

Cost of banking crises: Does the policy framework matter?

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Disclaimer: The views expressed in the article are those of the authors and do not necessarily reflect those of the Banque de France.

Introduction

Many studies on the **main determinants** of the **occurrence** and **cost of banking crises**

Important issue: banking crises are very harmful for the real economy

Recent surveys highlight the responsibility of: excess credit and debt, size of banking sector, trade openness, current account deficits, banking regulation, institutional quality, ...

What about policy frameworks?

Definition

The macro policy framework refers to all the features that define and **restrict** the conduct of macro policies (monetary policy, fiscal policy, ER regime)

We focus on the **degree of restrictiveness** of PF (may be ambivalent)

Consider a restrictive PF (ex: fiscal rule)

Advantages

- Strengthen accountability
- Discipline policymakers (see Heinemann & Al., 2018)
- Time-consistent policies
 - ⇒ Improve the credibility of policymakers
 - ⇒ Strengthen policy and eco stability
 - ⇒ Reduce vulnerabilities that lead to financial crises
- Give fiscal space in case of crisis (Romer & Romer, 2017)

Drawbacks

- Lack of flexibility (rules = inappropriate if unstable eco structures)
- Having the hands tied may lead banking crises to be more costly
- Stringent PF are not sufficient to prevent banking crises
- Stringent PF (Fiscal rules, CBC, CBI, Fixed ER, ...) may be counter-productive and induce procyclicality

Introduction

Question: Do the discipline-enhancing effects of restrictive PF exceed the drawbacks related to the lack of flexibility and the counter-productive effects?

Influence of the **degree of restrictiveness of PF**: this issue has been neglected so far; **1st originality** of our contribution

The **2nd originality** is that we focus on the *unconditional* cost of banking crises

- The existing literature focuses on the cost of banking crises *conditional* on having a banking crisis
 - Selection bias
 - Neglect the factors that explain why a crisis occurs or not
 - PF can contribute to crisis / non-crisis situations ⇔ **the absence of crisis is an important information**
- Similarly, focusing only on the proba of crisis = not sufficient

Introduction

- We want to gauge the **global effect** of several key macro policy features on the (unconditional) **cost of banking crises** (like in a cost-benefit analysis)
- Empirical investigation
 - A sample of **67 countries** over the period **1970-2012**
 - The value of the dependent variable reported at any time for any country, may be zero or positive. **Zero = no crisis or no costs in case of crisis.**

The empirical approach of our paper rely on a **random-effects Poisson estimator**

Agenda

- 1 Introduction
- 2 The cost of banking crises
- 3 Methodology
- 4 Fiscal PF
- 5 ERR
- 6 Monetary PF
- 7 Robustness
- 8 Conclusion

Measuring the cost of banking crises

Measuring the cost of banking crises

Our dependent variable measures the unconditional cost of banking crises, such as:

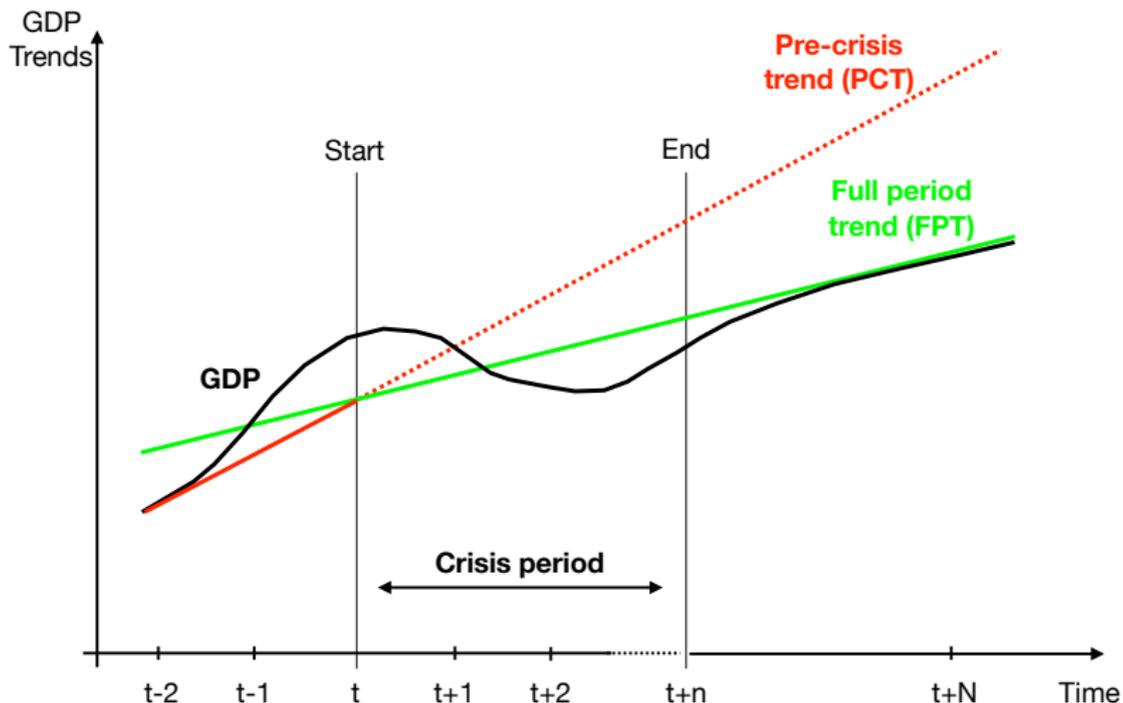
$$y_{i,t}^k = \begin{cases} \tilde{y}_{i,t}^k & \text{when a banking crisis occurs} \\ 0 & \text{otherwise} \end{cases}$$

Banking crises dates are those provided by Laeven & Valencia (2013)

As usual in the literature, the *conditional* costs of banking crises refer to GDP losses

We use $k = 4$ alternative measures of output losses

Measuring the cost of banking crises



Measuring the cost of banking crises

- “loss_5years” measures the gap between the actual GDP and the linear extrapolated HP pre-crisis trend (noted $PCT_{i,t}$). Following Wilms & Al. (2018), extrapolation is based on the average growth rate of the trend over the 5 years before the banking crisis:

$$\tilde{y}_{i,t}^{5\text{year}} = \frac{PCT_{i,t} - GDP_{i,t}}{PCT_{i,t}}$$

- “loss_all” = same definition, but with extrapolation based on the average growth rate of the trend from the 1st observation to the year before the start of the banking crisis

Measuring the cost of banking crises

- “trend_loss” = loss in trend over the crisis period. This makes reference to hysteresis effects related to banking crises (see Cerra & Saxena, 2017). With $FPT_{i,t}$ corresponding to the HP filter trend computed over the full sample:

$$\tilde{y}_{i,t}^{trend} = \frac{PCT_{i,t} - FPT_{i,t}}{PCT_{i,t}}$$

- “cycle_all” = the gap between actual GDP and the full period trend.
Idea: if significant loss, is it due to a change in GDP trend or to a temporary deviation of the actual GDP from this - possibly yet decreasing or lower - trend?

$$\tilde{y}_{i,t}^{cycle} = \frac{FPT_{i,t} - GDP_{i,t}}{FPT_{i,t}}$$

The methodology

Our real losses measures are characterised by a **right-skewed distribution** with a **mass-point at zero** (= no crisis + crisis with no real losses)

- ⇒ ~~Gaussian distribution~~ ⇒ ~~Tobit model~~
- ⇒ Poisson model (for continuous variables. Ex: Int. trade)

Our estimates are based on the Pseudo-ML estimators of a random-effects Poisson model:

$$y_{i,t}^k = \xi_i \exp \left(\beta_0 + \sum_{s=1}^9 \beta_s X_{s,i,t-1} + \beta_{PF} PF_{i,t-1} + \delta_t + \epsilon_{i,t} \right)$$

Random effects \sim Gamma distribution to deal with the problem of overdispersion (Wooldridge, 2015)

The control variables

Macroeconomic and financial characteristics

- GDP per capita (level of dev + heterogeneity)
- Inflation rate
- Credit-to-GDP ratio (= size of the banking sector)

Real and financial vulnerabilities:

- Credit-to-GDP gap
- Public debt (as a % of GDP)

International stress:

- The number of simultaneous banking crisis in time t
- Domestic currency crisis (dummy from Reinhart & Rogoff, 2009)

Policy responses:

- Discretionary gov spendings (Ambrosius, 2017)
- The level of central bank assets (Cleaning up afterwards by monetary policy)

Results with the control variables only

	loss_5years	loss_all	trend_loss	cycle_loss
GDP per capita	0.001 (0.001)	0.002** (0.001)	0.003** (0.001)	-0.001 (0.001)
Inflation	0.005*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.004*** (0.001)
Bank credit / GDP	0.028*** (0.002)	0.027*** (0.001)	0.029*** (0.002)	0.021*** (0.003)
Credit-to-GDP gap	0.719*** (0.190)	0.692*** (0.162)	0.574*** (0.212)	1.070*** (0.286)
Public debt / GDP	0.025*** (0.002)	0.027*** (0.001)	0.027*** (0.002)	0.024*** (0.003)
Simultaneous crisis	0.002 (0.006)	0.002 (0.005)	0.002 (0.006)	0.019 (0.013)
Currency crisis	0.824*** (0.081)	0.571*** (0.070)	0.835*** (0.087)	0.958*** (0.125)
Discret. gov. consumption	-3.412*** (0.473)	-2.044*** (0.379)	-1.731*** (0.510)	-3.988*** (0.660)
CB assets	0.002 (0.005)	-0.006 (0.004)	0.008 (0.006)	-0.016** (0.008)
Constant	-3.043*** (0.354)	-2.934*** (0.321)	-3.680*** (0.379)	-3.490*** (0.432)
Observations	2,193	2,193	2,193	2,193
Number of countries	67	67	67	67
Crisis obs.	212	212	212	212
Year FE	YES	YES	YES	YES

Notes: Standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

The impact of the fiscal policy framework

We focus on **fiscal rules** (FR) to characterize the degree of restrictiveness of the fiscal PF

- FR represent **restrictions**
 - Are **discipline-enhancing**
 - A way to improve the **credibility** of policymakers
 - Should reduce the risk of **sovereign and twin crises**
 - More “**fiscal space**” (in case of crisis)
 - **But lack flexibility** in case of crisis + potential **pro-cyclicality** problem
- We focus on 3 types of rules, based on the database provided by Schaechter & AI (2012)
 - **Expenditure rules** : limits on gov spending
 - **Budget balance rules** : constraints on public deficit
 - **Debt rules** : limits in terms of debt-to-GDP ratio
= binary variables (1/0 for i at time t).

+ **number of rules** simultaneously prevailing at time t in i

The impact of fiscal rules (1/2)

	loss_5years	loss_all	trend_loss	cycle_loss
Expenditure rule	-1.605*** (0.201)	-1.835*** (0.181)	-2.000*** (0.225)	-1.046*** (0.332)

Budget balance rule	-0.165 (0.187)	-0.455*** (0.162)	-0.440** (0.213)	-0.117 (0.298)

Observations	977	977	977	977
Number of countries	45	45	45	45
Crisis obs.	130	130	130	130
Year FE	YES	YES	YES	YES

Note: Standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

The impact of fiscal rules (2/2)

	loss_5years	loss_all	trend_loss	cycle_loss
Debt rule	-1.818*** (0.231) ...	-2.174*** (0.196) ...	-2.122*** (0.241) ...	-1.679*** (0.393) ...
Number of rules	-0.591*** (0.079) ...	-0.690*** (0.067) ...	-0.769*** (0.087) ...	-0.426*** (0.131) ...
Observations	977	977	977	977
Number of countries	45	45	45	45
Crisis obs.	130	130	130	130
Year FE	YES	YES	YES	YES

Note: Standard errors are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Comments on the impact of fiscal rules

These results suggest that the discipline and credibility effects of FR overcome their potential adverse effects

However, they may rely on the potential existence of “flexibility clauses” which allow for easing the fiscal constraints in case of need (not-so-binding constraints?)

Thus we explicitly consider “flexibility clauses”: “Cycle-friendly” clauses modulate the limit of the budget balance rule according to the position of the economy on the business cycle. $D = 1$ when a budget balance rule is set with a clause, 0 otherwise.

	loss_5years	loss_all	trend_loss	cycle_loss
Budget balance rule with clause	-3.680*** (0.437)	-3.709*** (0.366)	-4.100*** (0.487)	-2.559*** (0.731)
Budget balance rule without clause	0.861*** (0.233)	0.257 (0.183)	0.426 (0.271)	0.568* (0.331)

Conclusion on the impact of fiscal rules

The fiscal policy framework may be even **better** when the constraints are accompanied by a dose of **flexibility**

- ⇒ highlight the benefits of an **intermediate solution** that consist of a rule with a flexibility clause. In particular for budget balance rules (= more counter-cyclical rule)

The impact of exchange rate regimes (ERR)

Bipolar view

- **Corner regimes are restrictive frameworks** that enhance the responsibility of policymakers
- \neq Intermediate ERRs which are more prone to crisis

Recent papers challenge this point of view (Ambrosius, 2017; Combes & Al., 2016)

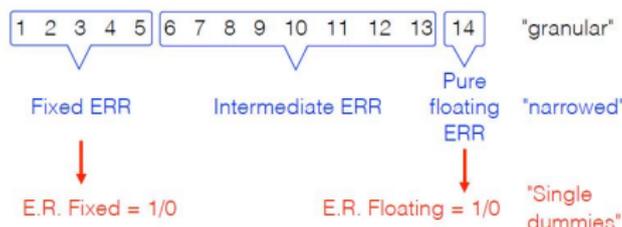
Against this backdrop, we test the influence of ERRs on the unconditional costs of banking crises

Analysis based on the ERR classification of Ghosh & Al (2011)

The impact of the exchange rate regimes (ERR)

Classification of Ghosh & AI (2011) :

Classification of Ghosh & AI (2011) :



Two regressions:

- 1) The 2 single dummies (E.R. fixed and E.R. Floating) are included in the regressions (with intermediate ERR as the reference)
- 2) Non-linearity hypothesis is tested with the quadratic "granular" classification

The impact of the exchange rate regimes (ERR)

	loss_5years	loss_all	trend_loss	cycle_loss
Dummy E.R. fixed	0.728*** (0.110)	0.899*** (0.097)	0.694*** (0.124)	0.559*** (0.165)
Dummy E.R. Floating	0.928*** (0.102)	0.909*** (0.092)	0.670*** (0.120)	1.307*** (0.158)
...
E.R. Regime	-0.410*** (0.057)	-0.558*** (0.050)	-0.379*** (0.065)	-0.480*** (0.088)
E.R. Regime (squared)	0.025*** (0.003)	0.033*** (0.003)	0.023*** (0.004)	0.030*** (0.005)
...
Observations	1,713	1,713	1,713	1,713
Number of countries	67	67	67	67
Crisis obs.	204	204	204	204
Year FE	YES	YES	YES	YES

E.R. Regime: **U-shaped** confirmed with threshold \approx “8’

Discussion on the impact of the ERRs

Fixed ERR

- provides implicit guarantee against currency risk ⇔ moral hazard
- is more vulnerable to speculative attacks and more sensitive to banking and currency crisis (Burnside & Al., 2001, 2004)
- while defending its parity a CB may not be able to fulfil its LLR mission (Chang & Velasco, 2000, ...)

Pure floating

- lead to more volatility in the economy
- threat of increase in real debt burden when agents are indebted in foreign currency (Eichengreen & Hausmann, 1999)

Discussion on the impact of the ERRs (cont'd)

Intermediate ERRs

- do not reduce discipline (market discipline, like flexible ERR: punishment is immediate in case of bad behaviour)
- imply less volatility than a pure floating ERR
- the exchange rate can be used as a stabilising tool in case of crisis (\neq fixed ERR)

Thus, as for FR, **an intermediate solution is to be preferred** (as opposed to a too restrictive framework)

The impact of monetary policy framework: CBI & CBC

Central Banks' Independence (CBI)

- By strengthening the **responsibility** of the policymaker and by protecting her from lobbying pressures, CBI should be **discipline-enhancing**
- But an independent CB may be **less prone to “clean up afterwards”** (Rosas, 2006; Berger & Kisser, 2013)

Central Banks' Conservatism (CBC) (pref. for inflation stabilization)

- A high degree of CBC implies more **monetary discipline**
- **But** can render a banking crisis more costly because of a **lack of “leaning”** before the crisis (Levieuge & AI, 2018) and **lack of “cleaning up”** afterwards

We test the impact of the degree of CBI and CBC on unconditional cost of banking crises

The impact of CBI and CBC: Results and comments

We find that CBI and CBC have a positive effect on the unconditional cost of banking crises [Details](#)

These results do not mean that very low levels of CBC and CBI are desirable

Non-linearity was expected: low and high levels being detrimental

However our sample comprises mostly countries with high levels of CBC and CBI vs only few (low-income) countries with low or intermediate levels of CBC and CBI

⇒ We did not find evidence of non-linearity (On the positive sloped part only? ⇒ Strictly positive impact of CBI and CBC).

The impact of inflation targeting (IT)

IT is a **restrictive framework**: It implies a precommitment to a certain level of inflation at a given horizon

- IT improves **transparency**, **accountability** and **credibility** (Bernanke & Mishkin, 1997)
- However: influence of IT on **financial stability** is discussed (Frappa & Mésonnier, 2010; Lin, 2010; Fazio & Al., 2015)

$$D_{i,t} = \begin{cases} 1 & \text{once a country has (fully fledged) adopted IT} \\ 0 & \text{otherwise} \end{cases}$$

	loss_5years	loss_all	trend_loss	cycle_loss
Inflation targeting	-1.371*** (0.187)	-1.616*** (0.180)	-1.268*** (0.205)	-1.579*** (0.325)

Observations	1,723	1,723	1,723	1,723
Number of countries	67	67	67	67
Crisis obs.	204	204	204	204
Year FE	YES	YES	YES	YES

The impact of inflation targeting (IT) - Comments

Interestingly, **IT mixes pre-commitment and flexibility**: the inflation target has to be reached at a medium-term horizon. Meanwhile, the CB can respond to shocks

Bernanke & Mishkin (1997):

*Some useful policy strategies are ‘rule-like’, in that by their forward-looking nature they constrain central banks from systematically engaging in policies with undesirable long-run consequences; but which also allow some discretion for dealing with unforeseen or unusual circumstances. **These hybrid or intermediate approaches may be said to subject the central bank to ‘constrained discretion’.***

IT = a **constrained discretion framework** which implies **discipline** but allows for **discretion**

IT = an **intermediate solution** between very lax and very restrictive framework, like FR with flexibility clause and intermediate ERRs

The impact of inflation targeting (IT) - Comments

All in all we provide evidence of the benefits of “constrained discretion” in terms of costs of banking crises

= first empirical evidence of the benefits of constrained discretion so far

Robustness checks

- ① Sensitivity of the results to some **banking regulation** features (from Barth & Al., 2013) and to the existence of a **deposit insurance scheme** (WDI database), as add. control variables
 - ✓ The previous findings hold (despite substantial changes in the sample size) + banking regulation reduces costs of banking crises
- ② Do the PF measures only account for **institutional quality**?
 - ✓ Our results are robust to the inclusion of several proxies of institutional quality taken from ICRG database
- ③ Do the PF measures account for **similar characteristics** (poss. unobserved)? Variables related to MP, FP and ER frameworks are simultaneously included in the regressions
 - ✓ All our variables of interest remain significant (original information)

Conclusion

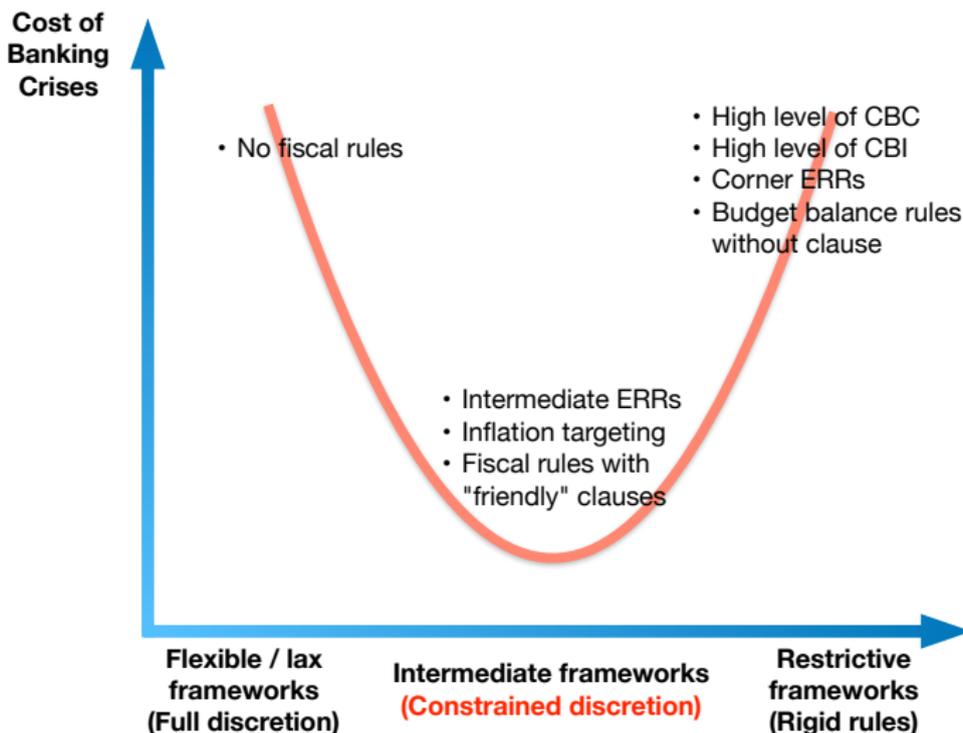
- 1 Influence of the **degree of restrictiveness of PF** (MP, FR, ERR) on the cost of systemic banking crises

Do the discipline-enhancing effects of restrictive PF and their related “policy space” exceed the drawbacks related to the lack of flexibility?

- 2 Focus on the **unconditional cost** of banking crises
- 3 **Original empirical methodology** (random-effects Poisson pseudo-ML estimator)

We find robust evidence of the benefits of policy frameworks based on “constrained discretion”

Graphical representation of the results



Extensions

- 1 Interactions (complementarity / substitutability) between different structural features
- 2 Influence of transparency and credibility on the cost of banking crises (Bianchi & Melosi, 2018)

Thank you for your attention

Impact of CBI - Results

Tests based on the CWN indicator of CBI (*de jure* measure of independence)

	loss_5years	loss_all	trend_loss	cycle_loss
CBI (CWN index)	1.784*** (0.296) ...	1.644*** (0.259) ...	0.624* (0.329) ...	2.152*** (0.464) ...
Observations	1,635	1,635	1,635	1,635
Number of countries	66	66	66	66
Crisis obs.	192	192	192	192
Year FE	YES	YES	YES	YES

Impact of CBC - Results

Tests based on 2 indicators of CBC:

- *de jure* **CWN_OBJ indicator** = a subcomponent of CWN. CWN_OBJ captures the weight given to the objective of price stability relative to other objectives in CB's statutes
- *de facto* **"CONS" indicator** (Levieuge & Lucotte, 2014)

	loss_5years	loss_all	trend_loss	cycle_loss
CWN_OBJ index	1.507*** (0.214) ...	1.081*** (0.187) ...	0.222 (0.240) ...	2.377*** (0.336) ...
CONS_W	0.346** (0.136) ...	-0.070 (0.121) ...	0.429*** (0.151) ...	0.442** (0.212) ...