Internet Appendix for
"Financial market misconduct and public enforcement: The case of Libor manipulation"

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A   Further details on Libor computation

This internet appendix provides details on the Libor computation in place throughout the period of our analysis, 2001 through 2012. During the period, the organization responsible for the computation was the British Bankers' Association (BBA), a trade association of over 200 banks based in London. The actual collection of the data and the computation of Libor were performed by Thomson Reuters. Libor is computed for 10 distinct currencies (the Australian dollar, the British pound sterling, the Canadian dollar, the Danish krone, the Euro, the Japanese yen, the New Zealand dollar, the Swedish krona, the Swiss franc, and the U.S. dollar) and 15 different maturities. The 15 maturities range from overnight to one year.

While any bank that trades in London can apply to become a panel bank for any currency for which Libor is computed, its selection by BBA is based on three factors: (i) the bank's scale of market activity, (ii) its reputation, and (iii) its perceived expertise. Thus, the number of panel banks varies with currencies and over time, but within a given currency, the number does not vary across maturities.

Interest rate data from the panel banks are collected via a survey. Panel banks are supposed to report the lowest perceived interest rate at which the bank can borrow an unsecured, "reasonable loan amount" in the London interbank market for a given currency and maturity. The maturity dates are standardized to International Swap Dealers Association (ISDA) norms. The BBA does not define a "reasonable loan amount."

Libor submissions are supposed to be reported by the bank's staff primarily responsible for its cash or liquidity management, via a secure computer application, to Thomson Reuters by 11:10am, London time. Thomson Reuters checks for data errors, allows the panel banks to correct obvious mistakes, and publishes Libor by 11:30am. At the same time, Thomson Reuters also publicly releases the individual submissions provided by all the panel banks. If any errors are identified post-publication, Thomson Reuters corrects these

and publishes recomputed Libor and individual submissions by 12:00 noon, London time. Panel banks do not have access to individual submissions and cannot legally view other panel banks' submissions prior to publication of the official Libor.

For computing the trimmed averages, the number of contributing banks is rounded down to the nearest number divisible by four. For example, for the USD with 18 panel banks the number of banks will be rounded down to 16. No submissions are excluded at this stage. Thomson Reuters then excludes the 25% highest and the 25% lowest submissions of the rounded number. For the USD example cited above, this means Thomson Reuters will exclude the highest four (25% of 16) and the lowest four submissions. The remaining 10 (=18-4-4) submissions are simply averaged to compute the Libor for USD for any given maturity.

Table B.1: Panel banks' submission periods

This table reports the initial year/month for which Libor submissions in a given currency are available across panel banks. The sample ends in November 28, 2012, for all banks. An asterisk denotes banks that are not publicly traded.

Bank name	USD	GBP	JPY	CHF
Banco Santander (now Abbey National)	-	2001/01	-	-
Bank of America	2001/01	-	-	-
Bank of Tokyo - Mitsubishi UFJ Ltd.	2001/01	2001/01	2001/01	2001/01
Barclays	2001/01	2001/01	2001/01	2001/01
BNP Paribas	2011/02	2001/01	-	-
Citigroup	2001/01	2005/07	2002/03	2001/01
Credit Agricole	2011/02	2010/12	2010/12	-
Credit Suisse Group	2001/01	-	-	2001/01
Deutsche Bank	2001/01	2001/01	2001/01	2001/01
HSBC Hdg	2001/01	2001/01	2001/01	2001/01
JP Morgan Chase & Co.	2001/01	2001/01	2001/01	2001/01
Lloyds Banking Group	2001/01	2001/01	2001/01	2001/01
Mizuho	-	2009/02	2001/01	-
Norinchukin*	2001/01	-	2001/01	-
Rabobank*	2001/01	2001/01	2001/01	2009/06
Royal Bank of Canada	2005/07	2003/03	-	-
Royal Bank of Scotland Group	2001/01	2001/01	2001/01	-
Societe Generale	2009/02	2010/06	2006/01	2001/01
Sumitomo Mitsui Banking Corporation	2011/02	-	2001/01	-
Union Bank of Switzerland	2001/01	2001/01	2001/01	2001/01

Table B.2: First stage results of TSLS analysis

This table reports the estimates of the first-stage regression of changes in Libor on changes in the corresponding currency-maturity risk-free rate of a given country, domestic aggregate stock market returns, and changes in VIX. The last two rows report the corresponding F-test of overidentifying restrictions and their corresponding p-values.

Variable	USD-1m	USD-3m	USD-6m	GBP-1m	GBP-3m	GBP-6m	JPY-1m	JPY-3m	JPY-6m	CHF-1m	CHF-3m	CHF-6m
Δr_f	0.664***	0.699***	0.730***	0.793***	0.784***	0.753***	0.484***	0.280***	0.192***	0.804***	0.810***	0.798***
	(6.157)	(7.845)	(14.224)	(5.738)	(5.458)	(7.702)	(3.262)	(3.619)	(3.739)	(8.960)	(8.680)	(10.564)
r_{Mkt}	0.030	-0.129	0.019	-0.012	0.018	0.025	0.033	-0.001	0.013	-0.071	-0.043	-0.008
	(0.304)	(-0.793)	(0.166)	(-0.206)	(0.330)	(0.362)	(0.540)	(-0.021)	(0.483)	(-1.346)	(-1.153)	(-0.235)
ΔVIX	0.001	0.002	0.001	-0.000	-0.000	0.001	0.001	-0.001	-0.000	0.000	0.000	0.000
	(0.637)	(0.851)	(0.792)	(-0.393)	(-0.448)	(1.127)	(1.265)	(-1.377)	(-0.701)	(0.488)	(0.520)	(0.941)
Obs.	725	725	725	725	725	725	725	725	725	725	725	725
R^2	0.7418	0.7281	0.7247	0.7707	0.7786	0.6360	0.4970	0.3596	0.2549	0.8059	0.8231	0.8037
F	34.5516	64.3660	235.9030	30.9960	30.6160	36.8490	14.3670	14.1300	13.3013	80.2377	77.4266	114.2900
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0003	0.0000	0.0000	0.0000