



# LIBOR: Frequently Asked Questions

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## Summary

The London Interbank Offer Rate (LIBOR) is an estimate of prevailing interest rates in London money markets. Barclays, a British bank that serves on the panel responding to the LIBOR survey, recently admitted submitting false responses to manipulate the index (and attempting to manipulate a similar index, the Euro Interbank Offer Rate [EURIBOR]). The Commodity Futures Trading Commission (CFTC) and the U.S. Department of Justice (DOJ) reached settlements with Barclays in which the bank agreed to admit fault and pay a large fine.

This report answers several frequently asked questions.

- How is LIBOR calculated?
- Which banks serve on the dollar LIBOR panel?
- How can a single bank manipulate LIBOR?
- How did Barclays manipulate LIBOR?
- How is LIBOR used in the U.S. financial systems?
- Are there alternatives to LIBOR?
- Were U.S. policymakers, such as the Federal Reserve Bank of New York, aware of problems with LIBOR?

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This report answers several common questions regarding the London Interbank Offer Rate (LIBOR), an index representing prevailing interest rates in London money markets.

Recently, the Commodity Futures Trading Commission (CFTC) and the U.S. Department of Justice (DOJ) reached settlements with Barclays, in which the British bank admitted submitting false responses to the survey used to calculate LIBOR and the Euro Interbank Offer Rate (EURIBOR) to manipulate the indexes.<sup>1</sup> American policymakers have a number of concerns, including the possibility that American banks that participate in the LIBOR survey may also have attempted to manipulate the index, the effect that changes in LIBOR can have on borrowers and lenders whose contracts reference LIBOR to determine the interest rate of a loan, and the reliance of policymakers on LIBOR as one of the indicators of the stability of the financial system. For brevity and ease of exposition, this report focuses on LIBOR, although the manipulation and policy issues regarding EURIBOR are similar.

## How is LIBOR Calculated?

LIBOR is an index that measures the cost of funds to large global banks operating in London financial markets or with London-based counterparties. The British Bankers' Association (BBA), a private trade association, constructs LIBOR, and Thomson Reuters publishes it worldwide. Each day, the BBA surveys a panel of banks, asking the question, "At what rate could you borrow funds, were you to do so by asking for and then accepting inter-bank offers in a reasonable market size just prior to 11 am?"<sup>2</sup> The BBA throws out the highest and lowest portion of the responses, and averages the remaining middle. The average is reported at 11:30 a.m.

LIBOR is actually a set of indexes. There are separate LIBOR rates reported for 15 different maturities (length of time to repay a debt) for each of 10 currencies. The shortest maturity is overnight, the longest is one year. In the United States, many private contracts reference the three-month dollar LIBOR, which is the index resulting from asking the panel what rate they would pay to borrow dollars for three months.

## Which Banks Serve on the Dollar LIBOR Panel?

The panel surveyed to construct the dollar LIBOR is made up of the 18 banks listed in **Table 1**. The U.S. banks on the dollar panel include Bank of America, Citibank, and JPMorgan Chase, although all of the listed banks have significant U.S. activities. For the dollar LIBOR, the highest 4 and lowest 4 responses of the 18 banks on the panel are thrown out, and the middle 10 are averaged.

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<sup>1</sup> U.S. Commodity Futures Trading Commission, "CFTC Orders Barclays to pay \$200 Million Penalty for Attempted Manipulation of and False Reporting concerning LIBOR and Euribor Benchmark Interest Rates," press release pr6289-12, June 27, 2012, available at <http://www.cftc.gov/PressRoom/PressReleases/pr6289-12> and U. S. Department of Justice, "Barclays Bank PLC Admits Misconduct Related to Submissions for the London Interbank Offered Rate and the Euro Interbank Offered Rate and Agrees to Pay \$160 Million Penalty," press release, June 27, 2012, available at <http://www.justice.gov/opa/pr/2012/June/12-crm-815.html>.

<sup>2</sup> A more detailed discussion of the survey methodology can be found on the BBA website, available at <http://www.bbalibor.com/bbalibor-explained/the-basics>.

**Table 1. Banks on the Reporting Panel for Dollar LIBOR**

Bank of America	Bank of Tokyo-Mitsubishi UFJ	Barclays Bank
BNP Paribas	Credit Agricole	Credit Suisse
Citibank	Deutsche Bank	HSBC
JP Morgan Chase	Lloyds Banking Group	Rabobank
Royal Bank of Canada	Société Générale	Sumitomo Mitsui Banking Corporation
The Norinchukin Bank	The Royal Bank of Scotland Group	UBS

**Source:** British Bankers' Association

The panel of banks for the LIBOR for each currency is chosen according to a published set of criteria.<sup>3</sup> Market share in London and in transactions of various maturities for the currency are important factors. The committee also considers a firm's reputation and expertise in transactions in a currency. Banks can apply to be participants in the LIBOR survey, and the number of reporting banks has changed occasionally.

## Is LIBOR Unique?

Similar indexes are reported for other locations by other banking associations. For example, there is a EURIBOR for Europe, and a TIBOR for Tokyo. A primary difference between these other indexes and LIBOR is that they measure the cost of borrowing funds in these other locations, for various maturities, in various currencies. The sponsoring organizations and the methodologies may vary slightly from place to place, but the public reporting and the ability of third parties to reference the indexes are similar.

## How is LIBOR Used in the U.S. Financial System?

The LIBOR index is used in many ways. Many private loan contracts use LIBOR as a benchmark; for example, the interest rate on a mortgage, student loan, or car loan may be set to LIBOR plus a few percentage points. Many financial derivatives, such as an interest rate swap, compare a fixed interest rate to LIBOR (because LIBOR is capable of varying from day to day). Futures exchanges use LIBOR for contracts traded in the market. Policymakers use LIBOR as one element in even more complex indexes, such as the TED spread (Treasury-Eurodollar), used to assess the level of stress in financial markets.<sup>4</sup>

Private parties are not legally required to use LIBOR (or any other index) as a benchmark; instead, they choose to do so voluntarily. Conceptually, a lender setting the interest rate for a future loan might try to take into account what its cost of funds will be when the loan actually has to be issued. A lender knows that permanent surveys like LIBOR will be published on the future date on which a loan is to be offered. The contract could specify that on the future date, the

<sup>3</sup> The criteria are available on the BBALIBOR website; see <http://www.bbalibor.com/panels>.

<sup>4</sup> The TED spread refers to the difference between futures contracts on Treasury securities and futures contracts on Eurodollars of identical maturity and delivery date. When financial markets are stressed, the TED spread tends to widen because it is believed that the U.S. government can continue to borrow more easily than the private firms that rely on Eurodollar funding. A Eurodollar futures contract references LIBOR.

borrower will be given the loan with an interest rate based on the index value of LIBOR reported on that day. Because LIBOR is meant to represent the cost of borrowing dollars by the largest banks in global financial markets, other lenders may choose LIBOR if they believe that their own cost of funds is likely to follow a similar pattern over time.

## Are There Alternatives to LIBOR?

Alternatives to LIBOR for private contracts exist, but may have shortcomings. Differences in the type of borrower or the maturity of the loan may make other benchmarks less suitable for some purposes. For example, lenders could choose to use the yield on U.S. Treasury securities as a benchmark. However, the recent financial crisis served as a reminder that the borrowing costs of banks do not always trend in the same direction as the borrowing costs of the U.S. government. Or, banks could use the Federal Funds Rate as a benchmark, but that rate is subject to changes for policy reasons, not just market conditions.<sup>5</sup> The rate charged on interbank repurchase agreements in New York money markets could be an alternative, although repurchase agreements may be more analogous to collateralized debt under some circumstances. The appropriate alternative is likely to vary with the types of loans or the types of financial derivatives being benchmarked.

The value of loans, derivatives, and other financial instruments that reference LIBOR is very large. One estimate by staff of the Federal Reserve Bank of Cleveland found that 45% of prime adjustable rate mortgages (ARMs) and 80% of subprime ARMs used LIBOR as the benchmark.<sup>6</sup> A financial adviser to municipalities stated that about 75% of municipalities have some contracts tied to the index.<sup>7</sup>

## Can a Single Reporting Bank Manipulate a LIBOR Index?

Because the BBA throws out the highest and lowest survey responses, some people may think that a single bank on a LIBOR reporting panel cannot affect the final index. A single bank can affect the index, but will not always be able to move the index in the direction it wants, or may not be able to move the index at all, under some circumstances.

It is possible for a single bank on the panel to affect the dollar LIBOR if the bank's response would have been within the middle of the responses, or if it can change which responses are the middle responses. An illustrative example follows. Recall that the dollar LIBOR panel is made up of 18 banks, with only the responses of the middle 10 being averaged. Suppose that 4 banks report an interest rate of 3%, the next 10 banks report an interest rate of 8%, and 4 banks report an interest rate of 10%. The dollar LIBOR would be calculated by throwing out all of the 3% and 10% responses because the calculation throws out the highest and lowest 4 responses. In this example, the remaining 10 responses are all 8%, so the average would be  $80/10 = 8\%$ . LIBOR would be reported at 8%. However, if a bank that would have reported 10% wants to lower the LIBOR, and the bank lowers its bid from 10% to below 8% (for the sake of this example, assume the response is changed to 2%), the average will change, even though the bank's response is still

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<sup>5</sup> Targeting the Federal Funds Rate is one of the policy tools of the Federal Reserve when adjusting monetary policy.

<sup>6</sup> Venkatu, Guhan, "How Many U.S. Mortgages Are Linked to Libor?" *Economic Trends*, July 10, 2012, available at <http://www.clevelandfed.org/research/trends/2012/0712/01banfin.cfm>.

<sup>7</sup> Popper, Nathaniel, "Rate Scandal Spurs Scramble for Damages," *Dealbook New York Times*, July 10, 2012, available at <http://dealbook.nytimes.com/2012/07/10/libor-rate-rigging-scandal-sets-off-legal-fights-for-restitution/>.

thrown out. Why? Because one of the 8% responses is now among the highest 4 responses, and one of the 3% responses is in the middle 10. The average is now  $75/10=7.5\%$ . In this example, a single bank could move the index from 8% to 7.5%.

If the bank exaggerates its lie, perhaps by reporting 1% instead of 2%, the LIBOR remains 7.5% in this example. Thus, it is possible for a single bank to affect LIBOR under some circumstances, but there is a limit on the magnitude of the effect.

In some cases, the actions of a single bank will not move the index. In the above example, if the bank that would honestly report a 10% response wanted to increase the LIBOR index instead of lowering it, a change in the bank's own response would not achieve the desired manipulation because it would not change the value of any of the middle responses, nor would it change the responses comprising the middle. Why? Because reporting 12% instead of 10% still leaves the same 10 responses in the middle to be averaged. In this example, LIBOR remains 8%.

## **In Its Admissions, How Did Barclays Manipulate LIBOR?**

Barclays has admitted submitting false survey responses to manipulate LIBOR. Because LIBOR is used in U.S. derivatives markets participated in by Barclays, an attempt to manipulate LIBOR is an attempt to manipulate U.S. derivatives markets, and thus a violation of U.S. law. Barclays has settled separately with United Kingdom officials for violating UK law. Focusing on U.S. issues, the following describes Barclays' admissions with the CFTC and DOJ. The material in this section is drawn from the Statement of Facts in Appendix A of the settlement documents.<sup>8</sup>

The settlement documents signed by Barclays with the CFTC and DOJ include employee emails that can be divided into three categories documenting manipulation: (1) changing the survey response for the benefit of Barclays' derivatives trade positions, (2) changing the survey response to protect Barclays' reputation, and (3) attempting to induce other banks to change their survey responses.<sup>9</sup> The first two categories, Barclays acting alone, can affect LIBOR under some circumstances, but the methodology of LIBOR's calculation limits the magnitude of any impact of a single bank submitting a false bid. The third category, collusion, can have an impact of greater magnitude, but the settlement documents report only Barclays' attempts to reach out to other panel responders.

Like any large and complex global bank, derivatives trades make up only one part of Barclays' balance sheet. LIBOR survey responders are supposed to be from the firm's treasury office, or other general office, and kept separate from derivatives traders. During 2005-2007, Barclays' internal emails reveal derivatives traders asking other employees to submit false survey responses to benefit their trading positions.<sup>10</sup> In one particularly telling email exchange, a survey responder says that he or she was happy to help, and the trader thanks the individual.<sup>11</sup> Unlike many other

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<sup>8</sup> The order instituting the CFTC settlement can be found at <http://online.wsj.com/public/resources/documents/enfbarclaysorder062712.pdf>. The appendix can be found here. Page numbers refer to page numbers in Appendix A, Statement of Facts, available at <http://www.scribd.com/doc/98416026/Barclays-statement-of-facts-from-the-Justice-Department>.

<sup>9</sup> The Barclays documents do not name any specific other banks, and do not say that other banks colluded with Barclays. *Ibid.*, p.10.

<sup>10</sup> *Ibid.*, p. 5.

<sup>11</sup> *Ibid.*, p. 7.

divisions within Barclays, the derivatives traders' preferred LIBOR outcome changes direction from day to day; that is, on some days the derivatives traders prefer LIBOR to be high to benefit their position while on other days the traders prefer LIBOR to be low. Many other lines of business have only one preferred direction; for example, units of Barclays that pay interest will consistently prefer the LIBOR index to be low. In the settlement, Barclays admits that it submitted false survey responses (both too high and too low) during the 2005-2007 period.<sup>12</sup>

When global financial markets came under increasing stress during 2008, Barclays' management preferred that Barclays lower its responses to protect the firm's reputation.<sup>13</sup> Barclay's managers said that they did not want Barclays' "head to be above the parapet," lest it be shot at.<sup>14</sup> As financial turmoil increased throughout that year, large complex banks like Barclays were having increasing difficulty in raising funds. At times, Barclays' responses tended to be higher than other responders, drawing the attention of UK officials. UK financial regulators raised concerns with Barclays.<sup>15</sup> If Barclays' LIBOR survey responses were significantly higher than those of other LIBOR panel responders, then global investors might take that as a sign of weakness at Barclays. Individual submissions are made public in part to promote transparency of the index. Upon hearing that UK officials raised concerns with Barclays' management that the firm's responses were high, some Barclays employees concluded that UK officials wanted Barclays to submit lower LIBOR responses, a conclusion that the managers who met with UK officials have said was not warranted.<sup>16</sup> Unlike the 2005-2007 period during which Barclays submitted false responses in both directions, Barclays consistently under-reported its cost of funds in 2008.

## Were U.S. Policymakers Aware of Problems with LIBOR?

The Federal Reserve Bank of New York (FRBNY) reportedly raised concerns with Barclays about its LIBOR responses.<sup>17</sup> Reportedly, the FRBNY also raised concerns with UK regulators and the BBA about the methodology for the LIBOR index.<sup>18</sup>

In response to congressional inquiries, FRBNY has posted several documents that reveal its concerns with LIBOR as it was being calculated and reported in 2008.<sup>19</sup> Included among the documents are

- Explanatory Note;
- April 11, 2008: MarketSOURCE Weekly Market Review;
- May 6, 2008: Slide Deck of Presentation to U.S. Treasury, "Recent Developments in Short-Term Funding Markets";

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<sup>12</sup> Ibid., p. 5.

<sup>13</sup> Ibid., p. 15.

<sup>14</sup> Ibid., p. 18.

<sup>15</sup> Ibid., p. 21.

<sup>16</sup> Ibid., p. 22.

<sup>17</sup> Paletta, Damien, "Fed to Document LIBOR Action," *Online Wall Street Journal*, July 11, 2012, available at [http://online.wsj.com/article/SB10001424052702303919504577520361029916848.html?mod=WSJ\\_hp\\_LEFTWhatsNewsCollection](http://online.wsj.com/article/SB10001424052702303919504577520361029916848.html?mod=WSJ_hp_LEFTWhatsNewsCollection).

<sup>18</sup> Ibid.

<sup>19</sup> The documents can be found on the FRBNY website, at [http://www.newyorkfed.org/newsevents/news/markets/2012/Barclays\\_LIBOR\\_Matter.html](http://www.newyorkfed.org/newsevents/news/markets/2012/Barclays_LIBOR_Matter.html).

- May 20, 2008: MarketSOURCE report “Recent Concerns Regarding LIBOR’s Credibility”;
- June 1, 2008: Timothy F. Geithner e-mail to Mervyn King, copying Paul Tucker, with attached “Recommendations for Enhancing the Credibility of LIBOR”;
- June 3, 2008: Mervyn King e-mail to Timothy F. Geithner; and
- June 5, 2008: Slide Deck of Presentation to the Interagency Financial Markets Group Meeting, “Market Concerns Regarding LIBOR.”

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