) the  $R^2$  is the standard fraction of explained variance, not the McFadden pseudo  $R^2$ . Number of correctly classified FCL and non-FCL countries based on two alternative classification rules: in the first case a country is classified as FCL participant (non-participant) if predicted probability from the model is greater (smaller) than 50%; in the second case a country is classified as FCL participant (non-participant) if predicted probability from the model is greater (smaller) than proportion of FCL countries actually observed in sample.  
+ $p < 0.2$ ; \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Appendix Table A4 reports additional variations on the baseline multi-regressor probit model of Table 2. In columns (a) and (b) of Table A4, we replace in turn US export shares with US bank claim shares and EMBI spreads with the EIU’s overall country risk rating. The coefficient of US bank claim shares has the expected sign but is not significant. The risk rating’s coefficient has a counterintuitive positive sign but is again not significant. Replacing the EMBI spreads with the risk rating raises the significance of the inflation variable, probably because of the remaining collinearity between spreads and inflation. All other results in columns (a) and (b) are similar to those of the baseline model. Column (c) of Table A4 excludes from our baseline sample countries that had ongoing IMF arrangements when the FCL was launched (see Appendix Table A1). It could be argued that chances that those countries would qualify for the FCL were very slim. The resulting estimates are again close to those of the baseline model. Lastly, in columns (d) and (e) we check the sensitivity of our results to the estimation methodology by re-estimating the baseline model using logistic regression and OLS. The average marginal effects of the baseline probit and logit are very much alike. Also the marginal effects of the linear probability model (LPM) (equal to the model’s coefficients) are of the same order as in the probit, with the exception of the US export share effect (which is much larger in the LPM).<sup>61</sup>

Whereas the predictive abilities of the models in columns (a) to (d) of Appendix Table A4 are very much in line with the baseline model, the LPM in column (e), which has the disadvantage that it does not constrain predicted values to the 0-1 interval, performs less well in this respect.<sup>62</sup> When the probability cut-off is fixed at 50%, the LPM classifies only Mexico as an FCL country; with a sample-based cut-off Mexico, Poland and Colombia are all three identified as FCL participants, but so are ten non-FCL countries.<sup>63</sup>

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<sup>61</sup>Unlike in probit and logit estimation where the marginal effects vary over the different sample countries (see footnote 41), the LPM forces the marginal effects to be the same for every country.

<sup>62</sup>For a number of sample countries the probabilities predicted by the LPM are indeed negative.

<sup>63</sup>Nonetheless, in the LPM Colombia’s predicted probability of FCL participation (19.8%) is the fourth highest in the sample, surpassed only by the probabilities of Mexico (96.6%), Poland (44.2%) and Brazil (34.4%).

Table A5: Donor pool composition for synthetic controls

Non-FCL comparators	EMBI spread synthetic controls						Capital inflow synthetic controls					
	Mexico		Colombia		Poland		Mexico		Colombia		Poland	
	Full	Regional	Full	Regional	Full	Regional	Full	Regional	Full	Regional	Full	Regional
Argentina							X	X	X	X	X	
Brazil	X	X	X	X	X		X	X	X	X	X	
Bulgaria							X		X		X	X
Chile	X	X	X	X	X		X	X	X	X	X	
China	X		X		X		X		X		X	
Ecuador							X	X	X	X	X	
Egypt	X		X		X							
El Salvador	X	X	X	X	X		X	X	X	X	X	
Hungary	X		X		X	X	X		X		X	X
Indonesia	X		X		X		X		X		X	
Kazakhstan							X		X		X	X
Lebanon	X		X		X							
Malaysia	X		X		X							
Pakistan							X		X		X	
Panama	X	X	X	X	X		X	X	X	X	X	
Peru	X	X	X	X	X		X	X	X	X	X	
Philippines	X		X		X		X		X		X	
Russia	X		X		X	X	X		X		X	X
South Africa	X		X		X		X		X		X	
Sri Lanka							X		X		X	
Turkey	X		X		X	X						
Uruguay	X	X	X	X	X		X	X	X	X	X	
Venezuela							X	X	X	X	X	
Vietnam							X		X		X	

Notes: Sample constructed from countries included in JP Morgan EMBI Global as of end-March 2009, excluding countries with incomplete EMBI spread (capital inflow) data over January 2005-December 2014 (2005Q4-2014Q4) and FCL countries themselves. Composition of full and regional donor pools for synthetic controls shown separately for each FCL country and by outcome variable (EMBI spreads or capital inflows).

Table A6: Predictor variable weights in EMBI spreads synthetic controls

Variables	Synthetic controls					
	Mexico		Colombia		Poland	
	<i>Full</i>	<i>Regional</i>	<i>Full</i>	<i>Regional</i>	<i>Full</i>	<i>Regional</i>
<i>EMBI spread (bps)</i>	0.974	0.699	0.885	0.067	0.984	0.832
<i>Real GDP growth (%)</i>	0.000	0.015	0.114	0.044	0.004	0.001
<i>Reserves (% of GDP)</i>	0.000	0.283	0.000	0.869	0.009	0.027
<i>Public debt (% of GDP)</i>	0.026	0.000	0.001	0.000	0.001	0.026
<i>Current account balance (% of GDP)</i>	0.000	0.003	0.000	0.020	0.002	0.114

Notes: Values shown are diagonal elements of matrix of predictor variable weights that minimise pre-FCL RMSPE (i.e., matrix  $V$  in equation (9)). Composition of full and regional donor pools as presented in Appendix Table A5. Variables as defined in Section 4.2.2.

Table A7: Predictor variable weights in capital inflow synthetic controls

Variables	Synthetic controls					
	Mexico		Colombia		Poland	
	<i>Full</i>	<i>Regional</i>	<i>Full</i>	<i>Regional</i>	<i>Full</i>	<i>Regional</i>
<i>4-quarter gross capital inflows (% of GDP)</i>	0.147	1.000	1.000	0.422	0.067	0.981
<i>Real GDP growth (%)</i>	0.000	0.000	0.000	0.069	0.003	0.004
<i>Capital account openness index</i>	0.853	0.000	0.000	0.302	0.000	0.000
<i>Overall country risk rating</i>	0.000	0.000	0.000	0.206	0.930	0.015

Notes: Values shown are diagonal elements of matrix of predictor variable weights that minimises pre-FCL RMSPE (i.e., matrix  $V$  in equation (9)). Composition of full and regional donor pools as presented in Appendix Table A5. Variables as defined in Section 4.2.2.



Figure A1: Continued

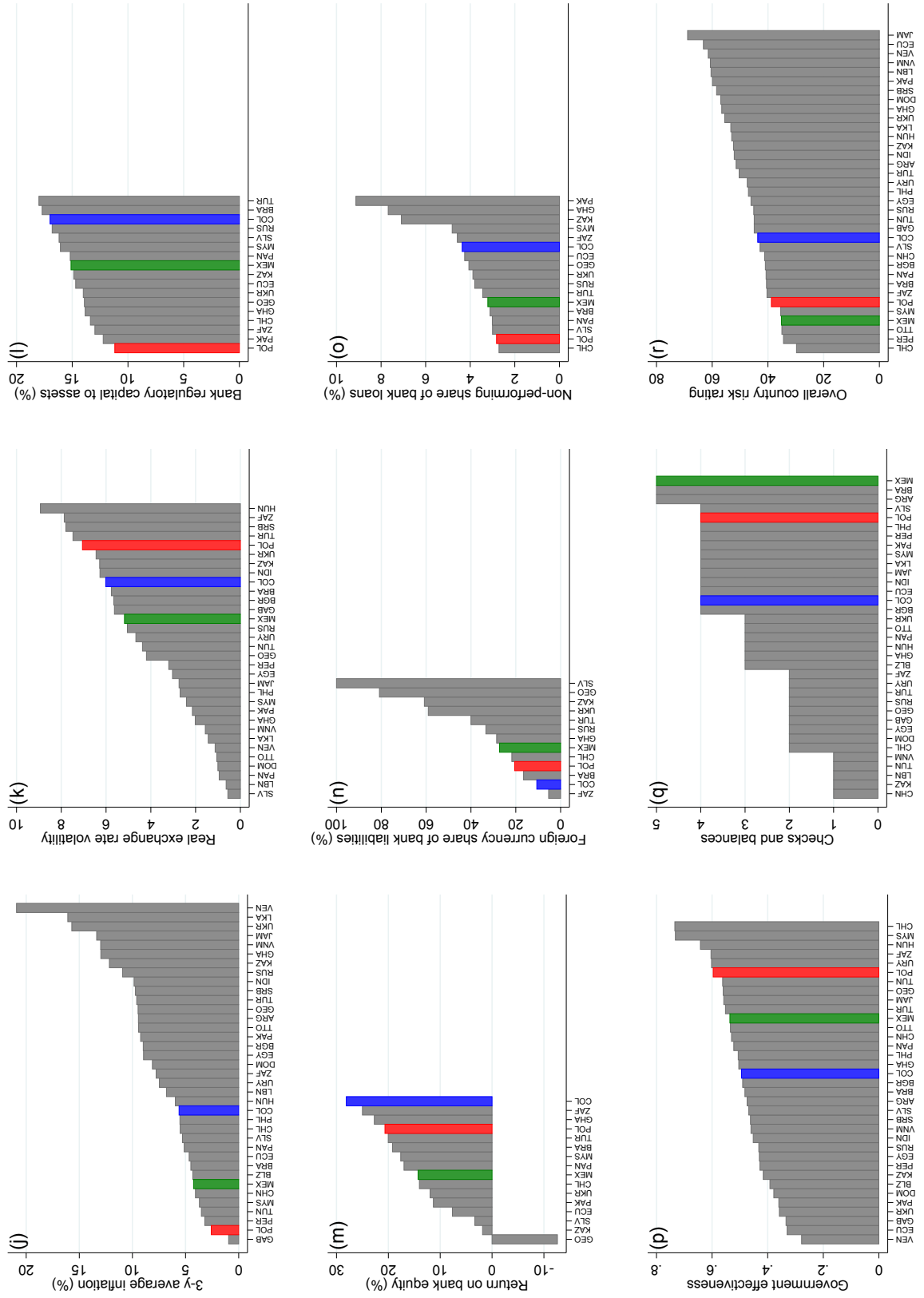


Figure A1: Continued

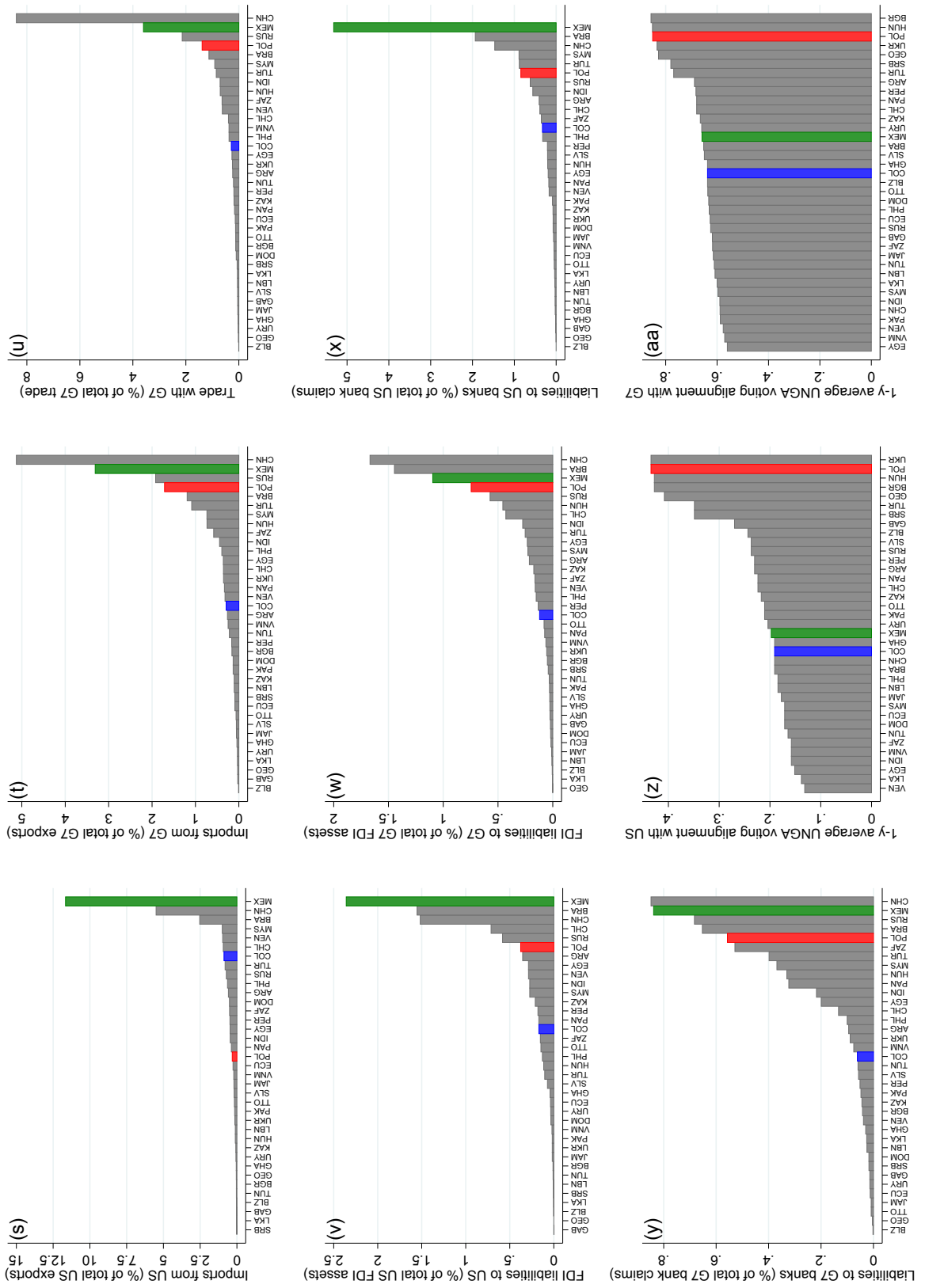
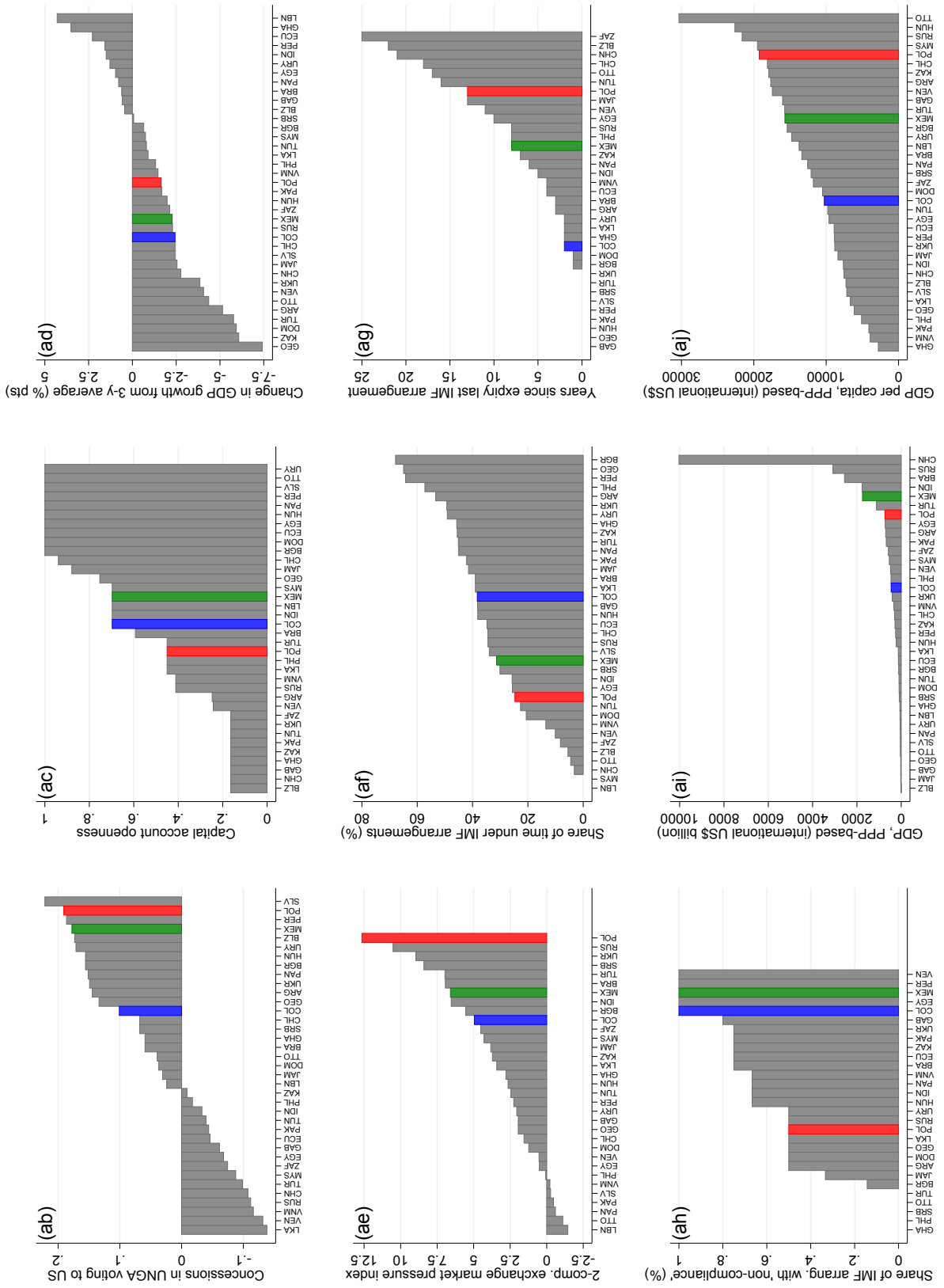




Figure A1: Continued



Notes: Sample countries and ISO-3 codes as defined in Appendix Table A1 and variables as defined in Appendix Table A2.

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