

The Myth About Oil & Chinese Aid

Pascal Jaupart

(University of Oxford - CSAE)

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Motivation & Introduction

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Rex Tillerson slams China's relationship with Africa

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US Secretary of State Rex Tillerson has criticised China's economic engagement in Africa, ahead of his first official visit to the continent.

'It is important that African countries carefully consider the terms of those agreements and not forfeit their sovereignty.'

Motivation & Introduction

In recent years, the magnitude of Chinese official finance has grown considerably.

→ China surpassed the US as provider of aid and loans to overseas countries in 2011 (AidData 2018).

This has generated much suspicion and interrogation in academic and public policy circles alike.

→ Suspicion nurtured further by the fact that China does not publish much information on its activities abroad.

Despite lack of systematic evidence, **it is widely believed that China tends to favour resource rich countries** (Bräutigam 2009).

Motivation & Introduction

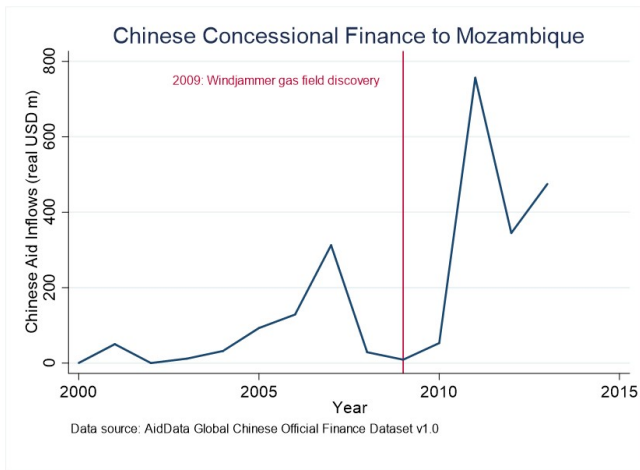


Figure 1: Chinese development finance to Mozambique

Motivation & Introduction

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This has generated much suspicion and interrogation in academic and public policy circles alike.

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Despite lack of systematic evidence, **it is widely believed that China tends to favour resource rich countries** (Bräutigam 2009).

⇒ **In this research project, I investigate the impact of natural resource endowments on the allocation of Chinese aid and loans to developing countries.**

Summary

Objective: Empirical analysis of the impact of natural resource endowments on foreign aid inflows.

Theory: Ambiguous - donor altruism vs self-interest.

Identification strategy:

- Country/region panel fixed effects model.
- Quasi-exogenous timing of very large oil and gas discoveries (conditional on country and year fixed-effects).

Findings:

- Oil and gas rich countries receive more Chinese finance.
- Flows concentrated in infrastructure and production sectors.
- More open and transparent resource rich countries benefit less.

Contributions:

- Focus on an emerging donor.
- Better understanding of Chinese official finance.
- More solid evidence on the impact of natural resources.

Outline

1. Motivation & Introduction
2. Literature review
3. Background information on Chinese official finance
4. Data
5. Identification strategy
6. Results
7. Conclusion

Literature review

Observed aid flows are determined by several factors:

- donor humanitarian motives and strategic interests.
- recipient need and merit.
- political economy, ...

⇒ A priori ambiguous relationship between natural resources and aid: **less need vs more economic interests.**

Two broad strands of aid allocation studies:

- Cross-country correlations (Alesina & Dollar 2000, Alesina & Weder AER 2002, Hoeffler & Outram 2011).
- Causal analysis of a specific determinant → **political motives mainly** (Kuziemko & Werker JPE 2006, Faye & Niehaus AER 2012, Dippel 2015).

Small but rapidly growing literature on Chinese aid.

Background information on Chinese official finance

→ Chinese official finance has grown rapidly over the last 15 years.

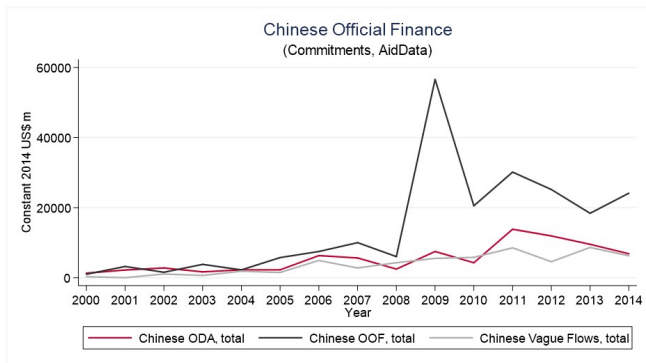


Figure 2: Chinese global official finance

Background information on Chinese official finance

→ More than half of Chinese aid goes to sub-Saharan Africa.

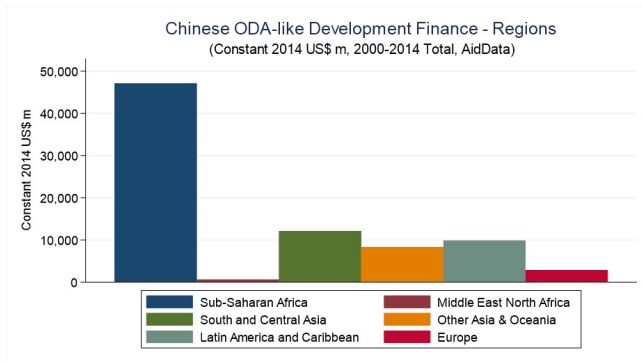


Figure 3: Chinese aid by regions

Background information on Chinese official finance

→ Chinese aid specializes in economic infrastructure sectors.

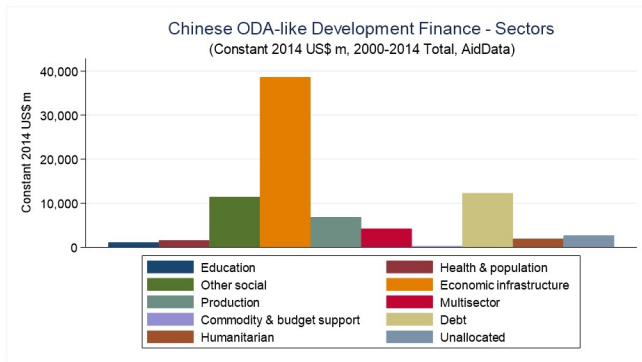


Figure 4: Chinese aid by sectors

Data

Sample:

- All developing countries as of 1995 UN/WB classification.

Chinese official finance data:

- AidData,
- SAIS CARI.

Oil and Gas:

- Ross and Mahdavi (2015): production and exports,
- Horn (2014): giant and super-giant discoveries. [map](#)

Covariates:

- QoG,
- WDI,
- ...

⇒ **Panel dataset spanning 2000-2012.**

Identification strategy

Baseline specification:

$$y_{ct} = \alpha_c + \delta_t + \nu_{rt} + \beta \cdot D_{ct} + X'_{ct} \cdot \gamma + \epsilon_{ct}$$

with c: country, r: sub-continent region, t: year.

Identification assumption:

Timing of giant discoveries quasi-exogenous conditional on country and year fixed-effects (cf Lei and Michaels JDE 2014; Arezki et al. QJE 2017).

Results - correlations

- (a) Correlations with full sample
- (b) Difference-in-differences evidence
- (c) Robustness and extensions

Results - correlations

	(1)	(2)	(3)	(4)
Dependent variable:	Oil Gas production dummy	Oil Gas production ln (real \$ per capita)	Oil Gas production ln (1 + real \$ per capita)	Oil Gas exports ln (real \$ per capita)
Discovered Oil Gas	0.0617 (0.0603)	1.517** (0.670)	1.081* (0.585)	1.193* (0.627)
Observations	1505	827	1505	587
R-squared	0.058	0.34	0.127	0.498
# countries	116	68	116	57
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table 1: Correlations - Discoveries & oil and gas output

Results - correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + loans # projects	Aid + loans (per capita)	Aid + loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Discovered Oil gas	2.191*** (0.573)	7.126 (6.060)	1.449*** (0.397)	1.768 (4.445)	1.415*** (0.417)	5.359 (4.277)	-0.143 (0.501)
Observations	1718	1718	805	1718	694	1718	323
R-squared	0.15	0.06	0.166	0.031	0.113	0.072	0.259
# countries	133	133	111	133	109	133	92
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** p<0.01 ** p<0.05 * p<0.1.

Table 2: Correlations - Discoveries & Chinese official finance

Results - difference-in-differences

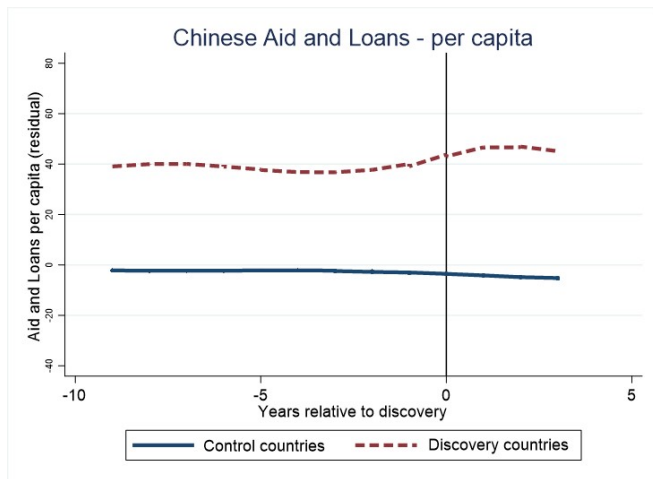


Figure 5: Effect of discoveries on Chinese aid and loans

Results - difference-in-differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + loans # projects	Aid + loans (per capita)	Aid + loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Discovered Oil Gas	1.267* (0.717)	13.64** (6.122)	0.958** (0.399)	7.341 (4.516)	1.219** (0.478)	6.294 (4.073)	0.0977 (0.515)
Observations	1133	1133	513	1133	470	1133	167
R-squared	0.276	0.083	0.260	0.036	0.155	0.142	0.366
# countries	88	88	69	88	69	88	56
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table 3: Discoveries & Chinese official finance (1/3)

oil and gas

Results - difference-in-differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + Loans # projects	Aid + Loans (per capita)	Aid + Loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Panel A: baseline model with full covariates: pop., income, under-5 mortality, FH political rights							
Discovered Oil Gas	1.091 (0.657)	16.89** (7.555)	0.663 (0.469)	7.974 (5.442)	0.923 (0.609)	8.921* (5.133)	0.224 (0.796)
Observations	1,119	1,119	506	1,119	463	1,119	167
Panel B: lagged dependent variable model (no country FE). Covariates: year FE, trends, pop., income							
Discovered Oil Gas	1.452** (0.577)	10.56* (5.673)	1.245*** (0.365)	4.788 (3.711)	1.507*** (0.468)	5.796 (3.894)	0.193 (0.841)
Observations	1,047	1,047	347	1,047	306	1,047	63
Panel C: baseline model with limited covariates controlling for GDP per capita (in log) instead							
Discovered Oil Gas	1.405** (0.698)	6.977 (7.191)	0.982** (0.395)	2.838 (5.554)	1.283*** (0.458)	4.139 (4.147)	-0.663 (0.496)
Observations	1,109	1,109	497	1,109	454	1,109	166
Panel D: baseline model with full covariates controlling for GDP per capita (in log) instead							
Discovered Oil Gas	1.259** (0.632)	11.42 (8.739)	0.708 (0.449)	3.787 (7.195)	1.024* (0.577)	7.635 (4.775)	-0.527 (0.559)
Observations	1,107	1,107	497	1,107	454	1,107	166
Robust standard errors clustered at the country level in parentheses. *** p<0.01 ** p<0.05 * p<0.1.							

Table 4: Discoveries & Chinese official finance (2/3)

Results - difference-in-differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + Loans # projects	Aid + Loans (per capita)	Aid + Loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Panel E: baseline model with full covariates controlling for polity2 measure of institutions							
Discovered Oil Gas	1.300* (0.746)	14.08*** (4.377)	0.981** (0.384)	7.704** (3.391)	1.248** (0.479)	6.376 (5.374)	-0.0404 (0.507)
Observations	874	874	451	874	412	874	161
Panel F: baseline model with full covariates controlling for civil war dummy (UCDP)							
Discovered Oil Gas	1.091* (0.655)	16.89** (7.562)	0.649 (0.466)	7.963 (5.484)	0.929 (0.611)	8.930* (5.155)	0.284 (0.778)
Observations	1,119	1,119	506	1,119	463	1,119	167
Panel G: baseline model with full covariates and region times year fixed effects instead of trends							
Discovered Oil Gas	1.227 (0.750)	9.416 (9.452)	0.846 (0.611)	7.665* (4.206)	1.285* (0.710)	1.752 (8.355)	-0.00327 (1.860)
Observations	1,119	1,119	506	1,119	463	1,119	167
Robust standard errors clustered at the country level in parentheses. *** p<0.01 ** p<0.05 * p<0.1.							

Table 5: Discoveries & Chinese official finance (3/3)

Extra robustness tests and extensions

Robustness tests:

- ▶ Countries with no known discoveries as 'controls' [link](#)
- ▶ Countries with discoveries over study period as 'controls' [link](#)

Extensions:

- ▶ Sector allocation [link](#)
- ▶ Institution quality heterogeneity [link](#)

Conclusion

- ▶ Using data on giant oil and gas fields, I find robust evidence that discoveries are followed by large increases in:
 - oil and gas production and exports,
 - Chinese aid and loans.
 - ▶ Chinese official finance seems to be targeted at economic infrastructure and production sectors.
 - ▶ Effect lower in countries with more open and transparent political and government institutions.
- ⇒ **Findings in line with belief that resource wealth matters for the allocation of Chinese official finance.**

Thank you for your attention!

(pascal.jaupart@bsg.ox.ac.uk)

Data

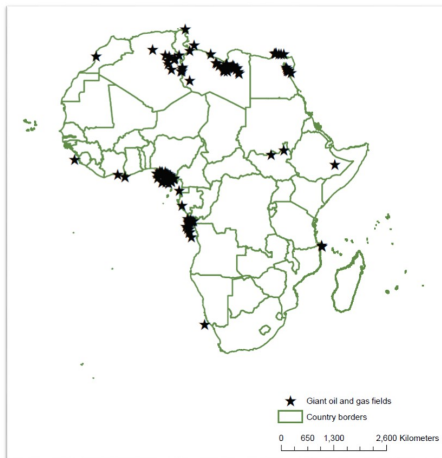


Figure 6: Giant oil and gas field discoveries in Africa (1868-2010)

Results - difference-in-differences

	(1)	(2)	(3)	(4)
Dependent variable:	Oil Gas production dummy	Oil Gas production ln (real \$ per capita)	Oil Gas production ln (1 + real \$ per capita)	Oil Gas exports ln (real \$ per capita)
Discovered Oil Gas	0.0575 (0.0565)	3.039*** (0.867)	1.306* (0.659)	2.283*** (0.721)
Observations	920	255	920	133
R-squared	0.084	0.430	0.127	0.449
# countries	71	24	71	17
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table 6: Discoveries & oil and gas output

back

Results - robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + loans # projects	Aid + loans (per capita)	Aid + loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Discovered Oil Gas	0.372 (0.970)	16.59* (9.520)	1.546*** (0.415)	6.047 (7.139)	0.668 (0.538)	10.54* (5.843)	0.646 (0.814)
Observations	870	870	405	870	375	870	126
R-squared	0.325	0.113	0.243	0.046	0.156	0.206	0.442
# countries	67	67	52	67	52	67	41
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table 7: Countries with no known oil reserves in 2000

back

Results - robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	Aid + loans # projects	Aid + loans (per capita)	Aid + loans (log)	Aid (per capita)	Aid (log)	Loans (per capita)	Loans (log)
Discovered Oil Gas	4.372*** (1.511)	-5.476 (14.34)	1.512** (0.661)	5.089 (3.188)	1.391 (0.990)	-10.57 (13.62)	-0.164 (0.429)
Observations	364	364	196	364	156	364	114
R-squared	0.300	0.149	0.373	0.132	0.387	0.149	0.374
# countries	28	28	26	28	25	28	22
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$.

Table 8: Countries with giant discoveries during 2000-2012 period

back

Results - extensions

(1)	(2)	(3)	(4)	(5)	(6)	
	Aid + Loans Social sectors		Aid + Loans Infrastructure and Production		Aid + Loans Other sectors	
Dependent variable:	(log)	(per cap.)	(log)	(per cap.)	(log)	(per cap.)
Panel A: baseline specification with full sample						
Discovered Oil Gas (1.133)	0.663 (1.554)	1.066 (0.729)	1.853** (4.233)	9.053** (0.500)	-0.371 (3.707)	-2.992
Observations	455	1718	441	1718	373	1718
Panel B: baseline specification with sample of countries without any discovery as 'controls'						
Discovered Oil Gas (1.298)	-0.378 (1.942)	1.286 (0.893)	1.847** (3.391)	12.49*** (0.627)	-0.336 (3.675)	-0.144
Observations	310	1133	269	1133	241	1133
Panel C: baseline specification with sample of countries with no (zero) oil reserves as of 2000						
Discovered Oil Gas (1.650)	-1.916 (2.492)	1.634 (0.946)	3.241*** (6.858)	16.61** (0.724)	-0.961 (4.409)	-1.655
Observations	253	870	207	870	187	870
Panel D: baseline specification with sample of countries with giant discovery(ies) over the sample period						
Discovered Oil Gas (1.532)	0.678 (2.143)	1.312 (1.443)	1.999 (14.33)	-3.129 (1.408)	-0.702 (2.408)	-3.660
Observations	105	364	134	364	97	364
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes	Yes	Yes
Limited covariates	Yes	Yes	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No	No	No

Robust standard errors clustered at the country level in parentheses. *** p<0.01 ** p<0.05 * p<0.1.

Table 9: Discoveries and sector allocation

Results - extensions

	(1)	(2)	(3)	(4)
Dependent variable:	Aid + Loans (per cap.)	Aid + Loans (per cap.)	Aid + Loans (per cap.)	Aid + Loans (per cap.)
Discovered Oil Gas	18.31 (11.20)	-3.015 (6.471)	6.404 (6.407)	-24.94*** (9.398)
Discovery x FH political rights	-6.754*** (2.544)			
Discovery x Polity 2		-1.863** (0.936)		
Discovery x ICRG QoG			-12.77 (13.05)	
Discovery x WB corruption				-27.49** (10.52)
Observations	1,563	1,331	1,032	1,551
R-squared	0.102	0.107	0.107	0.108
Country FE	No	No	No	No
Year FE	Yes	Yes	Yes	Yes
Region trends	Yes	Yes	Yes	Yes
Full covariates	No	No	No	No

Robust std. errors clustered at country level in parentheses. *** p<0.01 ** p<0.05 * p<0.1.

Table 10: Discoveries and institutional quality