

PUTNAM MUNICIPAL OPPORTUNITIES TRUST
Form N-CSR
June 26, 2015

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM N-CSR

**CERTIFIED SHAREHOLDER REPORT OF REGISTERED
MANAGEMENT INVESTMENT COMPANIES**

Investment Company Act file number: (811-07626)

Exact name of registrant as specified in charter: Putnam Municipal Opportunities Trust

Address of principal executive offices: One Post Office Square, Boston, Massachusetts 02109

Name and address of agent for service: Robert T Burns, Vice President
One Post Office Square
Boston, Massachusetts 02109

Copy to: Bryan Chegwiddden, Esq.
Ropes & Gray LLP
1211 Avenue of the Americas
New York, New York 10036

Registrant's telephone number, including area code: (617) 292-1000

Date of fiscal year end: April 30, 2015

Date of reporting period: May 1, 2014 – April 30, 2015

Item 1. Report to Stockholders:

The following is a copy of the report transmitted to stockholders pursuant to Rule 30e-1 under the Investment Company Act of 1940:

Putnam Municipal
Opportunities
Trust

Annual report
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Consider these risks before investing: Lower-rated bonds may offer higher yields in return for more risk. Bond investments are subject to interest-rate risk (the risk of bond prices falling if interest rates rise) and credit risk (the risk of an issuer defaulting on interest or principal payments). Interest-rate risk is greater for longer-term bonds, and credit risk is greater for below-investment-grade bonds. Unlike bonds, funds that invest in bonds have fees and expenses. The value of bonds in the fund's portfolio may fall or fail to rise over extended periods of time for a variety of reasons, including general financial market conditions, changing market perceptions of the risk of default, changes in government intervention, and factors related to a specific issuer or industry. These factors may also lead to periods of high volatility and reduced liquidity in the bond markets. You can lose money by investing in the fund. The fund's shares trade on a stock exchange at market prices, which may be lower than the fund's net asset value.

Message from the Trustees

Dear Fellow Shareholder:

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With the midway point of 2015 at hand, we note the sixth anniversary of the beginning of the U.S. economic expansion as dated by the National Bureau of Economic Research, which tracks the ups and downs of U.S. business cycles. It has also been six years since the beginning of the current bull market in U.S. stocks.

Both the expansion and the bull market are longer than average, and both appear to owe their longevity, to some degree, to the extraordinary policy measures undertaken by the Federal Reserve. Recently, however, the Fed has been preparing markets for a shift toward tighter monetary policy. Short-term interest rates could increase for the first time since 2006.

While higher interest rates can be a reflection of solid economic conditions, they can also pose a risk to fixed-income investments, and can have a less direct impact on stocks. International markets, which have performed well in early 2015, would also feel the effects of higher rates in the world's largest economy. In the following pages, your fund's portfolio manager provides a market outlook in addition to an update on your fund's performance.

With the possibility that markets could begin to move in different directions, it might be a prudent time to consult your financial advisor to determine whether any adjustments or additions to your portfolio are warranted.

As the owner of a Putnam fund, you have put your investment in the hands of professional managers who pursue a consistent strategy and have experience in navigating changing market conditions. They, and we, share a deep conviction that an active approach based on fundamental research can play a valuable role in your portfolio.

As always, thank you for investing with Putnam.

Respectfully yours,

Robert L. Reynolds
President and Chief Executive Officer
Putnam Investments

Jameson A. Baxter
Chair, Board of Trustees

June 12, 2015

Performance
snapshot

Annualized total return (%) comparison as of 4/30/15

Data are historical. Past performance does not guarantee future results. More recent returns may be less or more than those shown. Investment return and net asset value will fluctuate, and you may have a gain or a loss when you sell your shares. Performance assumes reinvestment of distributions and does not account for taxes. Fund returns in the bar chart are at NAV. See pages 5 and 11–12 for additional performance information, including fund returns at market price. Index and Lipper results should be compared with fund performance at NAV.

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Interview with your fund's portfolio manager

Thalia Meehan, CFA

What was the market environment like for municipal bonds during the 12-month reporting period ended April 30, 2015?

For much of the reporting period, the macroeconomic backdrop and accommodative monetary policies helped to keep interest rates low and to push municipal bond prices higher. However, uncertainty about the timing of the Federal Reserve's first rate hike since June 2006 contributed to heightened interest-rate volatility, especially in the second half of the period. The prospect of higher U.S. interest rates contributed to a rally in the U.S. dollar, which appreciated strongly against foreign currencies. Falling energy prices also added another dimension to the debate about growth as lower prices rippled through the economy and helped to ease inflationary pressures. Geopolitical tensions in the Middle East sparked a flight to quality at times during the period, as investors generally became more cautious in their outlook.

Municipal bonds benefited from the Fed's forward guidance during the period, which suggested that the central bank would not rush to raise interest rates. This past December, Fed officials modified their policy statement by adding that they "can be patient" on the timing of their first rate increase. Subsequently, in March, the Fed removed the word "patient" from its statement about plans for raising interest rates — a change in wording that was expected, but the central bank also tempered its outlook for the U.S. economy and inflation.

Broad market index and fund performance

This comparison shows your fund's performance in the context of broad market indexes for the 12 months ended 4/30/15. See pages 4 and 11–12 for additional fund performance information. Index descriptions can be found on page 13.

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Fed Chair Janet Yellen added that when rates start to increase, they might not approach long-term “normal” levels for some time. The overall dovish tone of Yellen’s statement was well received by investors, as it signaled a more gradual path to the normalization of interest rates than many investors had anticipated. Just before the close of the reporting period, Yellen acknowledged recent weakness in the U.S. economy but still left open the possibility of raising rates in the second half of 2015.

How did Putnam Municipal Opportunities Trust perform against this backdrop?

With interest rates low and fundamental credit quality stable, investors continued to seek out the yields offered by relatively riskier municipal bonds further out on the maturity spectrum as well as for those in the lower-rated, higher-yielding sectors. Consequently, credit spreads [the difference in yield between higher- and lower-quality municipal bonds] tightened during the period, resulting in slightly better returns for lower-quality investments than for higher-quality investments.

Municipal bond prices also benefited from favorable supply/demand dynamics, as inflows continued throughout the period. While supply is up significantly year over year, it has been dominated by refunding issuance, as municipal issuers replaced their older, higher-coupon bonds with lower-yield debt. The increased supply has generally been met with strong demand.

Credit quality overview

Credit qualities are shown as a percentage of the fund’s net assets (common and preferred shares) as of 4/30/15. A bond rated Baa or higher (MIG3/VMIG3 or higher, for short-term debt) is considered investment grade. The chart reflects Moody’s ratings; percentages may include bonds or derivatives not rated by Moody’s but rated by Standard & Poor’s (S&P) or, if unrated by S&P, by Fitch ratings, and then included in the closest equivalent Moody’s rating based on analysis of these agencies’ respective ratings criteria. Moody’s ratings are used in recognition of its prominence among rating agencies and breadth of coverage of rated securities. Ratings may vary over time.

Cash and net other assets, if any, represent the market value weights of cash, derivatives, short-term securities, and other unclassified assets in the portfolio. The fund itself has not been rated by an independent rating agency.

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“In our opinion, the general fiscal health and creditworthiness of the municipal bond market are solid.”

Thalia Meehan

The fund was well positioned for this environment, outperforming its benchmark, the Barclays Municipal Bond Index, and the average return of its Lipper peer group for the 12 months ended April 30, 2015.

Are your key investment themes, with their defensive orientation, still in place?

We maintained our slightly defensive bias in the portfolio because we believed that the municipal bond market’s attractive returns in 2014 could be attributed primarily to a combination of lower interest rates and strong market technicals. We kept the fund’s duration positioning, or interest-rate sensitivity, below the median of its Lipper peer group. We achieved this by maintaining a slightly higher-than-average cash position in the portfolio to help shelter it from price pressures, given the risk of interest rates moving higher. We also believed that carrying a slightly higher-than-average cash balance gave us greater flexibility to act swiftly in the event that timely investment opportunities presented themselves.

As for portfolio positioning, the fund retained an overweight exposure to municipal bonds rated A and Baa relative to the benchmark during the period. We continued to

Portfolio allocation by state

Top ten state allocations are shown as a percentage of the fund’s net assets (common and preferred shares) as of 4/30/15. Investments in Puerto Rico represented 0.5% of the fund’s net assets. Summary information may differ from the portfolio schedule included in the financial statements due to the differing treatment of interest accruals, the floating rate portion of tender option bonds, derivative securities, if any, and the use of different classifications of securities for presentation purposes. Holdings and allocations may vary over time.

emphasize essential service revenue bonds, which are typically issued by state and local government entities to finance specific revenue-generating projects, and underweighted local general obligation [G.O.] bonds relative to the benchmark. These securities rely on the taxing power of the issuer and the health of the local economy to make payments from property taxes or sales and income taxes. We maintained our underweight exposure to issuers in Puerto Rico relative to the fund's Lipper peer group, given our negative credit outlook for the Commonwealth. At the sector level, we favored transportation, higher education, continuing care retirement communities, and essential service utilities bonds in the portfolio relative to the fund's Lipper peer group. Overall, this positioning contributed positively to performance.

Our shorter-duration interest-rate positioning was a modest detractor from relative performance versus our Lipper peers, as interest rates moved lower during the period. An underweight position in non-rated bonds versus our Lipper peers also was a headwind for performance, as demand for high-yield municipal bonds helped push prices higher.

How do you think the dramatic decline in oil prices will play out across the municipal bond market?

Lower oil and energy prices should be a net positive for the municipal bond market, in our opinion. We believe certain sectors, such as

Comparison of top sector weightings

This chart shows how the fund's top weightings have changed over the past six months. Allocations are shown as a percentage of the fund's net assets (common and preferred shares). Current period summary information may differ from the information in the portfolio schedule notes included in the financial statements due to the inclusion of derivative securities, any interest accruals, and the use of different classifications of securities for presentation purposes. Holdings and allocations may vary over time.

transportation — notably airlines — and toll roads, could see a positive impact from the decline in prices. However, we also believe that oil-producing states, such as Texas, North Dakota, and Alaska, are likely to see falling revenues as production decreases or ceases for a period of time. In the cases of Alaska and North Dakota, however, these states typically have not issued much municipal bond debt and have set aside healthy reserves to ease budget pressures that typically accompany such a downturn. In the case of Texas, we believe the decline in oil and energy prices could be more widely felt. If oil prices remain low for an extended period of time, affected issuers may come under more pressure, in our opinion. The susceptibility of local G.O. bonds to macroeconomic developments, such as a sharp decline in oil prices, reinforces our predisposition to underweight G.O. bonds in the portfolio relative to the benchmark.

What factors are likely to influence the performance of municipal bonds in the coming months?

Questions about the timing of a Fed interest-rate hike are likely to dominate the public discourse and may fuel market volatility until the central bank acts. Thus, we believe the Fed's actions, along with the direction of longer-term U.S. Treasuries, will highly influence the performance of municipal bonds in 2015.

In our opinion, the general fiscal health and creditworthiness of the municipal bond market are solid. Despite some high-profile outliers, such as Detroit and Puerto Rico that have garnered much media attention, we expect defaults to remain low and that they could even decline further as the U.S. economy recovers. The default rate, which stood at 0.03% for 2014 [according to Bank of America Merrill Lynch], is a tiny fraction of the \$3.6 trillion municipal bond market, and we don't believe defaults are likely to increase meaningfully in the foreseeable future. That said, we would expect the State of Illinois, City of Chicago, and Puerto Rico to continue to be in the headlines, as they contend with budget and pension issues.

Prospects for tax reform appear to constitute little risk at this point, in our opinion. However, we are closely monitoring the various proposals and believe any momentum for change will more likely come after the 2016 elections.

With credit spreads the tightest that they have been in five years, we expect performance will be driven less by price appreciation potential and more by the tax-free income opportunities afforded by municipal bonds. In today's low interest-rate environment where investors continue to search for attractive yield opportunities, we believe many will look to tax-exempt investments to help them keep more of what they earn.

Thank you, Thalia, for your time and insights today.

The views expressed in this report are exclusively those of Putnam Management and are subject to change. They are not meant as investment advice.

Please note that the holdings discussed in this report may not have been held by the fund for the entire period. Portfolio composition is subject to review in accordance with the fund's investment strategy and may vary in the future. Current and future portfolio holdings are subject to risk. Statements in the Q&A concerning the fund's performance or portfolio composition relative to those of the fund's Lipper peer group may reference information produced by Lipper Inc. or through a third party.

Portfolio Manager Thalia Meehan holds a B.A. from Williams College. She joined Putnam in 1989 and has been in the investment industry since 1983.

In addition to Thalia, your fund's portfolio managers are Paul M. Drury, CFA, and Susan A. McCormack, CFA.

IN THE NEWS

There seems to be momentum in the U.S. equities market, which is now in its third-longest bull run since 1928. Inflation, as measured by the Consumer Price Index, was -0.1% before seasonal adjustment for the 12 months ended March 31, 2015, according to the Bureau of Labor Statistics. Low inflation and a resilient U.S. economy generally provide a supportive environment for equities. However, investors appear to be more cautious than celebratory. Uncertainties include the timing of the Federal Reserve's decision to implement the first hike in short-term interest rates since 2006 and whether the strong dollar could continue to worsen the trade balance, which could in turn reduce gross domestic product. In March, exports grew by less than 1% , according to the Bureau of Economic Analysis, compared with a 7.7% jump in imports in the same month. For now, the S&P 500 Index continues to hover around the 2100 mark. Investors should keep in mind that equities tend to perform well when short-term rates are rising from low levels. The reason is, in part, because rising rates typically signal an improving economy.

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Your fund's performance

This section shows your fund's performance, price, and distribution information for periods ended April 30, 2015, the end of its most recent fiscal year. In accordance with regulatory requirements for mutual funds, we also include performance information as of the most recent calendar quarter-end. Performance should always be considered in light of a fund's investment strategy. Data represent past performance. Past performance does not guarantee future results. More recent returns may be less or more than those shown. Investment return, net asset value, and market price will fluctuate, and you may have a gain or a loss when you sell your shares.

Fund performance Total return and comparative index results for periods ended 4/30/15

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	NAV	Market price	Barclays Municipal Bond Index	Lipper General & Insured Municipal Debt Funds (leveraged closed-end) category average*
Annual average (life of fund) (5/28/93)	6.34%	5.76%	5.44%	6.33%
10 years	79.28	89.72	57.19	81.35
Annual average	6.01	6.61	4.63	6.11
5 years	49.77	44.62	26.09	49.55
Annual average	8.41	7.66	4.75	8.36
3 years	21.23	13.62	10.78	20.86
Annual average	6.63	4.35	3.47	6.51
1 year	10.67	10.64	4.80	9.96

Performance assumes reinvestment of distributions and does not account for taxes.

Index and Lipper results should be compared with fund performance at net asset value. Fund results reflect the use of leverage, while index results are unleveraged and Lipper results reflect varying use of, and methods for, leverage.

Performance includes the deduction of management fees and administrative expenses.

*Over the 1-year, 3-year, 5-year, 10-year, and life-of-fund periods ended 4/30/15, there were 76, 71, 70, 67, and 39 funds, respectively, in this Lipper category.

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Fund price and distribution information For the 12-month period ended 4/30/15

Distributions

Number	12
Income ¹	\$0.7140
Capital gains ²	—

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Total	\$0.7140	
Distributions — Preferred shares	Series B (3,417 shares)	Series C (3,737 shares)
Income ¹	\$26.91	\$26.60
Capital gains ²	—	—
Total	\$26.91	\$26.60
Share value	NAV	Market price
4/30/14	\$12.73	\$11.61
4/30/15	13.35	12.10
Current rate (end of period)	NAV	Market price
Current dividend rate ³	5.35%	5.90%
Taxable equivalent ⁴	9.45	10.42

The classification of distributions, if any, is an estimate. Final distribution information will appear on your year-end tax forms.

¹ For some investors, investment income may be subject to the federal alternative minimum tax. Income from federally exempt funds may be subject to state and local taxes.

² Capital gains, if any, are taxable for federal and, in most cases, state purposes.

³ The most recent distribution, including any return of capital and excluding capital gains, annualized and divided by NAV or market price at end of period.

⁴ Assumes maximum 43.40% federal tax rate for 2015. Results for investors subject to lower tax rates would not be as advantageous.

Fund performance as of most recent calendar quarter
Total return for periods ended 3/31/15

	NAV	Market price
Annual average (life of fund) (5/28/93)	6.40%	5.82%
10 years	84.74	95.83
Annual average	6.33	6.95
5 years	54.17	45.76
Annual average	9.04	7.83
3 years	24.49	16.52
Annual average	7.57	5.23
1 year	13.81	14.48

See the discussion following the fund performance table on page 11 for information about the calculation of fund performance.

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Terms and definitions

Important terms

Total return shows how the value of the fund's shares changed over time, assuming you held the shares through the entire period and reinvested all distributions in the fund.

Net asset value (NAV) is the value of all your fund's assets, minus any liabilities, divided by the number of outstanding shares.

Market price is the current trading price of one share of the fund. Market prices are set by transactions between buyers and sellers on exchanges such as the New York Stock Exchange.

Fixed-income terms

Current rate is the annual rate of return earned from dividends or interest of an investment. Current rate is expressed as a percentage of the price of a security, fund share, or principal investment.

Yield curve is a graph that plots the yields of bonds with equal credit quality against their differing maturity dates, ranging from shortest to longest. It is used as a benchmark for other debt, such as mortgage or bank lending rates.

Comparative indexes

Barclays Municipal Bond Index is an unmanaged index of long-term fixed-rate investment-grade tax-exempt bonds.

Barclays U.S. Aggregate Bond Index is an unmanaged index of U.S. investment-grade fixed-income securities.

BofA Merrill Lynch U.S. 3-Month Treasury Bill Index is an unmanaged index that seeks to measure the performance of U.S. Treasury bills available in the marketplace.

S&P 500 Index is an unmanaged index of common stock performance.

Indexes assume reinvestment of all distributions and do not account for fees. Securities and performance of a fund and an index will differ. You cannot invest directly in an index.

Lipper is a third-party industry-ranking entity that ranks mutual funds. Its rankings do not reflect sales charges. Lipper rankings are based on total return at net asset value relative to other funds that have similar current investment styles or objectives as determined by Lipper. Lipper may change a fund's category assignment at its discretion. Lipper category averages reflect performance trends for funds within a category.

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Other information for shareholders

Important notice regarding share repurchase program

In September 2014, the Trustees of your fund approved the renewal of a share repurchase program that had been in effect since 2005. This renewal allows your fund to repurchase, in the 12 months beginning October 8, 2014, up to 10% of the fund's common shares outstanding as of October 7, 2014.

Important notice regarding delivery of shareholder documents

In accordance with Securities and Exchange Commission (SEC) regulations, Putnam sends a single copy of annual and semiannual shareholder reports, prospectuses, and proxy statements to Putnam shareholders who share the same address, unless a shareholder requests otherwise. If you prefer to receive your own copy of these documents, please call Putnam at 1-800-225-1581, and Putnam will begin sending individual copies within 30 days.

Proxy voting

Putnam is committed to managing our mutual funds in the best interests of our shareholders. The Putnam funds' proxy voting guidelines and procedures, as well as information regarding how your fund voted proxies relating to portfolio securities during the 12-month period ended June 30, 2014, are available in the Individual Investors section of putnam.com, and on the SEC's website, www.sec.gov. If you have questions about finding forms on the SEC's website, you may call the SEC at 1-800-SEC-0330. You may also obtain the Putnam funds' proxy voting guidelines and procedures at no charge by calling Putnam's Shareholder Services at 1-800-225-1581.

Fund portfolio holdings

The fund will file a complete schedule of its portfolio holdings with the SEC for the first and third quarters of each fiscal year on Form N-Q. Shareholders may obtain the fund's Form N-Q on the SEC's website at www.sec.gov. In addition, the fund's Form N-Q may be reviewed and copied at the SEC's Public Reference Room in Washington, D.C. You may call the SEC at 1-800-SEC-0330 for information about the SEC's website or the operation of the Public Reference Room.

Trustee and employee fund ownership

Putnam employees and members of the Board of Trustees place their faith, confidence, and, most importantly, investment dollars in Putnam mutual funds. As of April 30, 2015, Putnam employees had approximately \$498,000,000 and the Trustees had approximately \$142,000,000 invested in Putnam mutual funds. These amounts include investments by the Trustees' and employees' immediate family members as well as investments through retirement and deferred compensation plans.

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Important notice regarding Putnam's privacy policy

In order to conduct business with our shareholders, we must obtain certain personal information such as account holders' names, addresses, Social Security numbers, and dates of birth. Using this information, we are able to maintain accurate records of accounts and transactions.

It is our policy to protect the confidentiality of our shareholder information, whether or not a shareholder currently owns shares of our funds. In particular, it is our policy not to sell information about you or your accounts to outside marketing firms. We have safeguards in place designed to prevent unauthorized access to our computer systems and procedures to protect personal information from unauthorized use.

Under certain circumstances, we must share account information with outside vendors who provide services to us, such as mailings and proxy solicitations. In these cases, the service providers enter into confidentiality agreements with us, and we provide only the information necessary to process transactions and perform other services related to your account. Finally, it is our policy to share account information with your financial representative, if you've listed one on your Putnam account.

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Summary of Putnam Closed-End Funds' Amended and Restated Dividend Reinvestment Plans

Putnam High Income Securities Fund, Putnam Managed Municipal Income Trust, Putnam Master Intermediate

Income Trust, Putnam Municipal Opportunities Trust and Putnam Premier Income Trust (each, a “Fund” and collectively, the “Funds”) each offer a dividend reinvestment plan (each, a “Plan” and collectively, the “Plans”). If you participate in a Plan, all income dividends and capital gain distributions are automatically reinvested in Fund shares by the Fund’s agent, Putnam Investor Services, Inc. (the “Agent”). If you are not participating in a Plan, every month you will receive all dividends and other distributions in cash, paid by check and mailed directly to you.

Upon a purchase (or, where applicable, upon registration of transfer on the shareholder records of a Fund) of shares of a Fund by a registered shareholder, each such shareholder will be deemed to have elected to participate in that Fund’s Plan. Each such shareholder will have all distributions by a Fund automatically reinvested in additional shares, unless such shareholder elects to terminate participation in a Plan by instructing the Agent to pay future distributions in cash. Shareholders who were not participants in a Plan as of January 31, 2010, will continue to receive distributions in cash but may enroll in a Plan at any time by contacting the Agent.

If you participate in a Fund’s Plan, the Agent will automatically reinvest subsequent distributions, and the Agent will send you a confirmation in the mail telling you how many additional shares were issued to your account.

To change your enrollment status or to request additional information about the Plans, you may contact the Agent either in writing, at P.O. Box 8383, Boston, MA 02266-8383, or by telephone at 1-800-225-1581 during normal East Coast business hours.

How you acquire additional shares through a Plan If the market price per share for your Fund’s shares (plus estimated brokerage commissions) is greater than or equal to their net asset value per share on the payment date for a distribution, you will be issued shares of the Fund at a value equal to the higher of the net asset value per share on that date or 95% of the market price per share on that date.

If the market price per share for your Fund’s shares (plus estimated brokerage commissions) is less than their net asset value per share on the payment date for a distribution, the Agent will buy Fund shares for participating accounts in the open market. The Agent will aggregate open-market purchases on behalf of all participants, and the average price (including brokerage commissions) of all shares purchased by the Agent will be the price per share allocable to each participant. The Agent will generally complete these open-market purchases within five business days following the payment date. If, before the Agent has completed open-market purchases, the market price per share (plus estimated brokerage commissions) rises to exceed the net asset value per share on the payment date, then the purchase price may exceed the net asset value per share, potentially resulting in the acquisition of fewer shares than if the distribution had been paid in newly issued shares.

How to withdraw from a Plan Participants may withdraw from a Fund’s Plan at any time by notifying the Agent, either in writing or by telephone. Such withdrawal will be effective immediately if notice is received by the Agent with sufficient time prior to any distribution record date; otherwise, such withdrawal will be effective with respect to any subsequent

distribution following notice of withdrawal. There is no penalty for withdrawing from or not participating in a Plan.

Plan administration The Agent will credit all shares acquired for a participant under a Plan to the account in which the participant's common shares are held. Each participant will be sent reasonably promptly a confirmation by the Agent of each acquisition made for his or her account.

About brokerage fees Each participant pays a proportionate share of any brokerage commissions incurred if the Agent purchases additional shares on the open market, in accordance with the Plans. There are no brokerage charges applied to shares issued directly by the Funds under the Plans.

About taxes and Plan amendments Reinvesting dividend and capital gain distributions in shares of the Funds does not relieve you of tax obligations, which are the same as if you had received cash distributions. The Agent supplies tax information to you and to the IRS annually. Each Fund reserves the right to amend or terminate its Plan upon 30 days' written notice. However, the Agent may assign its rights, and delegate its duties, to a successor agent with the prior consent of a Fund and without prior notice to Plan participants.

If your shares are held in a broker or nominee name If your shares are held in the name of a broker or nominee offering a dividend reinvestment service, consult your broker or nominee to ensure that an appropriate election is made on your behalf. If the broker or nominee holding your shares does not provide a reinvestment service, you may need to register your shares in your own name in order to participate in a Plan.

In the case of record shareholders such as banks, brokers or nominees that hold shares for others who are the beneficial owners of such shares, the Agent will administer the Plan on the basis of the number of shares certified by the record shareholder as representing the total amount registered in such shareholder's name and held for the account of beneficial owners who are to participate in the Plan.

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Financial statements

These sections of the report, as well as the accompanying Notes, preceded by the Report of Independent Registered Public Accounting Firm, constitute the fund's financial statements.

The fund's portfolio lists all the fund's investments and their values as of the last day of the reporting period. Holdings are organized by asset type and industry sector, country, or state to show areas of concentration and diversification.

Statement of assets and liabilities shows how the fund's net assets and share price are determined. All investment and non-investment assets are added together. Any unpaid expenses and other liabilities are subtracted from this total. The result is divided by the number of shares to determine the net asset value per share. (For funds with preferred shares, the amount subtracted from total assets includes the liquidation preference of preferred shares.)

Statement of operations shows the fund's net investment gain or loss. This is done by first adding up all the fund's earnings — from dividends and interest income — and subtracting its operating expenses to determine net investment income (or loss). Then, any net gain or loss the fund realized on the sales of its holdings — as well as any unrealized gains or losses over the period — is added to or subtracted from the net investment result to determine the fund's net gain or loss for the fiscal year.

Statement of changes in net assets shows how the fund's net assets were affected by the fund's net investment gain or loss, by distributions to shareholders, and by changes in the number of the fund's shares. It lists distributions and their sources (net investment income or realized capital gains) over the current reporting period and the most recent fiscal year-end. The distributions listed here may not match the sources listed in the Statement of operations because the distributions are determined on a tax basis and may be paid in a different period from the one in which they were earned.

Financial highlights provide an overview of the fund's investment results, per-share distributions, expense ratios, net investment income ratios, and portfolio turnover in one summary table, reflecting the five most recent reporting periods. In a semiannual report, the highlights table also includes the current reporting period.

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Report of Independent Registered Public Accounting Firm

To the Trustees and Shareholders of
Putnam Municipal Opportunities Trust:

In our opinion, the accompanying statement of assets and liabilities, including the portfolio, and the related statements of operations and of changes in net assets and the financial highlights present fairly, in all material respects, the financial position of Putnam Municipal Opportunities Trust (the "fund") at April 30, 2015, and the results of its operations, the changes in its net assets and the financial highlights for each of the periods indicated, in conformity with accounting principles generally accepted in the United States of America. These financial statements and financial highlights (hereafter referred to as "financial statements") are the responsibility of the fund's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits, which included confirmation of investments owned at April 30, 2015 by correspondence with the custodian and brokers, provide a reasonable basis for our opinion.

PricewaterhouseCoopers LLP
Boston, Massachusetts

June 12, 2015

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The fund's portfolio 4/30/15

Key to holding's abbreviations

ABAG Association Of Bay Area Governments

AGM Assured Guaranty Municipal Corporation

AGO Assured Guaranty, Ltd.

AMBAC AMBAC Indemnity Corporation

BAM Build America Mutual

COP Certificates of Participation

FGIC Financial Guaranty Insurance Company

FHLMC Coll. Federal Home Loan Mortgage Corporation Collateralized

FNMA Coll. Federal National Mortgage Association Collateralized

FRB Floating Rate Bonds: the rate shown is the current interest rate at the close of the reporting period

G.O. Bonds General Obligation Bonds

NATL National Public Finance Guarantee Corp.

SGI Syncora Guarantee, Inc.

U.S. Govt. Coll. U.S. Government Collateralized

MUNICIPAL BONDS AND NOTES (140.3%)*

Rating**

Value

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		Principal amount	
Alabama (0.6%)			
Jefferson Cnty., Swr. Rev. Bonds, Ser. D, 6 1/2s, 10/1/53	BBB-	\$2,000,000	\$2,327,480
Selma, Indl. Dev. Board Rev. Bonds (Gulf Opportunity Zone Intl. Paper Co.), Ser. A, 5.8s, 5/1/34	Baa2	750,000	865,785
			3,193,265
Arizona (2.9%)			
Casa Grande, Indl. Dev. Auth. Rev. Bonds (Casa Grande Regl. Med. Ctr.), Ser. A, 7 5/8s, 12/1/29 (escrow) ^F	D/P	3,025,000	9,042
Coconino Cnty., Poll. Control Rev. Bonds (Tucson Elec. Pwr. Co. — Navajo), Ser. A, 5 1/8s, 10/1/32	A3	1,500,000	1,659,960
Glendale, Indl. Dev. Auth. Rev. Bonds (Midwestern U.), 5 1/8s, 5/15/40	A-	2,125,000	2,365,741
Maricopa Cnty., Poll. Control Rev. Bonds (El Paso Elec. Co.), Ser. A, 7 1/4s, 2/1/40	Baa1	2,400,000	2,787,600
Phoenix, Civic Impt. Corp. Arpt. Rev. Bonds, Ser. A, 5s, 7/1/40	A1	1,000,000	1,074,060
Pima Cnty., Indl. Dev. Auth. Rev. Bonds (Horizon Cmnty. Learning Ctr.), 5.05s, 6/1/25	BBB	1,550,000	1,552,542
Pinal Cnty., Elec. Rev. Bonds (Dist. No. 3), 5 1/4s, 7/1/36	A	500,000	566,690
Salt Verde, Fin. Corp. Gas Rev. Bonds, 5 1/2s, 12/1/29	A-	1,350,000	1,640,547
U. Med. Ctr. Corp. AZ Hosp. Rev. Bonds, U.S. Govt. Coll., 6 1/2s, 7/1/39 (Prerefunded 7/1/19)	AAA/P	1,000,000	1,203,370
Yuma, Indl. Dev. Auth. Hosp. Rev. Bonds (Yuma Regl. Med. Ctr.), Ser. A, 5s, 8/1/32	A-	2,065,000	2,276,745
			15,136,297
California (28.5%)			
ABAG Fin. Auth. for Nonprofit Corps. Rev. Bonds (Episcopal Sr. Cmnty.), Ser. A, 5s, 7/1/32	BBB+/F	550,000	600,342
ABC Unified School Dist. G.O. Bonds, Ser. B, FGIC, zero %, 8/1/20	Aa3	1,500,000	1,344,495
Bay Area Toll Auth. of CA Rev. Bonds (San Francisco Bay Area), Ser. F-1, U.S. Govt. Coll., 5s, 4/1/39 (Prerefunded 4/1/18)	AA	2,500,000	2,791,000
(Toll Bridge), Ser. S-4, 5s, 4/1/33	A1	1,200,000	1,353,360

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MUNICIPAL BONDS AND NOTES (140.3%)* <i>cont.</i>	Rating**	Principal amount	Value
<i>California cont.</i>			
Burbank, Unified School Dist. G.O. Bonds (Election of 1997), Ser. C, NATL, FGIC, zero %, 8/1/23	AA-	\$1,000,000	\$785,630
CA Hsg. Fin. Agcy. Rev. Bonds (Home Mtge.)			
Ser. E, 4.8s, 8/1/37	A3	5,000,000	5,054,950
Ser. K, 4 5/8s, 8/1/26	A3	2,435,000	2,457,353
CA Muni. Fin. Auth. COP (Cmnty. Hosp. Central CA), 5 1/4s, 2/1/37	A-	1,800,000	1,880,514
CA Muni. Fin. Auth. Rev. Bonds (Biola U.), 5s, 10/1/42	Baa1	500,000	537,595
CA Poll. Control Fin. Auth. Solid Waste Disp. FRB (Waste Management, Inc.), Ser. C, 5 1/8s, 11/1/23	A-	850,000	877,778
CA Poll. Control Fin. Auth. Wtr. Fac. Rev. Bonds (American Wtr. Cap. Corp.), 5 1/4s, 8/1/40	A-	1,000,000	1,075,860
CA State G.O. Bonds			
6 1/2s, 4/1/33	Aa3	12,000,000	14,429,520
5 1/2s, 3/1/40	Aa3	7,450,000	8,721,268
5s, 4/1/42			