FONDATION POUR LES ÉTUDES ET RECHERCHES SUR LE DÉVELOPPEMENT INTERNATIONAL

Corruption in turbulent times: a response to export booms and busts

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Work still in progress…

MOTIVATIONS

- **The 2008 financial crisis** revealed that malpractices in the management of public and private affairs have directly contributed to the financial collapse (OECD, 2009).
- But also found a fertile ground in the opulence of the economic and financial expansion prior to economic reversal.
- **Galbraith (1997)**: economic crises are often followed by scandals of large-scale corruption, revealing the prevalence of malpractices in the administration of public and private affairs prior to economic reversal.

Corruption feeds on economic expansions,

and may contribute to economic recessions

- **The contribution of governance quality** (transparency, accountability, corruption) **to output fluctuations** is widely documented:
  - ✓ "bad governance" contributes to domestic fluctuations (Acemoglu et al. 2003; Mobarak, 2005);
  - ✓ "good governance" contributes to absorb external shocks (Rodrik, 2000).

Economic shocks are more likely to occur, and their negative effects on growth to persist, in countries with weak institutions and low governance quality (Melhum *et al*, 2006).

Do economic shocks affect governance quality?

Corruption in times of opulence

- Theoretical predictions and empirical evidence on the effect of economic fluctuations on corruption**,** mainly deal with a ***voracity effect*** **of economic booms**, particularly in fragile states (Tornell and Lane, 1999; Dalgaard and Olsson, 2008; Arezki et al., 2012; etc.).

Therefore, "opportunistic corrupt behaviors" are likely to expand during economic booms in countries with weak institutions.

Could corruption also be a response to adverse shocks? Less evidence but various arguments…

Corruption in times of scarcity

- **"Queuing models"** (Lui, 1985; Kulsheshtra, 2007) or **"auction models"** (Saha, 2001) **of bribery** give some answers:

  People compete for scarce public resources, which gives strong discretionary powers to public agents, who may enrich with bribe-taking.

- Corruption: a **risk-coping strategy**?
  - ✓ **wage cutes and other income losses** may decrease the relative cost of engaging in illegal revenue-generating activities (Becker and Stigler, 1974; Guillaumont and Puech, 2005)…
  - ✓ … and can be compensated by corrupt activities (Borcan et al. 2014).

"Survival corrupt behaviors" are therefore likely to expand during busts.

Are "opportunistic" and "survival corruption" asymmetric responses to shocks?

Asymmetric responses to shocks: the role of institutions

- **Melhum et al (2006):** the impact of natural resource windfalls on growth depends on whether institutions are "grabber friendly" or "producer friendly".
- **Melhum et al (2003)**: countries may move from a low-development "Predator's club" to a higher-development "Producer's club", and *vice versa*.
- The way corruption responds to favorable and adverse shocks is a question of **talent allocation**, as **institutions determines whether productive or rent-seeking activities are relatively more profitable**

Therefore, in weak institutional framework, corruption may increase during both positive and adverse shocks, and vice versa.

Asymmetric responses to shocks: the role of institutions

Institutions \ Fluctuations	Booms	Busts
Grabber-friendly institutions	+ opportunistic corruption	+ survival corruption
Producer-friendly institutions	- survival corruption	- opportunistic corruption

EMPIRICAL FRAMEWORK

Corruption equation

$$Corruption = \mathrm{E}\{positive\ shocks, negative\ shocks | Institutions, Controls\}$$

- **Measurement issues:**
  - ✓ Corruption prevalence?
  - ✓ Economic fluctuations?
  - ✓ Grabber or producer-friendly institutions?

Corruption variable

- **World Bank Enterprise Survey Data:** firms' reports on informal payments as a proxy for the prevalence of corruption within the public sector.
  - ✓ **Micro-estimations**: data on informal payments expressed as a % of annual sales
  - ✓ **Macro-estimations**: binary data on informal payments (0/1), aggregated for cross-country analysis.

- **Advantages:**
  - ✓ Based on experience rather than perceptions of corruption.
  - ✓ Data comparable internationally and wide coverage (130 000 companies in 135 countries).
  - ✓ Based on an anonymous survey and indirect questions.
  - ✓ Aggregated data on bribery incidence within respondent firms (1:bribe or 0:no bribe), reducing potential bias in the amount of bribe reported by firms (Clarke, 2011).

Variable of interest: export instability

- Based on export fluctuations around a **mixed trend** estimated on a rolling [t; t-15] time window (Cariolle and Goujon, 2015):

$$y_{it} = \alpha + \beta_1 t + \beta_2 y_{it-1} + \varepsilon_{it}$$ with ε_{it} zero-mean disturbance term.

- **Major**, **and primary source** of economic instability in developing countries (Bevan et al. 1993; Guillaumont et al. 1999; Combes and Guillaumont, 2002; Jones and Olken, 2010).

- **Instability in exports (in const. USD) is likely to be exogenous:**

  → policy-related factors are likely to influence the trend rather than fluctuations around it.

  → ε_t stationary and uncorrelated: see Cariolle and Goujon (2015) for a study on instability measurements applied to export data.

Estimating asymmetric reactions to export shocks

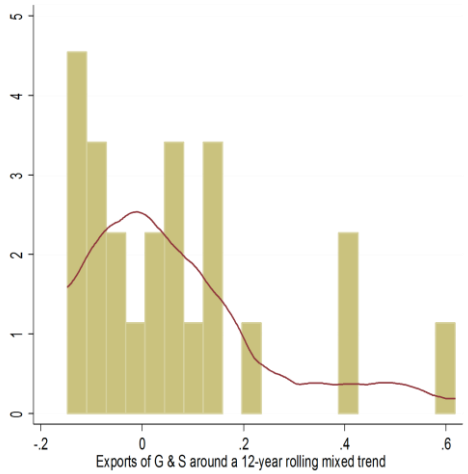
- The literature analyses agents' responses to shocks using **periodic shock variables**, reflecting the magnitude and the asymmetry of shocks.
- Limit of such an approach**:** corruption is i) a **lasting phenomenon**, ii) **likely to vary only in response to sharp fluctuations**.
- The **skewness of exports**, computed on a rolling basis and over a short timeframe (t; t-5), is a measure of the *de facto* **asymmetry** and **abruptness of shocks**:

$$Skewness_{it} = 100 \times \frac{\frac{1}{T}\sum_{t-5}^{t}\left(\frac{y_{it}-\hat{y}_{it}}{\hat{y}_{it}}\right)^{3}}{\left[\frac{1}{T}\sum_{t-5}^{t}\left(\frac{y_{it}-\hat{y}_{it}}{\hat{y}_{it}}\right)^{2}\right]^{3/2}}$$

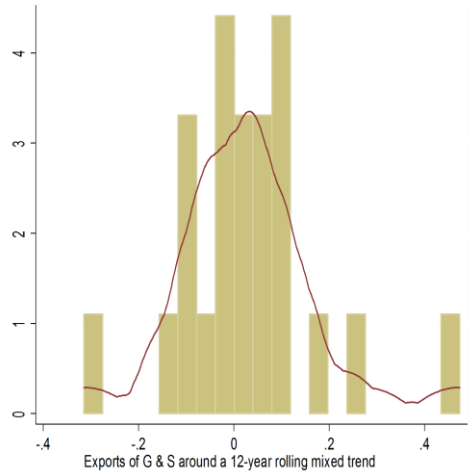
"The skewness specifically captures asymmetric and abnormal patterns in the distribution of [a variable], and thus can identify the risky paths that exhibit rare, large, and abrupt [variations]" (Rancière *et al*., QJE 2008, p.360).

Export skewness and the asymmetry of fluctuations

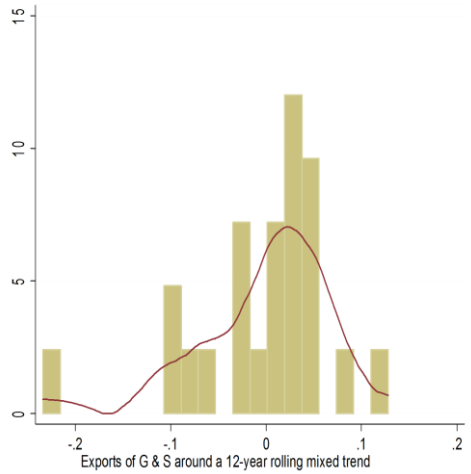
Kernel densities of the distribution of exports around their trend and its corresponding moments in Argentina, Algeria and Mexico (drawn from Cariolle and Goujon, 2015).



ARGENTINA
Std. Dev. = 20%
Skewness = 136%
Kurtosis = 433%



ALGERIA
Std. Dev. = 15%
Skewness = 71%
Kurtosis = 502%



MEXICO
Std. Dev. = 7%
Skewness = −125%
Kurtosis = 520%

Variable of interest: instability in export volume

- We want to identify **asymmetric reactions to asymmetric fluctuations**

  Therefore, we enter separately **positive skewness** and **negative skewness** variables in the corruption regression (Rancière et al, 2008).

- Need to control for **the effect of symmetric shocks**:

  Ex ante effect related to the perception of instability and decisions made to reduce exposure to economic fluctuations (Elbers et al., 2007):

Therefore, we control for the **long-run (t;t-15) standard deviation of exports** around $\hat{y}$

Controls

- **Macro controls:**
  - ✓ GDPpc, government spending, openness, natural resource rents, education, population size (WDI);
  - ✓ Democracy, polity durability (Polity IV);
- **Firms' characteristics:**
  - ✓ Firms size, % of direct and indirect exports in total sales, % public ownership, % of working K financed by internal fund.

Institutional framework

- To test the role of institutions, institutional variables are introduced in interaction with positive and negative skewness variables.
- **Democratic institutions:** expected to increase the cost of engaging in corrupt activities:
  - ✓ Polity2 (from the polity IV)
  - ✓ Press freedom (Freedom House)
  - ✓ Economic influence over media (Freedom House)
- **Access to external finance:** expected to reduce the cost of engaging in productive activities:
  - ✓ Domestic credit provided by the banking system (WDI)

Final corruption equation

Cross-section estimations of

$$Bribes = \mathrm{E}\{[skewness > 0]; [skewness < 0] \mid std\ dev, macro\&firm\ ctrl\}$$

- **Micro OLS-estimates** on firm's bribe payments (% of annual sales) with observations clustered by country.
- **Macro OLS-estimates** on bribery incidence (% of firms declaring informal payments).

Total sample: 19,616 firms' bribe reports from 38 developing countries interviewed between 2006 and 2012

RESULTS

Estimates from baseline estimation

	Micro-level	**Macro-level**
Dependent variable:	Bribe payments	Bribery incidence
Export skewness > 0	**0.008* (0.08)**	**0.095** (0.02)**
Export skewness < 0	0.003 (0.24)	**0.096** (0.03)**
Export standard deviation	0.052 (0.39)	1.288** (0.02)
N Countries	38	38
N Firms	19 616	na.
Dummy sectors	Yes	No
Country clusters	Yes	na.
R-squared	0.03	0.73

Controls not reported. Standards errors robust to heteroscedasticity, clustered by country in micro-estimations. P-values in parenthesis. †significant at 15% *significant at 10%; **significant at 5%; ***significant at 1%.

1. Asymmetric corruption response to shocks

2. **Firms' bribe payments:**

✓ Positive shocks increase firms' bribe payments → opportunistic corruption

3. **Country bribery incidence:**

✓ Symmetric effect of asymmetric shocks

✓ In our sample of developing countries, **both positive and negative export shocks increase bribery incidence.**

Opportunistic corrupt behaviors are likely to expand during export booms…

…while survival corruption behaviors are likely to expand during export busts.

The role of democracy

Dependent variable:	**Micro-level** Firms' bribe payments			**Macro-level** Bribery incidence		
	(1)	(2)	(3)	(4)	(5)	(6)
Export skew>0	**0.015*** (0.01)**	-0.027 (0.49)	-0.070** (0.04)	**0.179*** (0.00)**	-0.644 (0.11)	-0.786** (0.02)
Export skew<0	**0.011† (0.11)**	-0.049 (0.20)	-0.076*** (0.01)	**0.210*** (0.00)**	-0.910 (0.13)	-0.872** (0.03)
Skew>0 × polity2	**-0.0013† (0.15)**			**-0.017** (0.03)**		
Skew<0 × polity2	-0.0012 (0.22)			**-0.02** (0.04)**		
Skew>0 × free press		-0.009 (0.35)			**-0.194* (0.07)**	
Skew<0 × free press		-0.014 (0.16)			**-0.261* (0.10)**	
Skew>0 × econ. infl. media			**-0.030** (0.02)**			**-0.336*** (0.01)**
Skew<0 × econ. infl. media			**-0.030*** (0.00)**			**-0.365** (0.02)**
N Countries		38			38	
N Firms		19 616		na	na	na
Dummy sectors		Yes		No	No	No
Country clusters		Yes		No	No	No
R-squared:		0.03		0.79	0.82	0.85

- ✓ **Nonlinear** and **asymmetric corruption response** to shocks
- ✓ Booms and busts have a positive effect on bribe payments and bribery incidence when democracy is weaker.
- ✓ Booms and busts have a negative effect on bribery incidence when democracy is stronger.

Strong pillars of democracy make both booms and busts more detrimental to "grabbers" than to "producers"

The role of external finance

Dependent variable:	**Micro-level** Bribe payments	**Macro-level** Bribery incidence
Export skew>0	**0.017† (0.13)**	**0.219*** (0.01)**
Export skew<0	**0.016** (0.03)**	**0.238*** (0.00)**
Skew>0 × domestic credit by banks	0.0002 (0.36)	**-0.003* (0.06)**
Skew<0 × domestic credit by banks	**-0.0003** (0.04)**	**-0.004*** (0.00)**
Domestic credit by banks	0.013 (0.41)	0.650* (0.06)
N Countries	37	37
N Firms	19 166	na.
Dummy sectors	Yes	No
Country clusters	Yes	No
R-squared:	0.03	0.81

Controls not reported. Standards errors robust to heteroskedasticity. P-values in parenthesis. † significant at 15% *significant at 10%; **significant at 5%; ***significant at 1%. In column (1), access to credit market is proxied by the share of domestic credit provided by the banking system in GDP.

- ✓ **Nonlinear** and **asymmetric corruption response** to shocks
- ✓ Booms and busts have a positive effect on bribe payments and bribery incidence when access to external finance is limited.
- ✓ Booms and busts have a negative effect on bribery incidence when democracy is weaker.

The role of the banking system is particularly salient during export busts

Easier access to external finance also makes busts more detrimental to “grabbers” than “producers”

Additional evidence from micro-estimates

- We exploit firm-level information to build a proxy of idiosyncratic export shocks:

$$Idiosyncratic\ export\ skew = Export\ skew \times \frac{firm's\ direct\ exports}{firm's\ total\ sales}$$

- **Advantages:**
  - ✓ Test of the **direct effect** of **firm-level export fluctuations** on **amounts** of informal payments
- **Drawbacks:**
  - ✓ The interaction term introduces endogeneity in instability variables

Dependent variable:	OLS estimates - Informal payments (% total sales)		
	Total sample	**Polity IV ≤ 5**	**Polity IV>5**
Id. direct export skew >0	-0.001 (0.73)	**0.01** (0.05)**	**-0.007** (0.05)**
Id. direct export skew <0	-0.000 (0.83)	0.007 (0.41)	**-0.004* (0.07)**
Id dir export Std deviation	0.33 (0.14)	0.09 (0.58)	0.006 (0.72)
Firm controls	Yes		
Sector dummies	Yes		
Country dummies	Yes		
Sector clusters	Yes		
N Countries	47		
N Firms	25 067	5594	19473
R-squared:	0.06	0.07	0.05

Controls not reported. Standards errors robust to heteroskedasticity and are clustered by sector. P-values in parenthesis. *significant at 10%; **significant at 5%; ***significant at 1%.

✓ **Booms are positively correlated with bribe payments when democracy is weaker.**

✓ **Booms and Busts are negatively correlated with bribe payments when democracy is better**

Dependent variable:	Probit estimates – Bribery incidence (1/0)		
	Total sample	**Polity IV ≤ 5**	**Polity IV>5**
Id. direct export skew >0	-0.001 (0.12)	0.000 (0.87)	**-0.002** (0.05)**
Id. direct export skew <0	**-0.003*** (0.00)**	-0.002 (0.15)	**-0.003** (0.04)**
Id export Std deviation	0.003 (0.74)	0.015 (0.69)	0.003 (0.66)
Firm controls	Yes		
Sector dummies	Yes		
Country dummies	Yes		
Sector clusters	Yes		
N Countries	47		
N Firms	25 067	5590	19471
Pseudo R-squared	0.20	0.31	0.14

Controls not reported. Standards errors robust to heteroskedasticity and are clustered by sector. P-values in parenthesis. *significant at 10%; **significant at 5%; ***significant at 1%.

✓ **Busts are negatively correlated with bribe incidence, whatever the level of democracy**

✓ **Booms and busts are negatively correlated with bribe incidence when democracy is better**

- No such micro-evidence regarding the role access external finance.
- Need further investigations…

CONCLUSION

Research contributions

- General analytical framework for the effect of economic fluctuations on corrupt transactions
- Hypothesis testing based on data on firms' experience of corruption with public agents (WBES).
- Skewness-based measure of export instability to consider the effect of booms and busts on corruption prevalence
- Results consistent with previous research on the "voracity effect" + evidence of a positive effect of adverse shocks on corruption prevalence

Main lessons

- When economies are institutions are weak, both export booms and busts are likely to increase corruption.
- Improving access to financial markets and supporting pillars of democracy should dampen the positive effect of export booms and busts on corruption prevalence, by keeping productive activities attractive.

Ways forward?

- External factors of stability – such as remittances and aid (Combes and Ebeke, 2011; Dabla-Norris et al. 2011; Guillaumont and Chauvet, 2001) – should yield anti-corruption outcomes.
- Robust empirical positive relationship between the long-term standard deviation of exports and corruption incidence:

Need to further study how corruption may help agents reducing *ex ante* their exposure to economic fluctuations

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Thank you.