Inter-American Development Bank
Capital Markets and Financial Institutions

Impact Evaluation of the IDB's Liquidity Program for Growth Sustainability

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Plan of presentation

- Goals and background
- Subprime crisis and macroeconomic impact on LPGS borrowers
- Methodological approach and LPGS timeline
- Results
- Assessing PGLS Rationale and Outcomes

Goals and background

Goals:

(1) Assess short-term effect of LPGS-related public news on macroeconomic stability

(2) Take stock of program design and outcomes

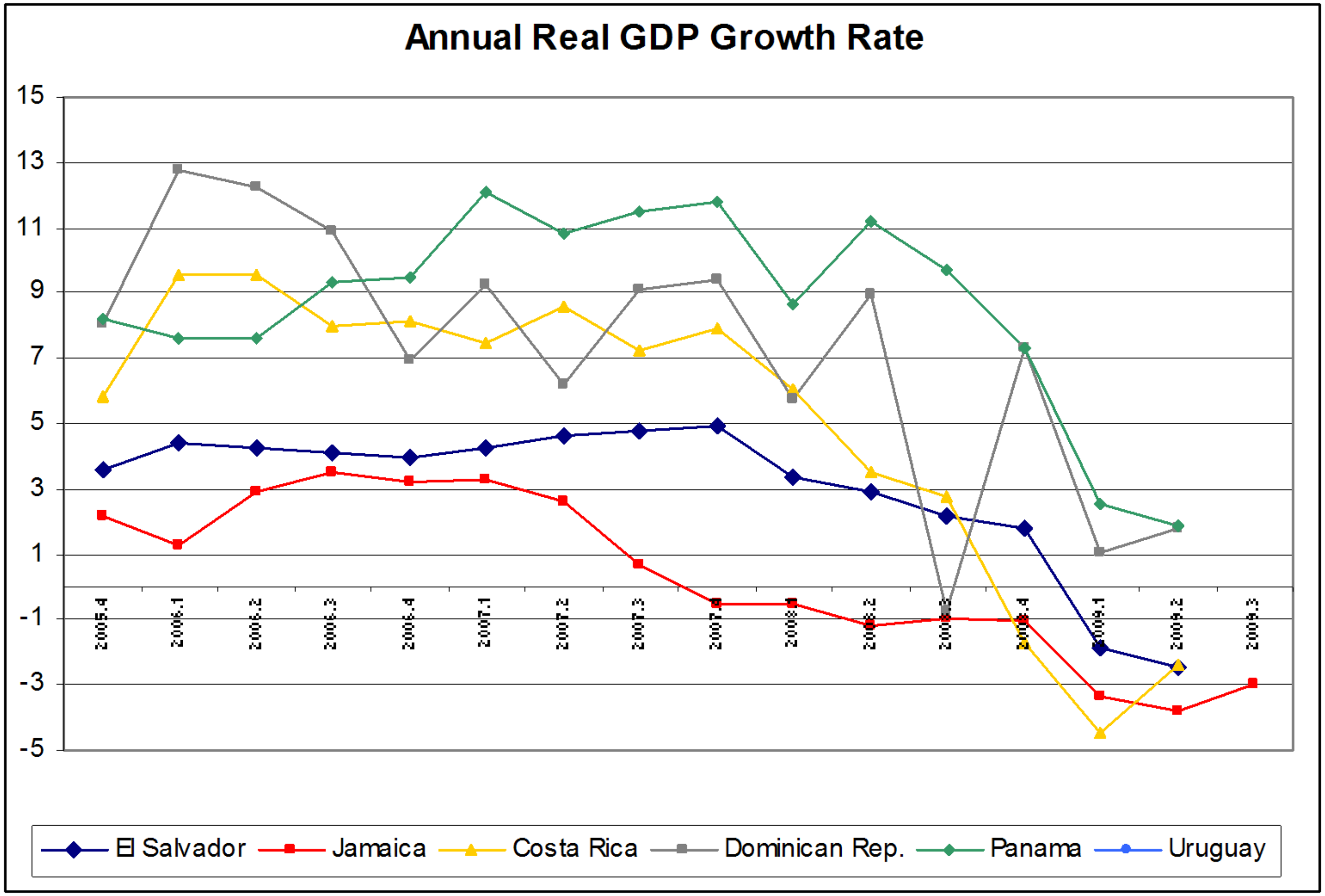
Background:

- ❖ LPGS launched in October 2008 to provide liquidity to LAC countries hit by subprime crisis spillovers
- ❖ Emergency line to be managed by central banks or other second-tier institutions
- ❖ MSME as final beneficiaries, to meet working capital and trade financing needs
- ❖ Expedited disbursement, 5-year maturity, 3-year grace period and soft eligibility rules
- ❖ US$ 6 billion available with a maximum of US$ 500 million per country (appealing only for small countries)

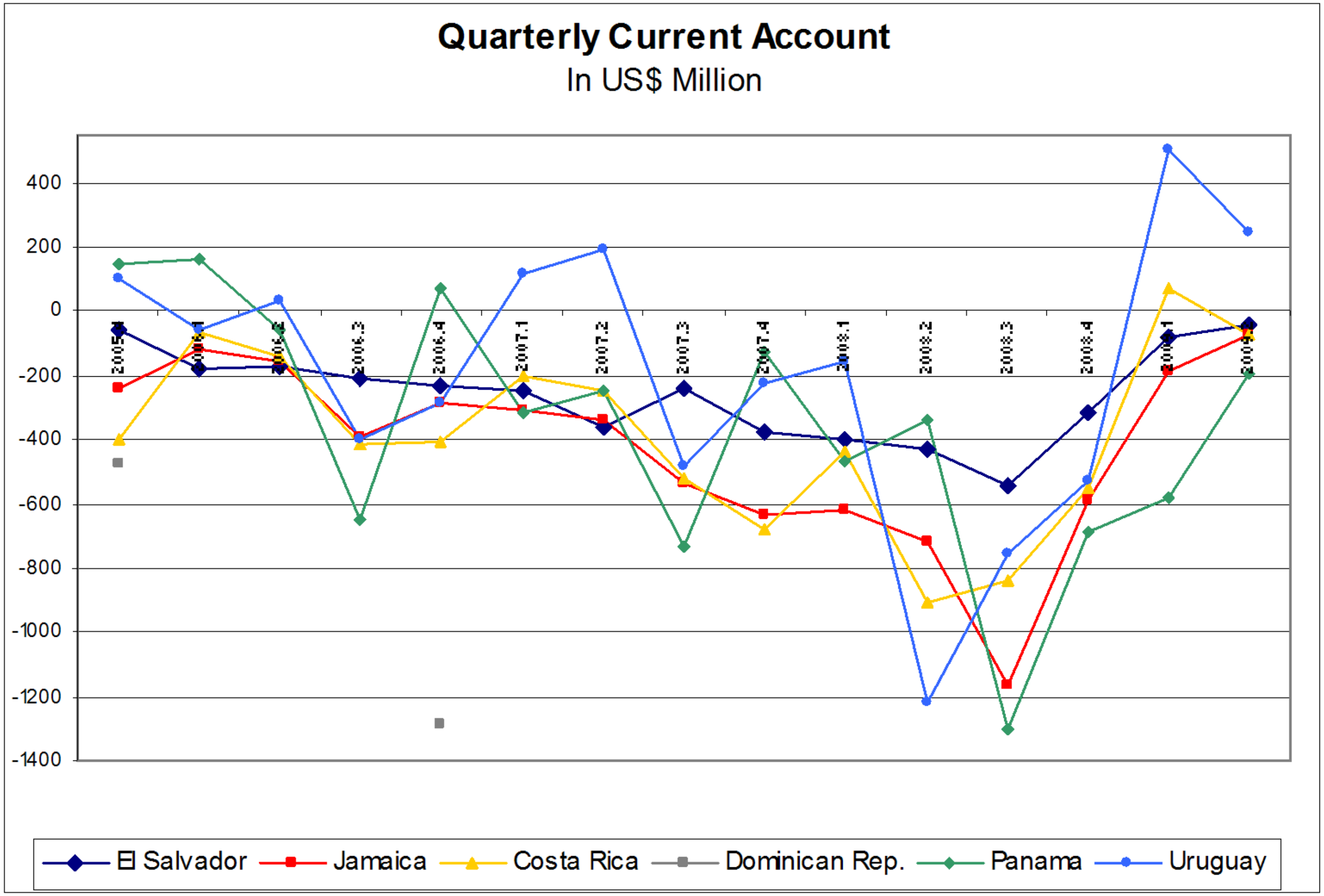
Execution of LPGS

Country	Agreed Loan Amount (US$ million)	IDB Board and Country Approval	Amount Disbursed so far (US$ million)	Local Counterpart
El Salvador	400	Yes	188	Central Bank with surveillance by Banco Multilateral de Inversiones
Costa Rica	500	Yes	0	Central Bank
Jamaica	300	Yes	74	Development Bank of Jamaica
Dominican Rep.	300	Yes	0	Central Bank
Panama	500	Yes	0	Banco Nacional de Panamá

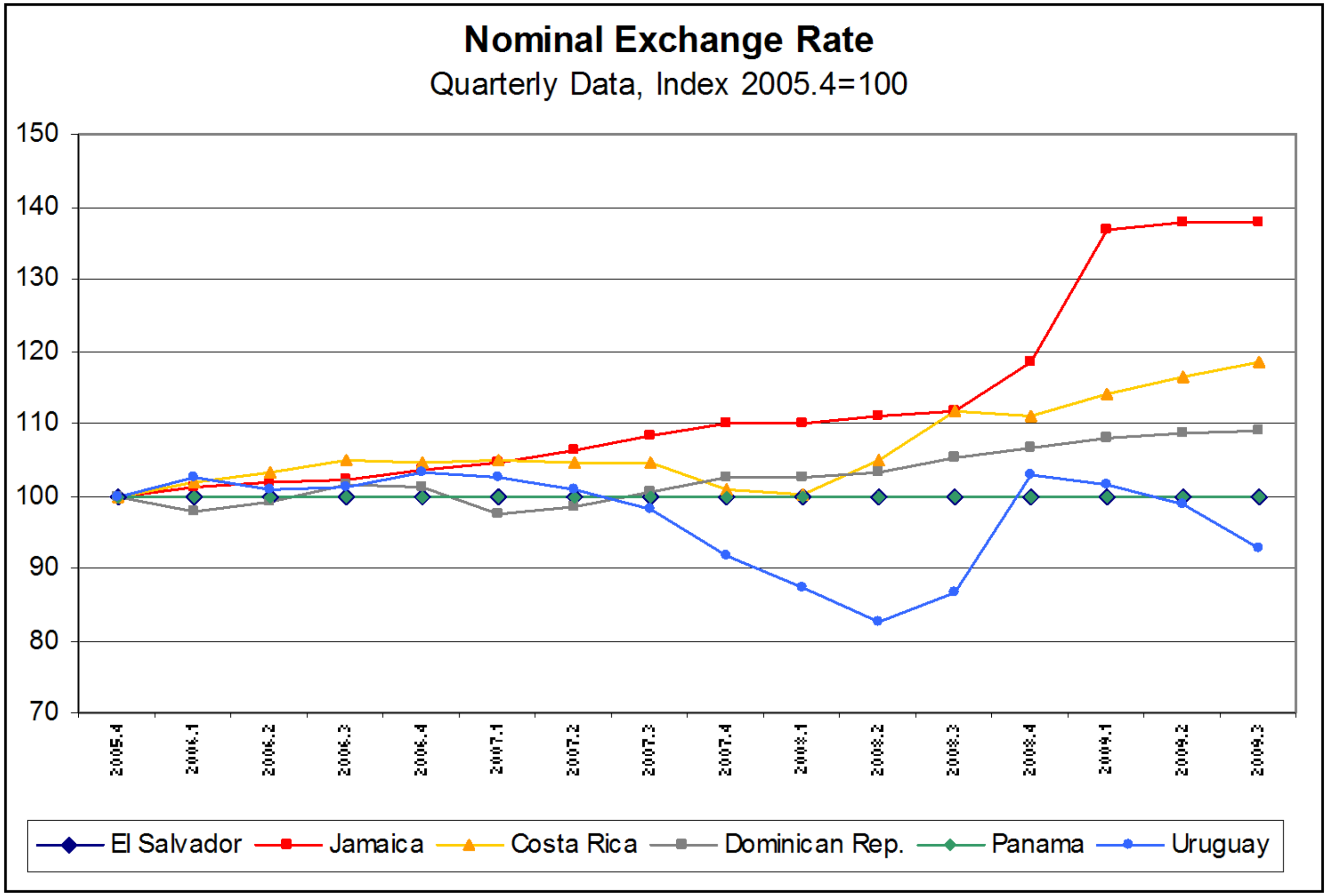
Selected macroeconomic indicators of distress



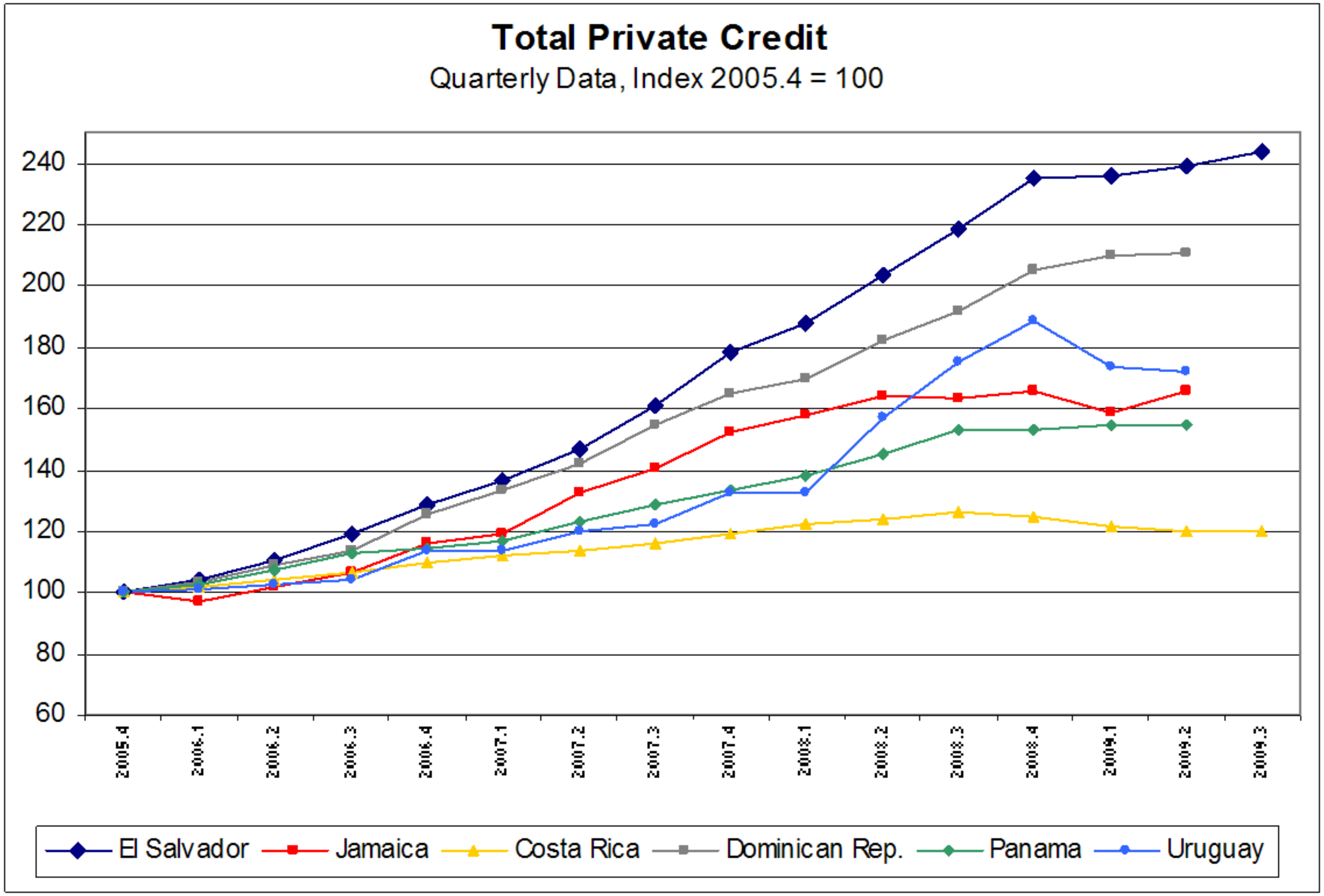
Annual Real GDP Growth Rate
15
13
11
9
7
5
3
1
-1
-3
-5
2005.4
2006.1
2006.2
2006.3
2006.4
2007.1
2007.2
2007.3
2007.4
2008.1
2008.2
2008.3
2008.4
2009.1
2009.2
2009.3
El Salvador
Jamaica
Costa Rica
Dominican Rep.
Panama
Uruguay



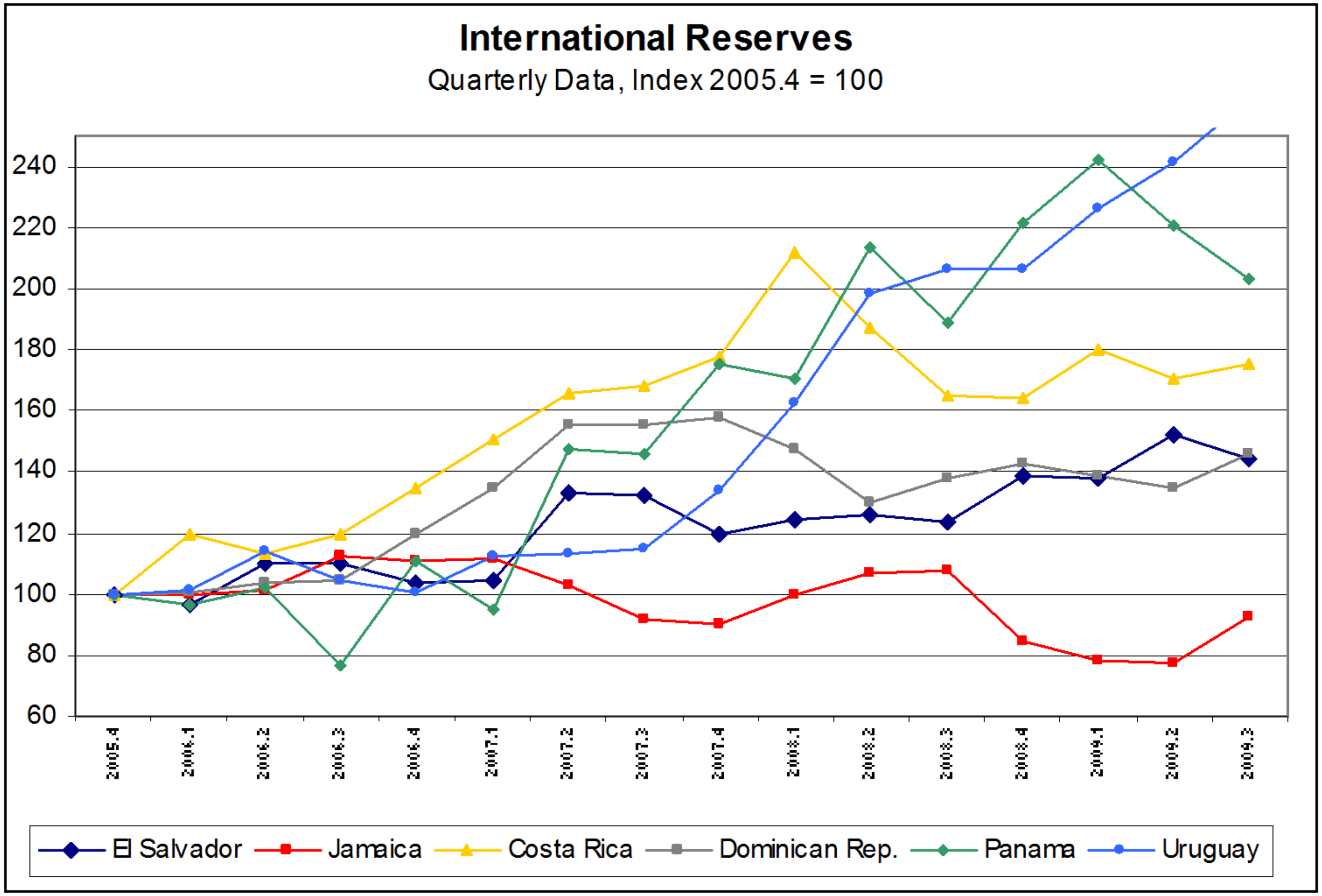
Quarterly Current Account
In US$ Million
400
200
0
-200
-400
-600
-800
-1000
-1200
-1400
2006.3
2006.4
2007.1
2007.2
2007.3
2007.4
2008.1
2008.2
2008.3
2008.4
El Salvador
Jamaica
Costa Rica
Dominican Rep.
Panama
Uruguay



Nominal Exchange Rate
Quarterly Data, Index 2005.4=100
150
140
130
120
110
100
90
80
70
2005.4
2006.1
2006.2
2006.3
2006.4
2007.1
2007.2
2007.3
2007.4
2008.1
2008.2
2008.3
2008.4
2009.1
2009.2
2009.3
El Salvador
Jamaica
Costa Rica
Dominican Rep.
Panama
Uruguay



Total Private Credit
Quarterly Data, Index 2005.4 = 100
240
220
200
180
160
140
120
100
80
60
2005.4
2006.1
2006.2
2006.3
2006.4
2007.1
2007.2
2007.3
2007.4
2008.1
2008.2
2008.3
2008.4
2009.1
2009.2
2009.3
El Salvador
Jamaica
Costa Rica
Dominican Rep.
Panama
Uruguay


International Reserves
Quarterly Data, Index 2005.4 = 100
240
220
200
180
160
140
120
100
80
60
2005.4
2006.1
2006.2
2006.3
2006.4
2007.1
2007.2
2007.3
2007.4
2008.1
2008.2
2008.3
2008.4
2009.1
2009.2
2009.3
El Salvador
Jamaica
Costa Rica
Dominican Rep.
Panama
Uruguay

Empirical Approach

- ***Driving question:*** *Did the public announcement of LPGS negotiations or disbursements diminish the level and volatility of key macroeconomic indicators?*

- Countries under analysis:
  - Entered the program: *El Salvador and Jamaica*
  - Accepted but later withdrew: *Costa Rica, Dominican Republic and Panama*
  - Declined invitation but given fast disbursement of pre-agreed loans: *Uruguay*

Data

Two required conditions:

(1) Financial variables sensitive to market mood swings, so as to be able to capture confidence effects of LPGS news

(2) High frequency (daily or at least less-than-monthly) to capture immediate, post-disclosure effect

Only variables meeting these conditions (many of which publicly unavailable):

- ***Interbank interest rate** in El Salvador, Costa Rica, and Dominican Republic;*
- ***Country risk premium** (as measured by JP Morgan's EMBI) in Panama and Uruguay;*
- ***International reserves** in Jamaica*

Event study based on GARCH *(Generalized Autoregressive Conditional Heteroskedasticity)* model

Advantages:

- Simultaneously estimates a standard (or mean) equation and a volatility equation

- Volatility autocorrelation or clustering is most likely to take place during crises (periods of high volatility following by more volatility, and viceversa)

- This violates Gauss-Markov homokedasticity assumption *[coefficients are still unbiased but display too low standard deviations, giving false sense of precision]*

- Instead of trying to correct this problem by modifying the variance-covariance matrix, GARCH models treat variance as another variable to be estimated

- Best variance predictor based on long-run variance and the most recent squared residual

- Maximum likelihood is employed to estimate the parameters after substituting in the normal distribution the variance parameter for its sample counterpart.

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 r_{t-1} + \alpha_3 D + \varepsilon_t \qquad (1)$$

$$\sigma_t^2 = \alpha_4 + \alpha_5 \varepsilon_{t-1}^2 + \alpha_6 \sigma_{t-1}^2 + \alpha_7 D \qquad (2)$$

Equation (1) is the *mean equation*, and Equation (2) is the *variance equation*

y_t is the variable of interest, explained by:

y_{t-1} : *autocorrelation caused by inertia in financial series*

r_{t-1} :lagged S&P500 index return (*subprime crisis contagion*)

D: LPGS-related news, represented by a dummies vector

D takes value 1 the day the information is publicly disclosed, and 0 otherwise

Two different kinds of news are distinguished:

1. **“LPGS Announcement” dummy:** LPGS is announced and formal negotiations with the country start
2. **“LPGS Approval” dummy:** Contract is signed

Underlying assumptions of this approach:

- ✓ *News were not anticipated by the market*

- ✓ *International financial market developments are properly controlled for:* lagged US stock returns are included

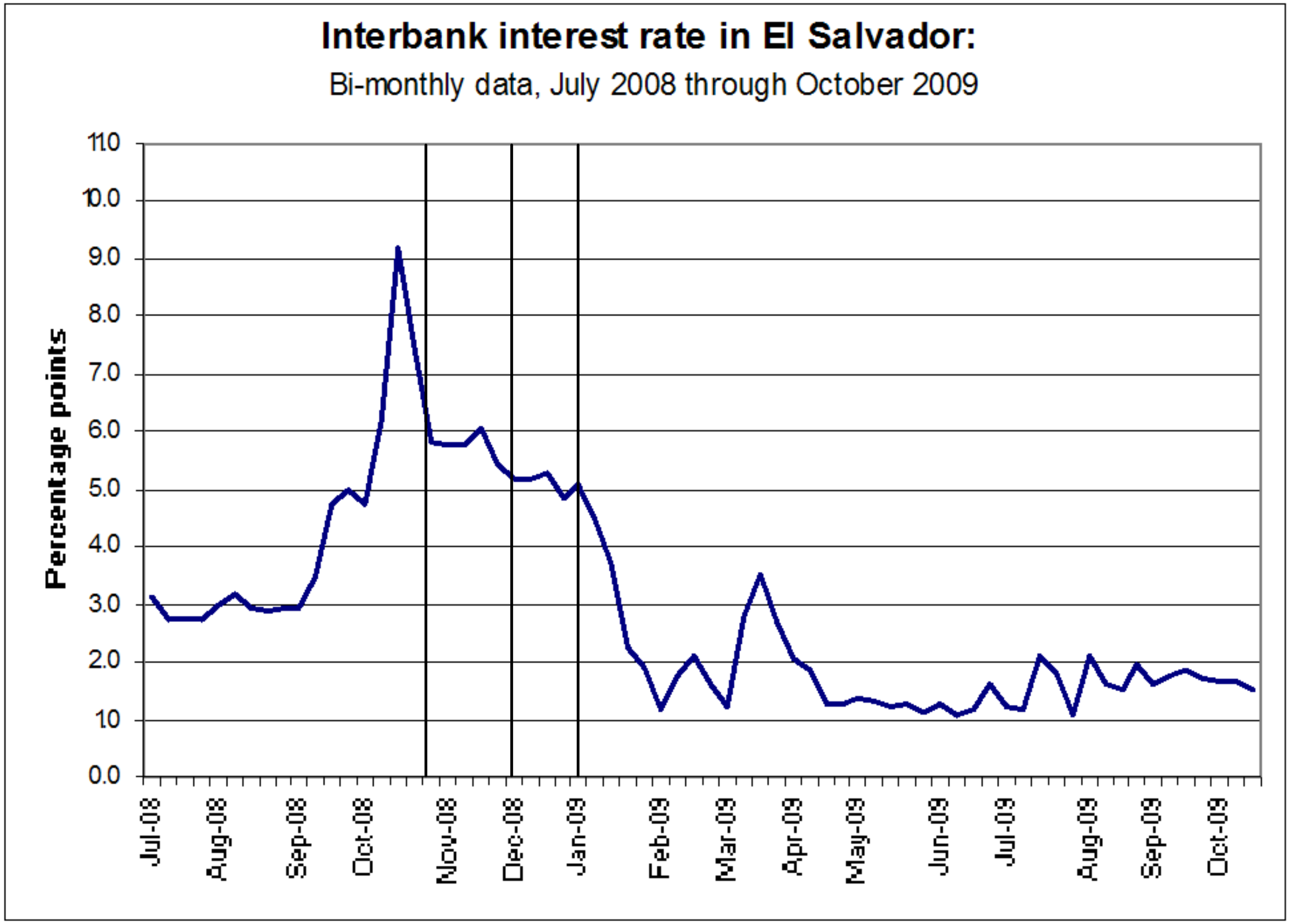
- ✓ *No other major news were released around the same time* (such as new policy measures, cabinet changes, other multilateral support programs, and the like): such news were also compiled and no overlaps with LPGS news were found

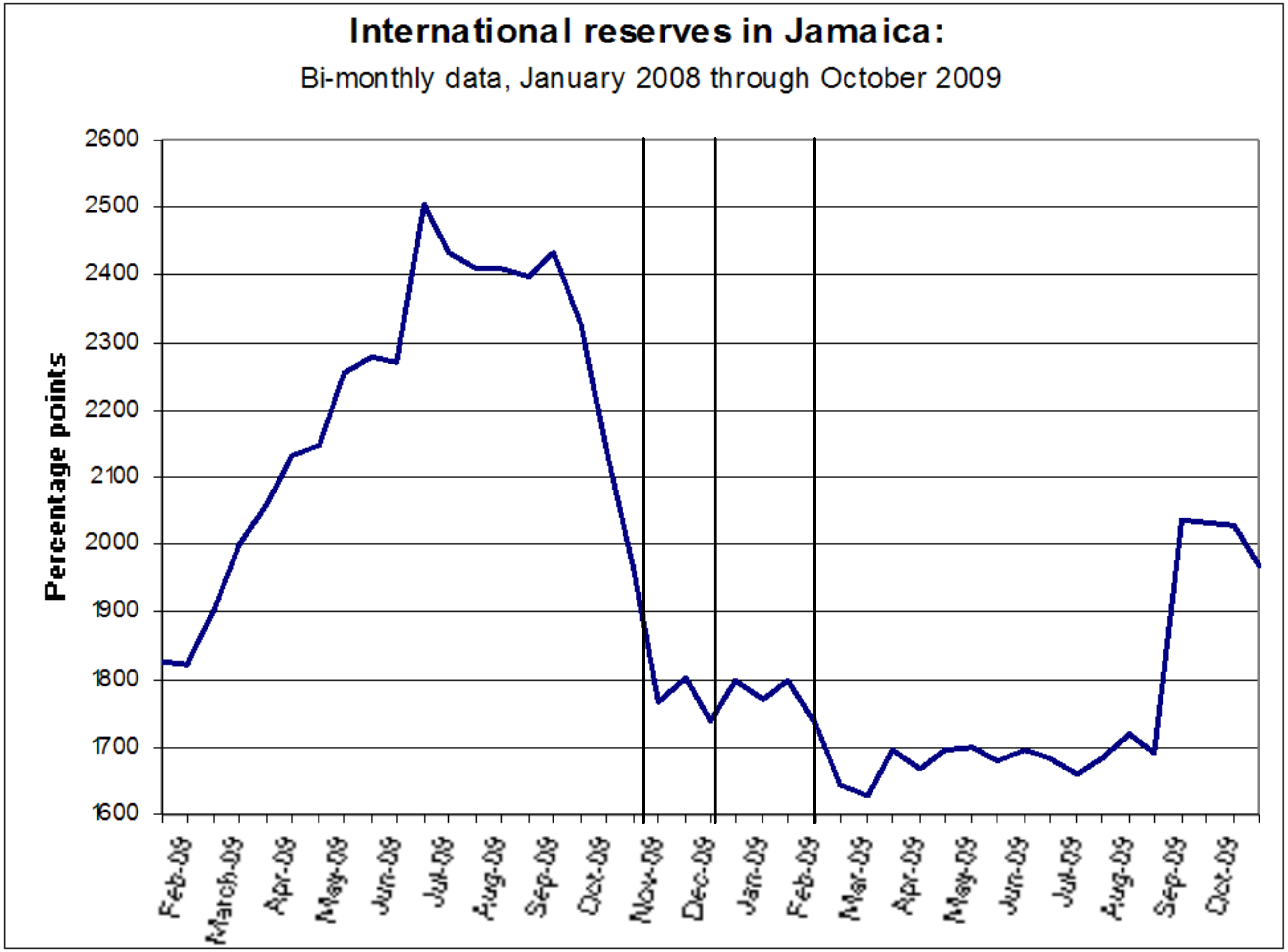
→ *Potential shortcomings are reasonably minimized*

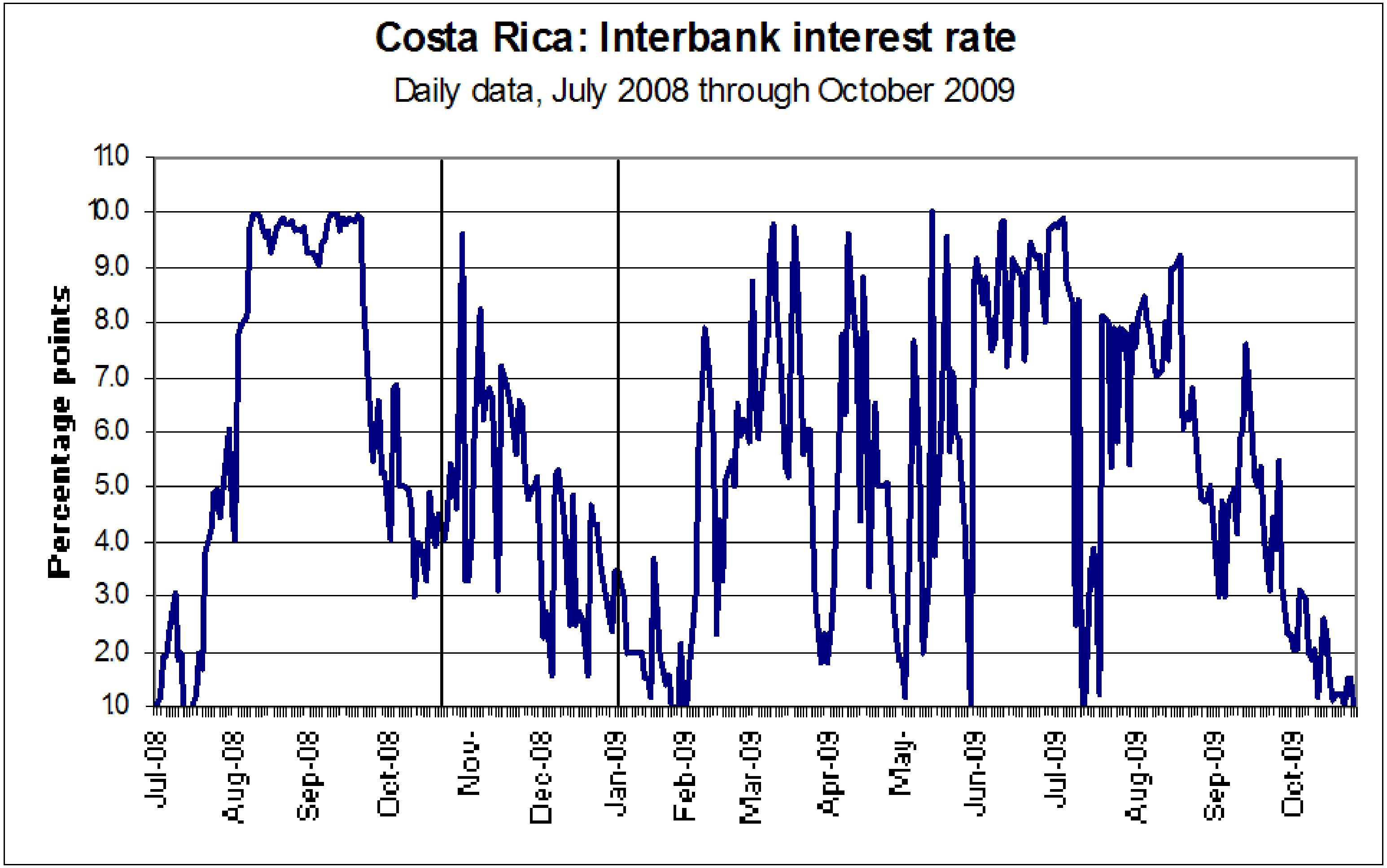
LPGS-related news and high frequency data

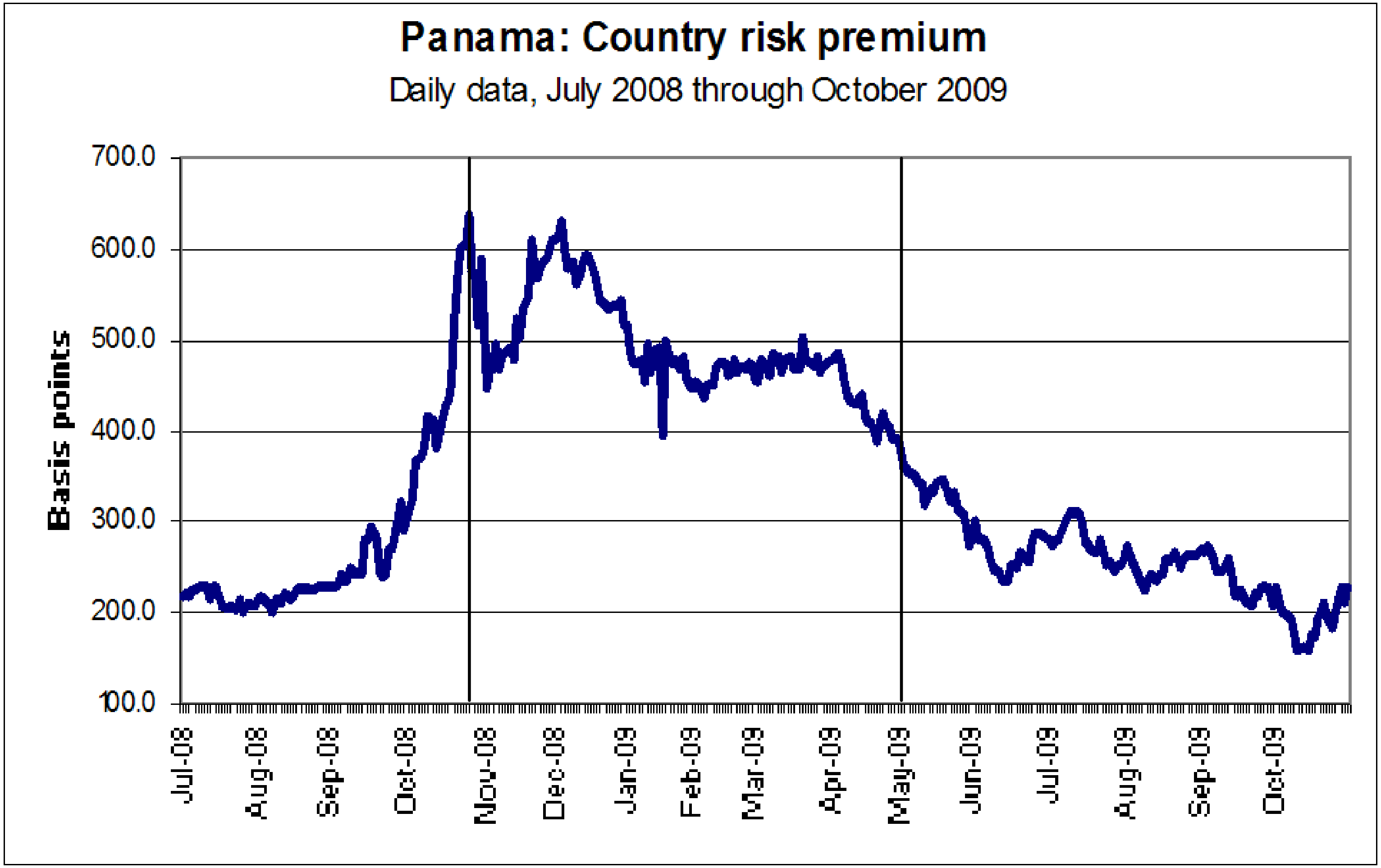
El Salvador: LPGS Chronology

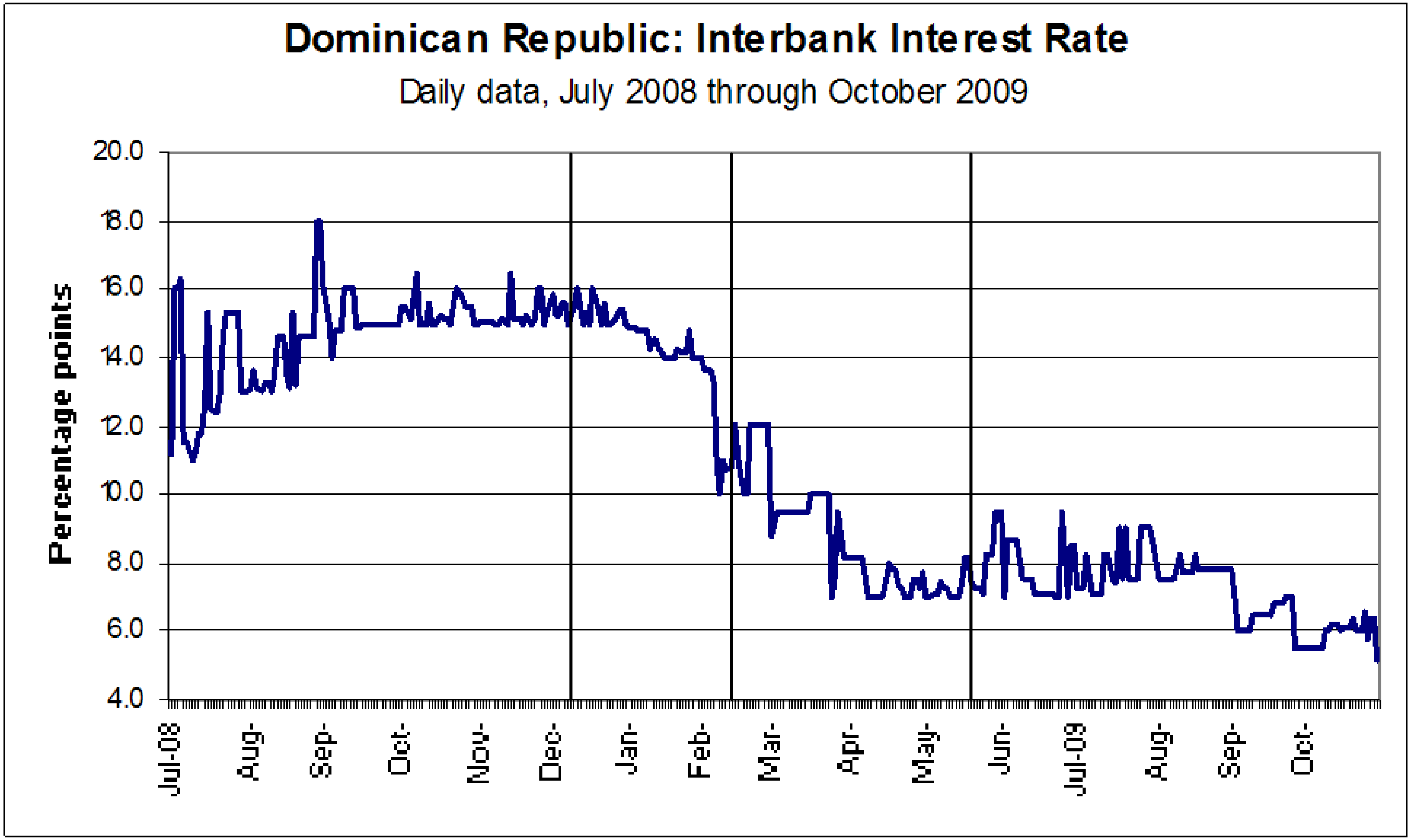
Date	News
10-13-2008	IDB announces LPGS for a total US$6,000 million, along with credit lines from Corporación Andina de Fomento (US$1,500 million) and Fondo Latinoamericano de Reservas (US$1,800 million).
11-12-2008	El Salvador's Banking Association announces US$500 million IDB loan
11-13-2008	President announces US$500 million to be lent by IDB
11-18-2008	President and Central Bank President announce US$500 million to be lent under LPGS. The loan was already approved by IDB Board and is expected to be disbursed in early December 2008
11-18-2008	President also announces negotiations with Central American Bank for Economic Integration (BCIE) for another US$300 million emergency loan
12-19-2008	US$400 million loan approved by the IDB Board on 12-17-2008 and contract signed with El Salvador
12-19-2008	Original offer of US$500 million loan reduced by US$100 million
12-23-2008	El Salvador looks for precautionary credit agreement with the IMF
12-24-2008	First US$37 million LPGS loan disbursed, according to official Central Bank information
01-16-2009	IMF approves stand by credit agreement for US$ 800 million
01-28-2009	Businessmen complain about lack of access to LPGS funds
02-11-2009	US$ 113.4 million already disbursed under LPGS
03-03-2009	US$155.2 million already disbursed as of 02-23-2009 out of total US$400 million, according to official Central Bank information. Up to 02-16-2009, 379 new loans for US$70.8 were granted.
03-08-2009	President of El Salvador complains about high cost of LPGS
04-14-2009	Salvadorean firms express concerns about lack of access to LPGS-financed loans
04-15-2009	US$187.2 million disbursed until 04-13-2009, according to official Central Bank information.
06-03-2009	Additional IDB loans to be made in 2010

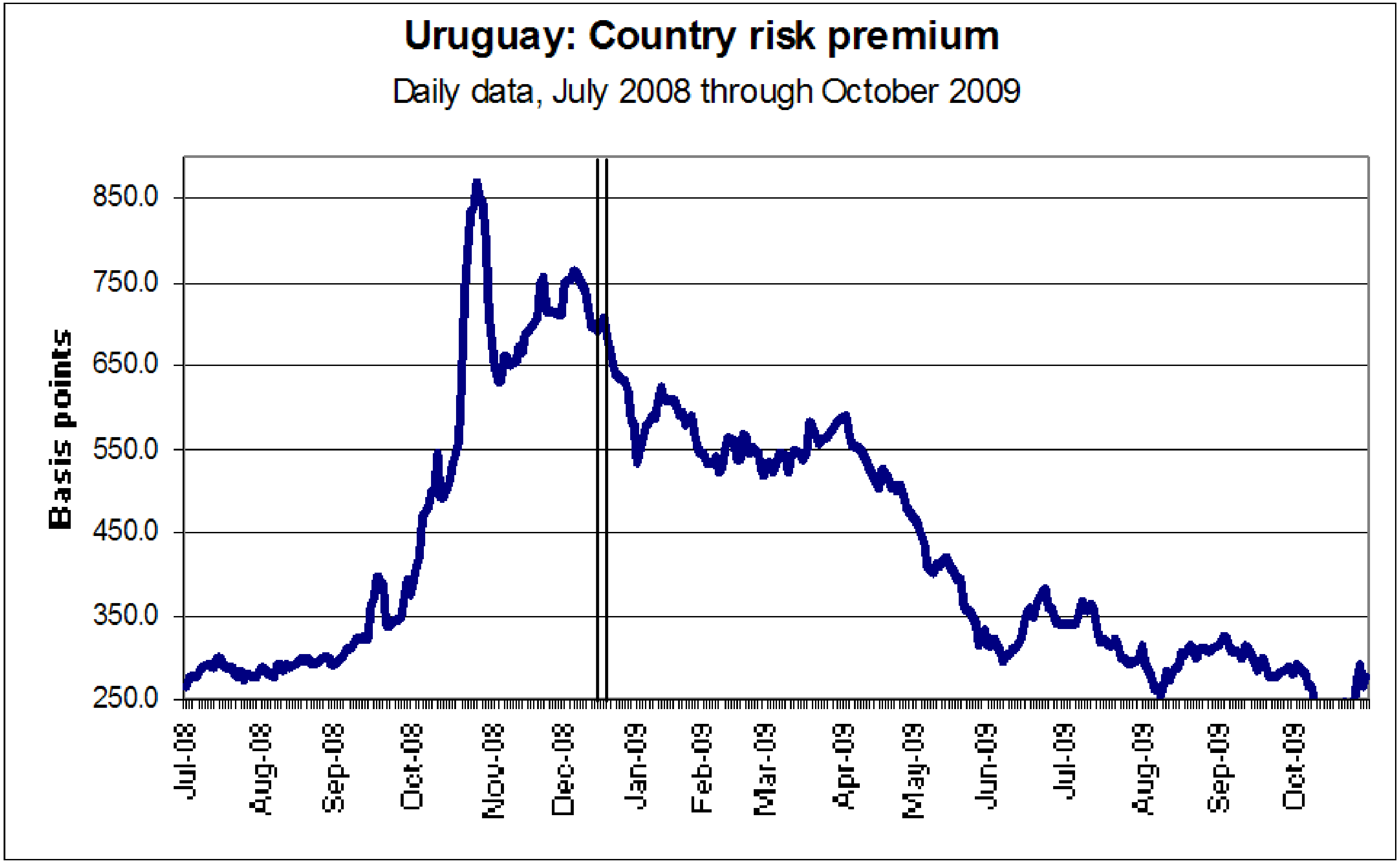

Interbank interest rate in El Salvador:
Bi-monthly data, July 2008 through October 2009
Percentage points
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08
Jan-09
Feb-09
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09


International reserves in Jamaica:
Bi-monthly data, January 2008 through October 2009
Percentage points
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
Feb-09
March-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09
Nov-09
Dec-09
Jan-09
Feb-09
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09


Costa Rica: Interbank interest rate
Daily data, July 2008 through October 2009
Percentage points
110
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
10
Jul-08
Aug-08
Sep-08
Oct-08
Nov-
Dec-08
Jan-09
Feb-09
Mar-09
Apr-09
May-
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09


Panama: Country risk premium
Daily data, July 2008 through October 2009
Basis points
700.0
600.0
500.0
400.0
300.0
200.0
100.0
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08
Jan-09
Feb-09
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09


Dominican Republic: Interbank Interest Rate
Daily data, July 2008 through October 2009
Percentage points
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
Jul-08
Aug-
Sep-
Oct-
Nov-
Dec-
Jan-
Feb-
Mar-
Apr-
May-
Jun-
Jul-09
Aug-
Sep-
Oct-


Uruguay: Country risk premium
Daily data, July 2008 through October 2009
Basis points
850.0
750.0
650.0
550.0
450.0
350.0
250.0
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08
Jan-09
Feb-09
Mar-09
Apr-09
May-09
Jun-09
Jul-09
Aug-09
Sep-09
Oct-09

Econometric Results

El Salvador: LPGS Effects on the Interbank Interest Rate

GARCH(1,1) with Bollerslev-Wooldridge Robust Standard Errors

Dep. Var.: Interbank interest rate	(1)	(2)	(3)	(4)
Mean Equation				
Constant	0.261	0.21*	0.217	0.30
	(1.598)	*(1.875)*	*(1.561)*	*(0.902)*
Interbank interest rate(-1)	0.940***	0.954***	0.953***	0.906***
	(20.482)	*(28.33)*	*(22.094)*	*(9.754)*
S&P 500 Return(-1)	-0.051**	-0.063***	-0.064***	-0.040
	(-1.969)	*(-4.070)*	*(-3.906)*	*(-1.321)*
LPGS Announcement Dummy	-1.500***	-0.817*		
	(-4.302)	*(-1.673)*		
LPGS Approval Dummy			-0.017	-0.006
			(-0.198)	*(-0.026)*
Variance Equation				
Constant	0.016	0.007	0.014	0.007
	(1.104)	*(0.508)*	*(1.379)*	*(0.508)*
ARCH(-1)	1.217**	2.06***	1.864***	2.06***
	(1.976)	*(3.584)*	*(3.339)*	*(3.584)*
GARCH(-1)	0.264*	0.125	0.103	0.125
	(1.655)	*(0.969)*	*(0.971)*	*(0.969)*
LPGS Announcement Dummy		-18.64***		
		(-3.322)		
LPGS Approval Dummy				-0.681***
				(-4.208)
Bi-monthly period	05/30/08 - 01/30/09	05/30/08 - 01/30/09	05/30/08 - 01/30/09	05/30/08 - 01/30/09
No. observations	36	36	36	36
Mean of dependent variable	4.15	4.15	4.15	4.15
S.D. of dependent variable	1.70	1.70	1.70	1.70
R-squared	0.787	0.780	0.761	0.765
Adjusted R-squared	0.743	0.726	0.711	0.706
Log likelihood	-28.09	-26.19	-27.54	-39.64
F-statistic	17.835	14.217	15.37	13.00
Prob(F-statistic)	*0.000*	*0.000*	*0.000*	*0.000*
LM ARCH test F-statistic (5 lags)	1.973	0.701	0.763	1.669
Probability LM ARCH test (5 lags)	*0.169*	*0.408*	*0.389*	*0.205*
Q-stat (5 lags)	6.096	5.355	5.499	7.905
Probability Q-stat (5 lags)	*0.297*	*0.374*	*0.358*	*0.162*

Statistical significance of the LPGS "Negotiation" and "Approval" Dummies (*)

Country	Dependent Variable	Estimated Coefficient on					
		Lagged Dependent Variable	S&P500 Index Return	LPGS Negotiation Dummy (Mean Equation)	LPGS Approval Dummy (Mean Equation)	LPGS Negotiation Dummy (Variance Equation)	LPGS Approval Dummy (Variance Equation)
El Salvador	Interbank Interest Rate	+	-	-	0	-	-
Jamaica	International Reserves	+	+	+	+	0	0
Costa Rica	Interbank Interest Rate	+	-	-	-	-	0
Panama	Country Risk	+	0	-	-	-	0
Dominican Republic	Interbank Interest Rate	+	0	0	-	0	-
Uruguay	Country Risk	+	-	-	-	-	0

(*) (+) Positive and significant at 10% or less, (-) Negative and significant at 10% or less, (0) Non-significant at 10% or less.

Economic significance of the LPGS "Negotiation" and "Approval" Dummies (*): Mean Equation

Country	Dependent Variable	Impact of Dummy Estimate on Dependent Variable (*)	
		LPGS Negotiation Dummy (Mean Equation)	LPGS Approval Dummy (Mean Equation)
El Salvador	Interbank Interest Rate	-36.1%	0
Jamaica	International Reserves	+2.6%	+2.0%
Costa Rica	Interbank Interest Rate	-7.8%	-35.6%
Panama	Country Risk	-7.2%	-4.1%
Dominican Republic	Interbank Interest Rate	0	-11.4%
Uruguay	Country Risk	-1.9%	-3.0%

(*) Calculated as (Point Estimate on Dummy Variable) / (Mean Value of Dependent Variable over the estimation period).
A value of zero (0) means that the estimated coefficient was statistically not significant at 10% or less.

Economic significance of the LPGS “Negotiation” and “Approval” Dummies (*): Variance Equation

Country	**Dependent Variable**	**Impact of Dummy Estimate on Dependent Variable (*)**	
		LPGS Negotiation Dummy (Variance Equation)	LPGS Approval Dummy (Variance Equation)
El Salvador	Interbank Interest Rate	-2.3%	0
Jamaica	International Reserves	0	0
Costa Rica	Interbank Interest Rate	-25.6%	0
Panama	Country Risk	-1.3%	0
Dominican Republic	Interbank Interest Rate	0	-19.8%
Uruguay	Country Risk	-0.06%	0

(*) Calculated as (Point Estimate on Dummy Variable) / (Mean Value of Dependent Variable over the estimation period).
A value of zero (0) means that the estimated coefficient was statistically not significant at 10% or less.

Assessing LPGS Design and Outcomes

Four Issues

1. Why was the assistance oriented towards the private sector and not to the public sector?
2. Were lending conditions too harsh?
3. Why was the line underutilized?
4. Was LPGS in the end an actual production-enhancing mechanism or just an insurance scheme in disguise?

Why was the assistance oriented towards the private sector and not to the public sector?

- IDB is a development bank, and as such it is outside its scope to play a lender-of-last-resort function at the regional level
- Instead, its mission is to provide resources with a direct impact on the country's *productive* capabilities
- Bank's mission complements that of the IMF, which is more resembling of a supranational lender of last resort
- Avoiding overlaps between multilaterals makes for a more efficient international financial architecture

Were lending conditions too harsh?

- Interest rate (LIBOR plus 400 basis points) was atypically high for an IDB loan
- Same applies to the front-end fee of 1% on the full amount requested and the 0.75% commitment fee on unused funds
- Adding to this, in making new loans, financial institutions would retain credit risk while posting guarantees to the second-tier institution
- Avoiding overlaps between multilaterals makes for a more efficient international financial architecture

Were lending conditions too harsh?

- Were these terms self-defeating or were actually coherent with the spirit of the program?
- With the benefit of hindsight, the evidence leans towards the second interpretation
- The Bank had to choose between more penalizing or more benevolent loan terms
- Under the former, willingness to participate would presumably be discouraged
- However, this would make it easier to identify the countries with a more pressing need for fresh funds

Were lending conditions too harsh?

- Softer conditions would make countries more enthusiastic to enter, but for the wrong reasons
- Financial institutions may have taken on the line not for boosting new lending but to substitute for other onerous sources of finance
- The Bank was uncertain about its ability to replenish this pool of resources in the midst of the crisis were it exhausted too quickly $\rightarrow$ an efficient rationing mechanism was needed

$\rightarrow$ *Hard loan terms were instrumental to the goal of screening countries with a speculative demand for funds from those facing an actual financial constraint*

Why was the line underutilized?

- Only 4.6% of the U$S6,000 million were effectively lent (US$89.4 million to Jamaica and US$186.4 million to El Salvador)
- Limited application of available funds might wrongly be interpreted as a failure of the program
- Weakness of this claim lies on the implicit assumption that money was badly needed

Why was the line underutilized?

Reasons for low LPGS demand:

- Credit demand was held back by the heightened risk aversion and the economic downturn
- By and large, banking systems did not witness a shrinkage of total liabilities
- The crisis was short-lived: by the time negotiations were under way, the initial demand was already vanishing
- In a context of dubious ability to repay, bank managers may have been against making new loans, regardless of any perceived final demand

Was LPGS in the end an actual production-enhancing mechanism or just an insurance scheme in disguise?

- Were countries trying to buy some time until regaining market confidence without the earnest intention of taking the loan?
- Front-end and commitment fees, 180-day validity of the loan approval and the one-year limit for making the loans were intended to encourage quick use of funds
- Countries were torn between avoiding a costly credit line and the risk of losing access to these valuable resources (first-come, first-served rule)
- Hence, countries did not seem to have applied to LPGS for a pure speculative insurance motive
- Again, loan conditions helped as an efficient self-selection device

Was LPGS in the end an actual production-enhancing mechanism or just an insurance scheme in disguise?

- This does not mean that LPGS did not act in practice as a sort of macroeconomic insurance policy
- Our previous econometric results attest to LPGS success in mitigating macroeconomic uncertainty
- This is true even for the mere announcement of negotiations and for rather small disbursements
- This suggests that LPGS worked out regardless of its intended productive use
- This is precisely the confidence effect associated to an insurance

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