Information sharing, credit booms and financial vulnerability in developing countries

ESRC -DFID
Workshop FERDI – Clermont-Ferand
April 28th

Research jointly supported by the ESRC and DFID

Outline

1. Introduction: motivation & contribution

2. Literature review

3. Empirical analysis

4. Results

5. Conclusion

1. Introduction: Motivation

- Recent financial crisis has shown the vulnerability of financial systems

- Looking for tools to reduce financial vulnerability
- Enhancing microprudential supervision
- Emerging macroprudential policies (pro-cyclicality – risk concentration)

- Initial focus on highly developed financial systems and emerging countries (Agenor & Pereira Da Silva, 2011, Wang and Sun, 2013, Gopinath, 2011)

- But few works on low income countries (LIC) and “non emerging” middle income countries

1. Introduction: Motivation

- **Financial vulnerability in LICs?**

- Risks magnified by exogenous shocks and information asymmetry
- Weaker institutions to deal with risks

But…

- Smaller financial systems (less complex and less leveraged)

"In light of 140 years of financial crises, the evidence suggests that larger financial sectors are more crisis-prone." (Schularick and Taylor, 2012)

- Weaker international financial integration de jure (financial flows restrictions) and de facto (smaller flows)

- **A better understanding of financial fragility in LICs is crucial :**

- Historical experience of banking crises in weakly developed financial systems through credit booms/bubbles with significant costs (Laeven and Valencia, 2008)
- Current financial dynamics will increase these risks (size effect, financial innovations, financial integration) unless financial regulation is adapted

1. Introduction: Motivation

Determinants of financial vulnerability

Key role of credit booms in financial crises dynamics (Schularick and Taylor, 2012, Aikman and others, 2015)

Also strong impact on NPLs (Vithessonti, 2016, Jakubik and Reininger, 2013)

Context of LICs:

Main financial risk = rapid growth of non-performing loans (NPL), with no adequate increase of financial provisions

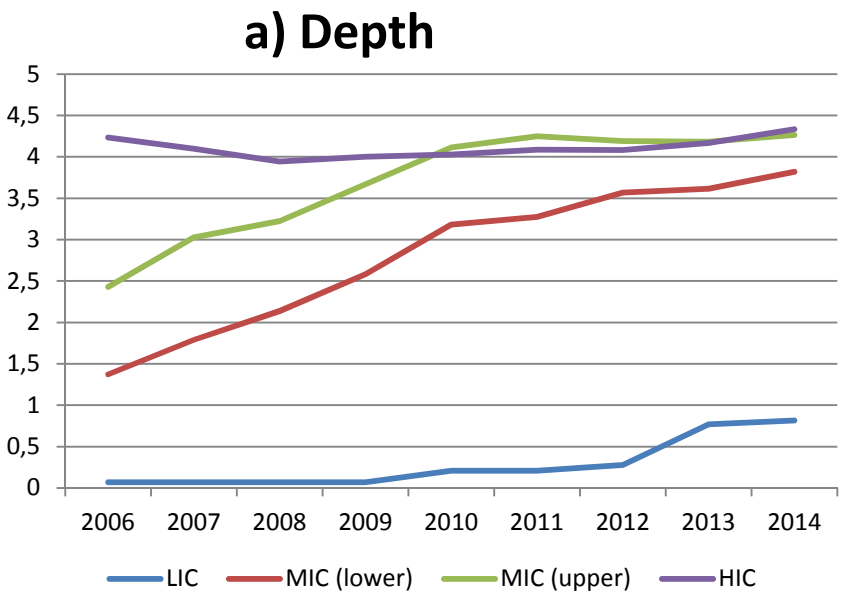
Sequence:

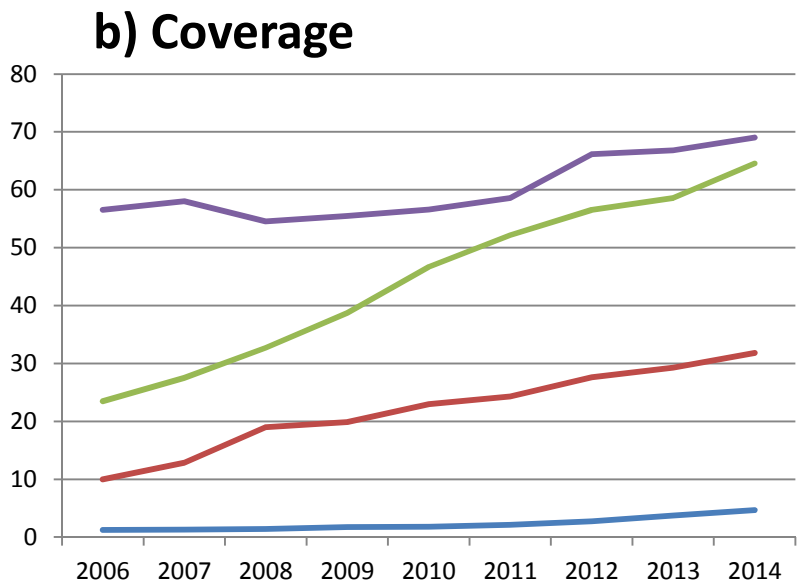
- Strong increase in credits (credit boom) with a loosening of loan screening
- With some delay, strong increase of NPLs
- End of the NPL episode:
  - EITHER NPL provisions / recapitalisation / credit crunch
  - OR Banking crisis (bankruptcies, banking system restructuration)

1. Introduction: motivation

Need to improve the screening capacity of lenders

$\Rightarrow$ Recent development of credit information sharing, mostly in MICs





1. Introduction: this paper

Main goal

Improving the understanding of financial vulnerability in LICs and lower MICs to provide efficient tools for financial stability, in particular to adapt macro-prudential policies

i) Assess the impact of credit information sharing (CIS) on financial vulnerability on a large range of countries, to assess whether developing countries differ

ii) Identify transmission channels of CIS (direct/ indirect through credit booms)

Main contributions

- Integrating most LICs (rather than mostly middle-income countries)
- Measure of financial instability that identifies all episodes of financial fragility (and not only banking crises)
- Analysis of direct (portfolio quality) and indirect (occurrence and impact of credit booms) effects of Credit information sharing (CIS)

1. Introduction: this paper

Methodology

Probit estimation of financial fragility episodes (jumps in NPL ratios)
Sample: 159 countries, 40 lower MICs and 39 LICs (2008-14)

Main results

1) CIS reduces financial fragility
2) Developing countries: the main effect is the direct effect
3) CIS (depth) has an impact on the occurrence of credit booms
4) CIS mitigates the negative effect of CB but only for emerging and developing countries
5) CB is a strong determinant of financial fragility for both developing and developed countries

2. Financial vulnerability literature

2.1 Determinants of financial vulnerability & policy implications

Riskiness of macroeconomic environnement

Affect borrowers capacity to service their debt

Positive impact of inflation, terms of trade, exchange rate depreciation,

Negative impact of GDP growth

(Demirguc-Kunt and Detragiache, 1998, Kaminsky& Reinhart, 1999, Klein, 2013)

Risk-taking behaviour of banks

(credit growth, credit screening, portfolio diversification

Hardly observable

2. Financial vulnerability literature

2.1 Determinants of financial vulnerability & and policy implications

Banking system incentives to deal with risk

Bank behavior affected by the banking sector characteristics:

- Market structure (fragility view vs stability view)
- banking regulation (microprudential policy, deposit insurance, financial liberalization)

Empirical literature

Financial liberalization (Demirguc-Kunt and Detragiache, 1998)

Banking competition (Berger, Klapper, Turk-Arisss, 2009)

Domestic banking regulation (Micro-prudential supervision, insurance schemes) (Barth, Caprio, Levine, 2004)

Information sharing (Buyucaracabak, and Valev, 2012)

$\Rightarrow$ Most studies on cross-section or long-run samples to get some heterogeneity

2. Financial vulnerability literature

2.1 Determinants of financial vulnerability & policy implications

Recommandations on the « financial policy » ?

« Eliminating distorsions and improve incentives through increased supervision and training, the establishment of safer, more transparent banking standards » (Gourinchas et al. 2001)

Main tools:

- Improve the implementation of micro-prudential banking regulations
- Improve accounting accounting standards

$\Rightarrow$ **Strong inertia in the short-run**

Focus on short-run tools to enhance financial stability:

1/ Development of Credit information sharing (CIS)

2/ Monitoring credit dynamics to design « LIC feasible » macro-prudential policies: focus on « basic » warning indicators => credit growth

2. Financial vulnerability literature

2.2 Why is credit growth a key indicator?

Theoretical mechanism:
Credit boom => loan portfolio deterioration => NPLs
Weak capacity of provisionning to cope with NPLs increases

Channels?

- **Less screening and monitoring of each project** (Dell'Ariccia and Marquez, 2006)
- Sectoral/ individual concentration
- Asset price rise => Assets used as collateral => financial accelerator

Main channels for LICs?

- Screening & Concentration
- Asset channel weaker (only for real estate)

2. Financial vulnerability literature

2.2 Why is credit growth a key indicator?

Empirical literature: Strong impact of credit booms on financial fragility
(for all types of countries and periods, Schularick and Taylor, 2012)

Credit growth increases the probability of banking crises
Demirgüç-Kunt and Detragiache (1998) Kaminsky et al. (1998), Kaminsky and Reinhart (1999)

Same result using credit boom indicators
Mendoza & Terrones, 2008, but not in Gourinchas et al., 2001.

$\Rightarrow$ Possible interaction between credit growth and information sharing has not been investigated

2. Financial vulnerability literature

2.2 Why is credit growth a key indicator?

Credit boom may reflect an improvement in investment opportunities (Aghion, Banerjee, 1999),

…especially when credit/GDP is initially low (LIC context)

…but this will induce an increase in financial fragility if the bank capacity to manage new risks is not significantly improved

$\Rightarrow$ A reduction of asymetry of information is needed

- Improvement of accounting standards
- More information available to banks (Credit information sharing)

$\Rightarrow$ Recent development of information sharing systems (credit registries) => time variability

2. Financial vulnerability literature

2.3 Credit information sharing and credit booms

Information sharing systems (Public credit registries & private credit bureaus)

- Improvement of credit selection (core objective)

$\Rightarrow$ Information sharing mitigates the positive effect of creditors' rights on risk taking (Houston et al., 2010)

- Enhancement of borrowers' incentives to repay (Klein, 1992, Vercammen, 1995, Padilla et Pagano, 2000).
- Mitigation of the hold-up problem (Sharpe, 1990; Fisher, 1990; von Thadden, 2004).

$\Rightarrow$ Impact on the **volume of credit**, the cost of credit, the composition of credit (long-run vs short run, new borrowers) and **on the default rate**

$\Rightarrow$ **Impact of credit booms may be conditional** to the development of CIS

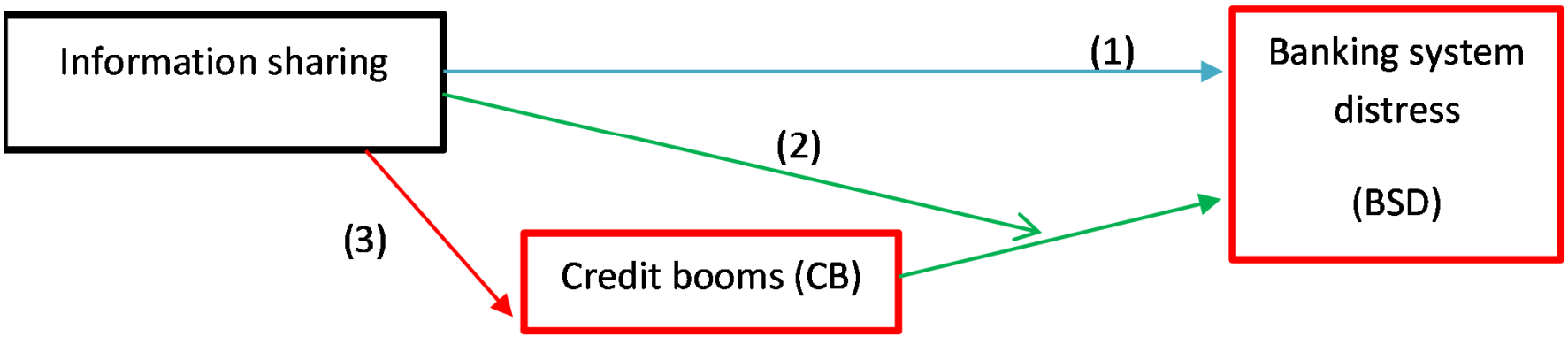
2. Financial vulnerability literature

2.3 Theoretical effects of information sharing systems?

⇒ Impact **on the default rate (portfolio quality)(1)**

⇒ Impact **of credit booms may be conditional to CIS** (2)

⇒ Impact on the volume of credit (**credit boom occurrence**) (3)



3. Empirical analysis: Datasets

- Datasets
  - Bankscope
  - WDI
  - Doing Business
  - International Financial Statitics

- Sample
  - 159 countries incluing:
    - 79 developing countries (GNI per capita < US$ 4,125)
    - 80 emerging and developed countries (GNI pc >US$ 4,125)
  - Period: 2008-2014

3. Empirical analysis: Variables

- Financial fragility
  - $\Delta(^{NPLs}/_{Loans}) \geq 3$ points
  - Authors' calculation using Bankscope database
  - Advantages
    - Available for a large number of countries, including low income countries
    - Identify episodes that were not transformed into financial crises
    - Why do not we use financial crises dataset?
      - Limited number of financial crises since 2005 in low-income countries (data before 2005 cannot be exploited due to the lack of data on information sharing mechanisms)

3. Empirical analysis: Variables

- Credit booms
  - Follow approach used by Gorton and Ordonez (2016)
  - 2 criteria are used to define a credit boom
    - An increase of the ratio of credit to GDP during at least three consecutive years
    - The average of increases is 5 percentage points by year
  - Data are extracted from WDI

3. Empirical analysis: Variables

- Credit information sharing (CIS)
  - Depth of credit information
  - Coverage of credit registries and credit bureaus
  - Authors' calculation using Doing Business data

- Control variables
  - Macroeconomics factors
    - GDP per capita, growth, inflation, exchange rate volatility
  - Financial factors
    - PC/GDP, capital inflows, Banking market concentration

3. Empirical analysis: Model

1st step: Baseline model (net effect of IS)

$$Pr(BSD_{it} = 1) = \alpha + \beta CIS_{it-1} + \Gamma X_{it-1} + \varepsilon_{it}$$

- Dependent variable
  - BSD_{it}: a dummy equals to 1 if a country *i* experienced an episode of financial fragility (see above) in year *t*
- Independent variables
  - CIS_{t-1}*:* Indicator of credit information sharing (depth and coverage)
  - X_{t-1}*:* Control variables (including time dummies)
- Method
  - Econometric method: Random-effect probit
    - Binary nature of dependent variable
    - Random effect: Control for unobserved heterogeneity
- Expected result: CIS reduces financial fragility ($\beta < 0$)

3. Empirical analysis: Model

2nd step: Transmission channels (cf. Figure 1)

1/ Inclusion of credit booms (CB)

$$Pr(BSD_{it} = 1) = \alpha + \beta CIS_{it-1} + \delta CB_{it-1} + \Gamma X_{it-1} + \varepsilon_{it}$$

Expected results:

- CIS directly reduces financial fragility ($\beta < 0$)
- Credit boom is detrimental for financial stability ($\delta > 0$)

2/ Interaction between IS and CB

$$Pr(BSD_{it} = 1) = \alpha + \beta CIS_{it-1} + \delta CB_{it-1} + \gamma CIS_{it-1} * CB_{it-1} + \Gamma X_{it-1} + \varepsilon_{it}$$

Expected result: CIS mitigates the negative effect of CB ($\gamma < 0$)

3/ Determinants of CB

$$Pr(CB_{it} = 1) = \alpha' + \beta' CIS_{it-1} + \Gamma' X_{it-1} + \varepsilon_{it}$$

Expected result: CIS reduces the likelihood to observe a credit boom ($\beta' < 0$)

4. Results

- **1st step: Baseline model**

	All countries		GNI per capita > US$ 4,125		GNI per capita < US$ 4,125	
	[1]	[2]	[3]	[4]	[5]	[6]
Depth of IS	-0.0149***		-0.0094**		-0.0225**	
	(-2.75)		(-2.07)		(-2.43)	
Coverage of IS		-0.0011***		-0.0006**		-0.0020**
		(-2.70)		(-2.07)		(-2.04)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	977	977	499	499	478	478
# countries	159	159	80	80	79	79
Pseudo R^2	0.08	0.08	0.12	0.12	0.09	0.08
LR test (rho=0)	38.42***	37.17***	34.97***	35.59***	1.84*	1.74*
Wald test	50.16***	49.83***	29.56***	29.20***	32.96***	31.81***

4. Results

- **1st step: Baseline model**
  - CIS reduces financial fragility ($\beta < 0$)
  - No distinction between developing and other countries
  - Result is robust to multiple sensitivity tests:
    - Econometric method
    - Sample
    - Change of dependent variable
    - Endogeneity of IS

4. Results

- **2nd step: Transmission channels**

1/ Inclusion of CB

2/ Interaction between CIS and CB

3/ Determinants of credit booms

4. Results

- **2nd step: Transmission channels**

1/ Inclusion of CB

	All countries		GNI per capita > US$ 4,125		GNI per capita < US$ 4,125	
	[1]	[2]	[3]	[4]	[5]	[6]
Depth of IS	-0.0132**		-0.0096*		-0.0197**	
	(-2.47)		(-1.95)		(-2.19)	
Coverage of IS		-0.0009**		-0.0005*		-0.0018*
		(-2.29)		(-1.83)		(-1.88)
CB	0.1073***	0.1054***	0.0468**	0.0442**	0.1721***	0.1719***
	(-4.16)	(-4.08)	(-2.49)	(-2.37)	(-3.04)	(-3.12)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	977	977	499	499	478	478
# countries	159	159	80	80	79	79
Pseudo R^2	0.09	0.09	0.12	0.12	0.1	0.09
LR test (rho=0)	29.73***	28.91***	28.15***	28.03***	1.36	1.41
Wald test	65.43***	64.93***	35.56***	35.40***	40.14***	39.41***

4. Results

- **2nd step: Transmission channels**

2/ Interaction between CIS and CB

	All countries		GNI per capita > US$ 4,125		GNI per capita < US$ 4,125	
	[1]	[2]	[3]	[4]	[5]	[6]
Depth of IS	-0.0114*		-0.0149		-0.0183**	
	(-1.86)		(-1.42)		(-2.40)	
Depth of IS*CB	-0.0374*		-0.0528*		-0.0111	
	(-1.64)		(-1.80)		(-0.35)	
Coverage of IS		-0.0006*		-0.0067		-0.00128*
		(-1.76)		(-1.52)		(-1.95)
Coverage of IS*CB		-0.0034***		-0.0035***		-0.0036
		(-2.79)		(-2.58)		(-1.06)
CB	0.307***	0.310***	0.345***	0.307***	0.249*	0.305**
	-3.3	-4.37	-2.9	-3.45	-1.82	-2.3
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	977	977	499	499	478	478
# countries	159	159	80	80	79	79

4. Results

- **2nd step: Transmission channels**

3/ Determinants of credit booms

	All countries		GNI per capita > US$ 4,125		GNI per capita < uS$ 4,125	
	[1]	[2]	[3]	[4]	[5]	[6]
Depth of IS	-0.0051*		-0.0146***		-0.0019*	
	(-1.88)		(-2.61)		(-1.75)	
Coverage of IS		-0.0002		-0.0005		0.0000
		(-1.09)		(-1.40)		(0.22)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	1083	1083	555	555	528	528
# countries	159	159	80	80	79	79
Pseudo R^2	0.12	0.12	0.18	0.18	0.07	0.06
LR test (rho=0)	29.51***	28.63***	5.57***	7.34***	18.06***	16.04***
Wald test	72.63***	70.72***	56.89***	52.35***	22.55***	20.73***

4. Results

- **2nd step: Transmission channels**

1/ Inclusion of CB

- No real change for CIS (CIS has a direct effect on financial fragility)
- CB is positive and statistically significant

2/ Interaction between CIS and CB

- CIS mitigates the negative effect of CB
- But this result holds only for developed and emerging countries
- For developing countries, CIS tend to directly reduce financial fragility

3/ Determinants of credit booms

- Depth of CIS reduces the likelihood to observe a credit boom
- Coverage of CIS: No impact
- No distinction between developing and other countries

5. Conclusion

- **Summary of the results**

1. CIS reduces financial fragility

2. Direct effect of CIS (controlling for Credit Booms)

3. CIS (depth) has an impact on the occurrence of credit booms

4. CIS mitigates the negative effect of CB but only for emerging and developing countries

1. CB is a strong determinant of financial fragility for both developing and developed countries

5. Conclusion

Policy implications

Two confirmations

1. Credit growth is a key variable to conduct macro-prudential policies
2. Benefits from the extension of information sharing

A new fact

3. Stronger impact of credit booms in LICs and lower MICs

- Larger marginal effect of credit booms on financial fragility
- Impact not mitigated by Credit information sharing

$\Rightarrow$ Suggests lower thresholds to /déclencher/ macroprudential policies

Dissemination

1. Séminaire Banque de France, 19 mai
2. Ioannina Meeting on Applied Economics and Finance, Corfu, June, 29.
3. 33rd International Symposium on Money, Banking and Finance, CERDI**,** July 7-8
4. AFSE, Nancy, June, 27-29

The Case of a Macroprudential Scheme in the WAEMU

Workshop FERDI – Clermont-Ferand - April 28th

Samuel Guérineau (Université d'Auvergne)
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Research jointly supported by the ESRC and DFID

Financial Volatility, Macroprudential Regulation and Economic Growth in Low-Income Countries

Outline

Part 1: The management of financial stability in WAEMU: where do we stand?

1.1 The overall framework for financial stability

1.2 Microprudential policies: a Bale I framework

1.3 Macroprudential policy: the project

Part 2: Benefits expected from macroprudential policies in WAEMU

2.1 Increasing need of macroprudential policies: assessing new risks

2.2 Effectiveness of macroprudential tools in developing countries

Part 3: Implemention of macroprudential policies in WAEMU

3.1 Structural barriers: financial development, transparency

3.2 Coordination issues and commitment to integration

Part 4: Recommandations

3.1 Tools

3.2 Timing

Part 1: The management of financial stability in WAEMU: where do we stand?

1.1 The overall framework for financial stability

- *One institution dedicated to financial stability*

$\Rightarrow$ « Comité de stabilité financière » (2010)

- Coordination between financial stability stakeholders
- Risk assesment

- *Four projects in progress:*

- Macroprudential policy
- Identification of « systemic banks »
- Shift from Basel I to to Basel II-III
- Deposit insurance fund / Financial stability fund

Part 1: The management of financial stability in WAEMU: where do we stand?

1.2 Microprudential framework

⇒ Implementation of Basel I… as most African and developing countries

Implementation of Basel II (Survey, 2010)
Annual progress reports only for **Basel Committee on Banking Supervision** members

	Implementation of Basel II Regulatory capital	Basel II implementation (as planed)
UEMOA	No	2015
LICs	1 country	
Lower MICs	1 country	2012-2015
Higher MICs	50%	2008-2012

Part 1: The management of financial stability in WAEMU: where do we stand?

1.3 The project of macroprudential framework

One tool (not specific) already implemented: reserve requirements
+ project of a macroprudential framework

- Survey managed by the IMF (2013-14) **on the use and projects** of Macroprudential tools

(Global Macroprudential Policy Instruments, GMPI)

$\Rightarrow$ Not available for BCEAO

$\Rightarrow$ Simplified form filled according to information available and transfered to BCEAO for an update & check

Lack of information on the progress the range of MP tools, methodology to calibrate the tools and results of calibration

Macroprudential tools	Year	Modifications/ project progress
Reserve Requirement Ratios	1993	- Broadening of reserve base (2000) - Harmonization of reserve ratios (déc 2012)
Capital buffer	In the process of being validated	
In the process of being validated	In the process of being validated	
Time-Varying/ Dynamic Loan-Loss Provisioning		
Loan-to-Value (LTV) Ratio	In the process of being validated	
Debt-to-Income (DTI) Ratio	In the process of being validated	
Limits on Domestic Currency Loans		

(Not translated)

Autres instruments macro-prudentiels		
Fonds de Garantie des Dépôts	Adopté le 21 mars 2014 et dénommé FGD-UMOA.	FGD-UMOA a pour mission d'assurer la garantie des dépôts des clients des Etablissements de crédit et des Systèmes Financiers Décentralisés, agréés dans l'UMOA
Dispositif Bâle I	Fin 2010	Régime de capital réglementaire dont Ratio solvabilité est fixé à 8%
Dispositif Bâle II et III	travaux techniques sont en cours de finalisation.	
Bureau d'information sur le crédit	3 juin 2013,	le BIC est une institution qui collecte, auprès des organismes financiers, des sources publiques et des grands facturiers (sociétés de fourniture d'eau, d'électricité, sociétés de téléphonie, etc.), des données sur les antécédents de crédit ou de paiement d'un client. Ces informations sont, ensuite, commercialisées auprès des Etablissements de crédit, des Systèmes Financiers Décentralisés et des grands facturiers, sous la forme de rapports de solvabilité détaillés.

(Not translated)

Autres instruments macro-prudentiels		
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Dispositif Bâle I	Fin 2010	Régime de capital réglementaire dont Ratio solvabilité est fixé à 8%
Mécanisme de résolution de crise		Le Conseil des Ministres a marqué son accord et le dispositif est en cours de mise en place
Cadre de surveillance macro-prudentiel		
Comité de Stabilité Financière	20 mai 2010	Il regroupe les différents Superviseurs (Banque, Assurance, Prévoyance Sociale, Marché Financier) et se réunit tous les 6 mois pour échanger sur les risques affectant la stabilité financière dans notre zone
stress tests		Ces tests permettent à la BCEAO d'apprécier la vulnérabilité des banques aux chocs de l'activité réelle
Rapports sur la stabilité financière		Pour le moment le rapport est interne

Fieldwork

Date

Mid June

Institutions

Direction of financial stability (BCEAO, Dakar)

Banking Commission (financial institutions supervisory agency, Abidjan)

CREMPF (financial markets supervisory agency, Abidjan)

Ministry of finance – Treasury , sous direction des affaires monétaires et bancaires (Abidjan/ Dakar)

Objectives

- Update progress in macroprudential project (Part 1)
- Feedback on the diagnosis & literature review on MP effectiveness (Part 1)
- Qualitative surveys on barriers to implementation and effectiveness of macroprudential policies with the different stakeholders of financial stability (parts 2-3-4)

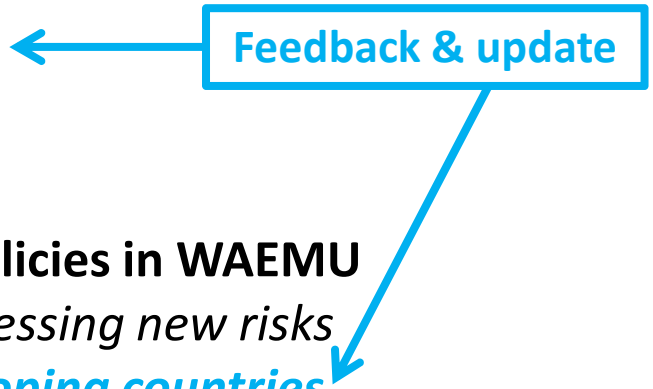
Fieldwork objectives

Part 1: The management of financial stability in WAEMU: where do we stand?

1.1 The overall framework for financial stability

1.2 Microprudential policies: a Bale I framework

1.3 Macroprudential policy: the project



Part 2: Benefits expected from macroprudential policies in WAEMU

2.1 Increasing need of macroprudential policies: assessing new risks

2.2 Effectiveness of macroprudential tools in developing countries

Part 3: Implemention of macroprudential policies in WAEMU

3.1 Structural barriers: financial development, transparency

3.2 Coordination issues and commitment to integration

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Fieldwork objectives

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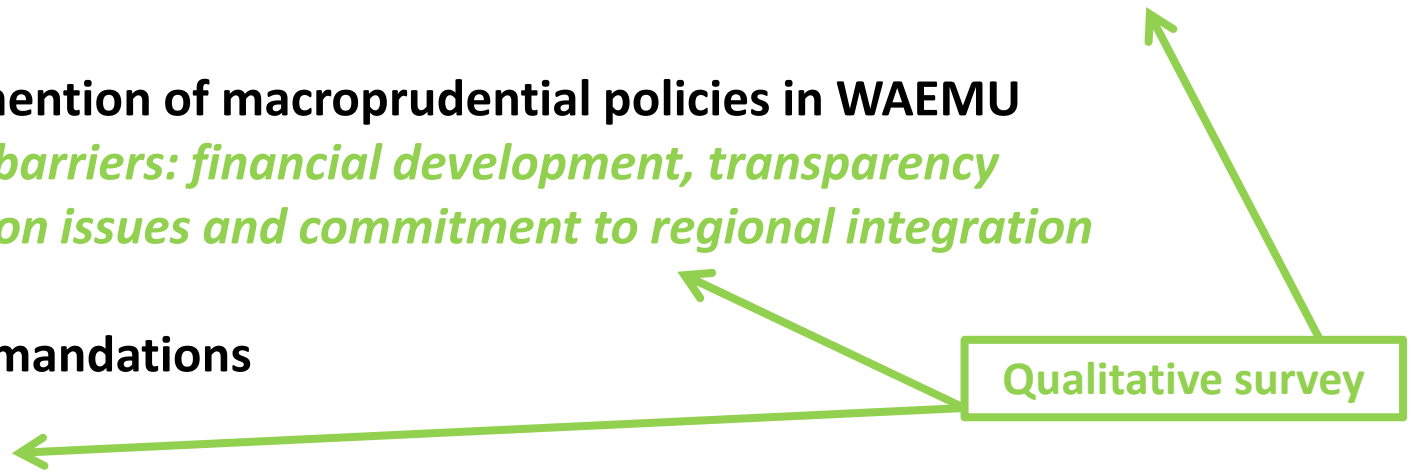
Part 4: Recommandations

3.1 Tools

3.2 Timing



Next steps

Preliminary full version
(mid-July)

Final full version
(end of september)

3. Financial vulnerability literature

3.5 What is information sharing ?

Strong information asymetry in the loan market in developing economies

Lack of reliable evaluation of revenues (accounting rules, external audit) and guarantees (land and real estate registries)

Two ways of collecting relevant information:

i) direct (first-hand) by its own services (bank screening)

ii) indirect FI specialized in credit risk assessment (private credit bureaus (PCB) and public credit registries (PCR) => Information sharing schemes

(databases on firms balance sheet, on borrowers past credits, payments incidents registers)

1. Introduction: Motivation (2/4)

Tools to reduce financial fragility in developed and emerging countries ?

- Radical reforms suggested: re-segmentation of financial systems (Deposit vs investment banks), International taxation

- Gradual reforms

- Enhancing micro-prudential supervision

Tightening of rules

Broadening of the scope of supervision to non banking institutions)

Cross-border supervision

- Emerging macro-prudential policies

(COMPLETER)

Peut-être ne pas présenter

3. Financial vulnerability literature

Why using country-level data?

Main bank-level NPL determinants:

Equity: negative impact on NPL (reduces bank moral hazard) Auteurs

Cost efficiency : ambiguous

- Low cost efficiency: signal of overal bad management (including loans screening and monitoring)
- High cost efficiency: (« skimping ») may be the result of little resources allocated to loan management

Excess bank lending

$\Rightarrow$ Overall low explanatory power of bank-level variables (developing economies sample drawn from bankscope + Klein (2013)

3. Financial vulnerability literature

Credit booms determinants

(non présenté)

Domestic economic policy
- Financial liberalization (poorly regulated)
- Weakly credible exchange rate anchoring (consumption boom)

External factors
- Surge in capital flows
- Positive terms of trade shock
- Technological positive shock

The Credit growth-NPL puzzle

Usual suspects ? (non présenté)

Sample: developed economies vs developing economies (especially LICs)
$\Rightarrow$ remains using developing countries samples

Agregation bias
$\Rightarrow$ remains using bank-level data (Bankscope)

Delayed effect
$\Rightarrow$ remains using lagged credit growth

Omitted variable: growth perspectives
$\Rightarrow$ remains controlling for standard macroeconomic variables

Measurement error (procyclical measure of NPL)
Possible, but to difficult to assess

Sequence of credit and NPL cycles

3. Financial vulnerability literature

Why using NPL variations?

Sequence of credit and NPL cycles

A COMPLETER

$\Rightarrow$ Relevance of NPL variation

Empirical tests of information sharing effects

- **Positive impact of credit registries on financial deepening** (Galindo and Miller (2001); Love and Mylenko (2003), and Djankov et al. (2007), also on ***SSA countries***, McDonald and Schumacher, 2007 ; Singh et al. (2009))

- **Positive effect on credit access but conditional to the legal environment and firm characteristics** (Jappelli and Pagano (2002), Brown et al., (2009), Triki and Gajigo (2012)

- **Negative impact on financial fragility (default rates**. Japelli et al. (2002) and Powell et al. (2004) Houston et al. (2010)

3. Financial vulnerability: Theoretical channels

A renvoyer en intro de cette section avec es facteurs de strcuture du système bancaire

c) Banking competition

Theoretical effects?

- **Competition fragility view**

Competition => reduction of bank margins => increase in risk-taking to preserve banks yields => portfolio quality degradation

- **Competition stability view**

Market power => high interest rates => increase in moral hazard & adverse selection from borrowers + moral hazard from banks (too big too fail) => riskier loan portfolio => financial vulnerability

Two theories compatible if the riskier loan portfolio is associated with an increased capacity to deal with these risks (equity, hedging)

- Complements credit boom

Credit booms Macroeconomic effects:

- Investment boom, GDP growth, rising asset prices (equity, housing), real appreciation, widening external deficits

Microeconomic effects:

- firms: increase in firm value, external financing, leverage
- Banks: increase in asset returns, capital adequacy ratios and NPL

Opposite dynamics after credit boom

The Credit growth-NPL puzzle