

PUTNAM MUNICIPAL OPPORTUNITIES TRUST
Form N-CSR
June 26, 2014

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: John W. Gerstmayr, Esq.
Ropes & Gray LLP
800 Boylston Street
Boston, Massachusetts 02199-3600

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

Date of fiscal year end: April 30, 2014

Date of reporting period: May 1, 2013 – April 30, 2014

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. Bond prices may fall or fail to rise over time for several reasons, including general financial market conditions and factors related to a specific issuer or industry. 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:

Global stock markets continue to advance, albeit at a slower pace than in 2013, as the recovery in economies around the world progresses.

In the United States, recent improvements in the vital areas of employment, manufacturing, and consumer sales appear to have returned the economy to its upward trajectory. Likewise, capital spending by businesses — a key variable needed to support continued economic expansion — has risen. This strength, along with the leadership transition at the Federal Reserve, has fueled debate about future monetary policy.

In this environment, we believe Putnam's commitment to active fundamental research and new ways of thinking can serve the best interests of investors. We also believe that it is worthwhile to meet with your financial advisor periodically to discuss the range of strategies that Putnam offers. Your advisor can help you assess your individual needs, time horizon, and risk tolerance — crucial considerations as you work toward your investment goals.

As always, thank you for investing with Putnam.

About the fund

Potential for income exempt from federal income tax

Municipal bonds can help investors keep more of their investment income while also financing important public projects such as schools, roads, and hospitals.

The bonds are typically issued by states and local municipalities to raise funds for building and maintaining public facilities, and they offer income that is generally exempt from federal, state, and local income tax.

Putnam Municipal Opportunities Trust has the flexibility to invest in municipal bonds issued by any state in the country or U.S. territory. The bonds are often backed by the issuing entity or by revenues collected from usage fees, and have varying degrees of credit risk — the risk that the issuer would not be able to repay the bond.

The fund also combines bonds of differing credit quality. In addition to investing in high-quality bonds, the fund's managers allocate a portion of the portfolio to lower-rated bonds, which may offer higher income in return for more risk. When deciding whether to invest in a bond, the managers consider factors such as credit risk, interest-rate risk, and the risk that the bond will be prepaid.

The managers are backed by Putnam's fixed-income organization, where municipal bond analysts are grouped into sector teams and conduct ongoing research. Once a bond has been purchased, the managers continue to monitor developments that affect the bond market, the sector, and the issuer of the bond.

The goal of this research and active management is to stay a step ahead of the industry and pinpoint opportunities for investors.

How closed-end funds differ from open-end funds

More assets at work Open-end funds are subject to ongoing sales and redemptions that can generate transaction costs for long-term shareholders. Closed-end funds, however, are typically fixed pools of capital that do not need to hold cash in connection with sales and redemptions, allowing the funds to keep more assets actively invested.

Traded like stocks Closed-end fund shares are traded on stock exchanges and, as a result, their prices fluctuate because of the influence of several factors.

They have a market price Like an open-end fund, a closed-end fund has a per-share net asset value (NAV). However, closed-end funds also have a “market price” for their shares — which is how much you pay when you buy shares of the fund, and how much you receive when you sell them.

When looking at a closed-end fund’s performance, you will usually see that the NAV and the market price differ. The market price can be influenced by several factors that cause it to vary from the NAV, including fund distributions, changes in supply and demand for the fund’s shares, changing market conditions, and investor perceptions of the fund or its investment manager.

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. Fund results reflect the use of leverage, while index results are unleveraged and Lipper results reflect varying use of, and methods for, leverage. Lipper calculates performance differently than the closed-end funds it ranks, due to varying methods for determining a fund’s monthly reinvestment NAV.

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Interview with your fund’s portfolio manager

Thalia, how would you characterize the market environment for municipal bonds for the 12 months ended April 30, 2014?

Municipal bonds closed out the 12-month reporting period with relatively flat results, despite considerable month-to-month volatility stemming from headline and interest-rate fears. Interest rates and bond yields generally rose during the first half of the period, as investors grappled with the Federal Reserve’s statements that it was considering a timetable for winding down its stimulative bond-buying program, known as quantitative easing [QE]. The markets were particularly volatile in the May–June 2013 time frame, despite assurances from the Fed that the scaling back of QE would be tied to improvements in the U.S. economy.

Negative returns for the municipal market continued during the summer months. Headline credit situations — most notably Detroit’s bankruptcy and Puerto Rico’s credit challenges — continued to spook investors, which in turn led to further fund outflows and downward pressure on municipal bond prices. Municipal bonds rallied after the Fed’s September announcement that it would wait for further evidence of improvement in the labor market before setting a time frame for tapering the QE program. Municipal bonds continued this momentum into October, when lawmakers agreed to extend the U.S. borrowing authority, avoiding

This comparison shows your fund’s performance in the context of broad market indexes for the 12 months ended 4/30/14. See pages 4 and 11–12 for additional fund performance information. Index descriptions can be found on page 13.

a possible debt default. However, the asset class slightly lost ground in November and December, as questions about the Federal Reserve's monetary policy caused investors to be cautious.

The municipal markets reversed course once again in January, posting a gain of almost 2% for the month, as measured by the Barclays Municipal Bond Index. This strong monthly return was sparked by a rise in interest rates, as investors moved to a risk-off mode around fears surrounding weaker-than-anticipated economic data and developing stress in emerging markets. In February, with the U.S. debt ceiling debate settled through March 2015, the environment for the credit markets improved. For the balance of the period, municipal bonds continued to post positive returns as broader economic data started to pick up and market technicals [supply/demand factors] helped to support prices.

What contributed to the improving technicals in the municipal market during the later part of the period?

Municipal bond issuance, which has been trending down in recent years, continued at a modest pace, and this was beneficial for municipal bond prices. The modest level of new supply has not kept pace with the solid demand from traditional tax-sensitive retail investors as well as from crossover taxable buyers drawn to the competitive yields and attractive relative value offered by this asset class. Meanwhile, inflows to tax-free mutual

Credit qualities are shown as a percentage of the fund's net assets (common and preferred shares) as of 4/30/14. 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. Ratings may vary over time.

Credit quality includes bonds and represents only the fixed-income portion of the portfolio. 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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funds, an important measure of demand, turned slightly positive in the first quarter of 2014 — primarily in tax-free high-yield bond funds. All told, with interest rates still low and fundamental credit quality improving, there has been greater investor appetite for the yields offered by municipal bonds further out on the maturity spectrum as well as for those in the lower-rated, higher-yielding sectors.

How did Putnam Municipal Opportunities Trust perform in this environment?

The fund, much like the municipal bond market, basically finished the 12-month period ended April 30, 2014, where it began — belying the great volatility in between. Against this backdrop, the fund lagged its benchmark, the Barclays Municipal Bond Index, but slightly outperformed the average return of its Lipper peer group.

What are your key investment themes?

Our defensive strategies remain in place, since we expect continued pressure on interest rates over the longer term as the Fed unwinds its economic stimulus program and investors adjust their expectations about the central bank's monetary policy.

Top ten state allocations are shown as a percentage of the fund's net assets (common and preferred shares) as of 4/30/14. Investments in Puerto Rico represented 2.4% 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.

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Ten-year U.S. Treasury yields were especially volatile in January 2014, initially falling from a high of 3.03% to a low of 2.58% before trading in a fairly narrow range for the remainder of the first quarter. The release of some weaker-than-expected economic data, coupled with the Fed's announcement that it would taper bond purchases by an additional \$10 billion per month in February fueled concern over the pace of economic growth in the United States. Higher-risk assets sold off as investors moved into safe-haven U.S. Treasuries. Comments by Fed Chair Janet Yellen following the central bank's March meeting seemed to come as somewhat of a surprise to the market, as she implied that interest-rate hikes could begin as early as the first quarter of 2015 if the pace of tapering bond purchases continues on its current path. However, those fears generally had eased by the end of the period.

Amid this volatility, we kept the fund's duration positioning, or interest-rate sensitivity, below that of its Lipper peer group. This included maintaining a slightly higher cash position in the portfolio to help shelter it from price pressures in an interest-rate environment that might be trending higher. We believe carrying slightly higher-than-average cash balances affords the fund greater flexibility to purchase attractively valued bonds even in a rising-rate environment. We continued to emphasize essential service revenue bonds, which are typically issued by state and local government entities to finance specific revenue-generating projects. While

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.

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we believe that conditions are improving at the state and local levels — and we were vigilant for investment opportunities — we continued to underweight local G.O. [general obligation] bonds. These securities rely on the taxing power of the issuer and the health of the local economy to make payments on these bonds.

What did this cautious undertone mean for the fund's positioning at the security level?

We have maintained an overweight exposure relative to the benchmark to municipal bonds rated A and Baa. In terms of sectors, relative to the fund's Lipper peer universe, we favored transportation, higher education, utility, and continuing-care retirement community bonds. This credit positioning contributed to the fund's performance. The fund's underweight exposure to Puerto Rico bonds dampened results, as did its shorter-duration interest-rate positioning, which detracted from returns relative to its Lipper peer group as interest rates moved lower during the final months of the period.

The fund increased its distribution rate during the period. What led to that decision?

The fund's monthly distribution rate was increased in October to \$0.0595 from \$0.0559, mainly due to an increase in the amount of income earned by the portfolio, which resulted from rising yields in the marketplace generally.

How does the fund use leverage?

Leverage generally involves borrowing funds or raising additional capital [e.g., by issuing debt securities or preferred stock] and investing the proceeds with the expectation of producing a return that exceeds the cost of borrowing or of the additional capital. Unlike open-end funds, closed-end funds, such as your fund, are permitted to engage in leverage by raising additional capital. Preferred share leverage is your fund's primary source of leverage. We also use tender option bonds as a supplemental source of leverage. Importantly, the purpose of leverage is to seek to enhance returns for the fund's common shareholders. Leverage generally offers opportunities for increased investment yield and also amplifies common shareholders' exposure to the effects of gains and losses in the fund's investment portfolio.

Are there risks associated with the use of leverage?

We believe common shareholders generally have been well served by the fund's use of leverage in recent years. However, the use of leverage presents certain risks for common shareholders. Because, as noted previously, leverage amplifies gains and losses, the net asset value of the common shares and the returns earned by common shareholders is generally more volatile in a leveraged fund than in a fund that does not use leverage. In addition, if the borrowing costs [which are typically based on short-term interest rates] associated with leverage rise, the costs of leverage will increase, most likely reducing the returns earned by common shareholders. We consider these risks regularly and may adjust the fund's investment exposures, taking into account leverage and other factors, as appropriate under market conditions.

What is your near-term outlook for the municipal bond market?

Despite the strong start for municipal bonds in 2014, we remain cautious and believe that there could be some volatility surrounding supply/demand factors and interest rates in the coming months. Tax-exempt municipal fund outflows for 2013 topped \$60 billion [Source: JPMorgan] — the most in 20 years — and put downward pressure on prices. Although we have seen fund flows improve and some direct retail buyers come into the market to help support prices, municipal bonds may remain vulnerable to potentially higher interest rates.

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The credit outlook of municipal bonds appears solid, especially since we expect U.S. growth to improve. With regard to tax policy, we think comprehensive tax reform is unlikely at least until after the 2014 mid-term elections. Over the longer term, we believe federal deficits and pressures around entitlement programs will likely contribute to the ongoing debate for broader tax reform, which could affect the value of municipal bonds.

We will continue to position the portfolio for modest upticks in the overall interest-rate environment, avoiding the more interest-rate-sensitive sectors of the municipal bond market to make the most of less-than-favorable market conditions. Our efforts remain focused on the pursuit of steady income, the minimizing of volatility, and a competitive total return for the funds.

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.

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

An anticipated boom in capital spending by U.S. businesses may provide the nation's economy with a much-needed boost in 2014. Capital expenditures this year are expected to increase by 10.3% among manufacturing companies and 10.8% among non-manufacturers, according to a recent forecast by the Business Survey Committee of the Institute for Supply Management (ISM). A rise in business investment — upgrading factories and industrial buildings, as well as buying new equipment and machinery — could provide a major catalyst to economic and corporate earnings growth. Since the 2008 financial crisis, most companies with extra cash have deployed it to repair balance sheets or have returned it to shareholders through stock buybacks or higher dividends. Today, some investors would rather see companies devote that capital to expand their operations.

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Your fund's performance

This section shows your fund's performance, price, and distribution information for periods ended April 30, 2014, 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 4/30/14

	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)	6.13%	5.53%	5.47%	6.18%
10 years	79.16	72.88	60.22	83.06
Annual average	6.00	5.63	4.83	6.21
5 years	65.81	64.83	30.97	65.24
Annual average	10.64	10.51	5.54	10.51
3 years	34.62	29.40	17.72	35.76
Annual average	10.42	8.97	5.59	10.70
1 year	-0.52	-2.40	0.50	-0.78

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

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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. Lipper calculates performance differently than the closed-end funds it ranks, due to varying methods for determining a fund's monthly reinvestment NAV.

* Over the 1-year, 3-year, 5-year, 10-year, and life-of-fund periods ended 4/30/14, there were 77, 72, 69, 68, and 39 funds, respectively, in this Lipper category.

Performance is shown net of expenses.

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Fund price and distribution information For the 12-month period ended 4/30/14

Distributions — Common shares

Number	12
Income 1	\$0.6960
Capital gains 2	—
Total	\$0.6960

Distributions — Preferred shares	Series B (3,417 shares)	Series C (3,737 shares)
Income 1	\$31.76	\$30.32
Capital gains 2	—	—
Total	\$31.76	\$30.32

Share value	NAV	Market price
4/30/13	\$13.54	\$12.66
4/30/14	12.73	11.61

Current rate (end of period)	NAV	Market price
Current dividend rate 3	5.61%	6.15%
Taxable equivalent 4	9.91	10.87

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 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 2014. 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 3/31/14

	NAV	Market price
Annual average (life of fund) (5/28/93)	6.06%	5.42%
10 years	70.06	54.41
Annual average	5.45	4.44
5 years	68.70	68.02
Annual average	11.03	10.94
3 years	35.43	26.03
Annual average	10.64	8.02
1 year	-0.81	-3.88

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 2013, 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, 2013, up to 10% of the fund's common shares outstanding as of October 7, 2013.

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, 2013, are available in the Individual Investors section of putnam.com, and on the Securities and Exchange Commission (SEC) 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 Forms N-Q on the SEC's website at www.sec.gov. In addition, the fund's Forms 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, 2014, Putnam employees had approximately \$458,000,000 and the Trustees had approximately \$110,000,000 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 **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

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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

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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.

Financial statements

A note about your fund's auditors

During your fund's fiscal year, between July 18, 2013, and December 16, 2013, a non-U.S. member firm in PricewaterhouseCoopers LLP's ("PwC") global network of firms had an investment in certain non-U.S. funds that became affiliated with Putnam Investments as a result of the acquisition of the funds' advisor by Putnam's parent company, Great-West Lifeco Inc. The investment consisted of pension plan assets for the benefit of the member firm's personnel. This investment is inconsistent with the SEC's independence rules applicable to auditors. Although upon the disposition of the investment by the member firm on December 16, 2013, PwC and its affiliates took all necessary steps to eliminate this issue, the requirements of the SEC's independence rules were not met for your fund's fiscal year because the SEC's rules require an audit firm to be independent for the entire fiscal year under audit. Based on its knowledge of the facts and its experience with PwC, the Audit and Compliance Committee of your fund's Board of Trustees concluded that the investment by the PwC member firm would not affect PwC's ability to render an objective audit opinion to your fund. Based on this conclusion and consideration of the potential risks that the disruption of a change of auditor could present, the Audit and Compliance Committee determined that PwC should continue to act as auditor for your fund.

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, 2014, 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, 2014 by correspondence with the custodian and brokers, provide a reasonable basis for our opinion.

PricewaterhouseCoopers LLP
Boston, Massachusetts
June 13, 2014

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The fund's portfolio 4/30/14

Key to holding's abbreviations

ABAG Association Of Bay Area Governments
AGM Assured Guaranty Municipal Corporation
AGO Assured Guaranty, Ltd.
AMBAC AMBAC Indemnity Corporation
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

FRN Floating Rate Notes: 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
VRDN Variable Rate Demand Notes, which are floating-rate securities with long-term maturities that carry coupons that reset and are payable upon demand either daily, weekly or monthly. The rate shown is the current interest rate at the close of the reporting period.

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MUNICIPAL BONDS AND NOTES (140.9%)*	Rating**	Principal amount	Value
Alabama (0.2%)			
Selma, Indl. Dev. Board Rev. Bonds (Gulf Opportunity Zone Intl. Paper Co.), Ser. A, 5.8s, 5/1/34	BBB	\$750,000	\$812,955
			812,955
Arizona (3.2%)			
Casa Grande, Indl. Dev. Auth. Rev. Bonds (Casa Grande Regl. Med. Ctr.), Ser. A, 7 5/8s, 12/1/29	BB-/P	3,025,000	2,950,796
Coconino Cnty., Poll. Control Rev. Bonds (Tucson Elec. Pwr. Co. — Navajo), Ser. A, 5 1/8s, 10/1/32	Baa1	1,500,000	1,551,015
Glendale, Indl. Dev. Auth. Rev. Bonds (Midwestern U.), 5 1/8s, 5/15/40	A-	2,125,000	2,211,466
Maricopa Cnty., Poll. Control Rev. Bonds (El Paso Elec. Co.), Ser. A, 7 1/4s, 2/1/40	Baa1	2,400,000	2,696,040
Phoenix, Civic Impt. Corp. Arpt. Rev. Bonds, Ser. A, 5s, 7/1/40	A1	1,000,000	1,033,080
Phoenix, Civic Impt. Corp. Waste Wtr. Syst. Rev. Bonds, 5s, 7/1/29	AA+	500,000	584,105
Pima Cnty., Indl. Dev. Auth. Rev. Bonds (Tucson Elec. Pwr. Co.), 5 3/4s, 9/1/29	Baa1	800,000	814,904
(Horizon Cmnty. Learning Ctr.), 5.05s, 6/1/25	BBB	1,550,000	1,497,641
Pinal Cnty., Elec. Rev. Bonds (Dist. No. 3), 5 1/4s, 7/1/36	A	500,000	544,045
Salt Verde, Fin. Corp. Gas Rev. Bonds, 5 1/2s, 12/1/29	A-	1,350,000	1,555,781
U. Med. Ctr. Corp. AZ Hosp. Rev. Bonds, 6 1/2s, 7/1/39	Baa1	1,000,000	1,103,610
			16,542,483

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California (29.2%)

ABAG Fin. Auth. for Nonprofit Corps. Rev. Bonds (Episcopal Sr. Cmnty.), Ser. A, 5s, 7/1/32	BBB+/F	550,000	565,917
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ABC Unified School Dist. G.O. Bonds, Ser. B, FGIC, zero %, 8/1/20	Aa3	1,500,000	1,263,435
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MUNICIPAL BONDS AND NOTES (140.9%)* cont.	Rating**	Principal amount	Value
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California cont.

Alameda, Corridor Trans. Auth. Rev. Bonds (Sr. Lien), Ser. A, 5s, 10/1/29	AA	\$1,250,000	\$1,398,063
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Bay Area Toll Auth. of CA Rev. Bonds (San Francisco Bay Area), Ser. F-1, 5s, 4/1/39	AA	2,500,000	2,653,525
(Toll Bridge), Ser. S-4, 5s, 4/1/33	A1	1,200,000	1,327,956

Burbank, Unified School Dist. G.O. Bonds (Election of 1997), Ser. C, NATL, FGIC, zero %, 8/1/23	AA-	1,000,000	727,720
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CA Edl. Fac. Auth. Rev. Bonds (Claremont Graduate U.), Ser. A, 5s, 3/1/42	Baa1	2,000,000	2,010,300
(U. of the Pacific), 5s, 11/1/21	A2	1,500,000	1,579,515
(Loyola-Marymount U.), NATL, zero %, 10/1/21	A2	1,300,000	998,868

CA Hsg. Fin. Agcy. Rev. Bonds (Home Mtge.) Ser. E, 4.8s, 8/1/37	A-	5,000,000	4,836,400
Ser. K, 4 5/8s, 8/1/26	A-	2,500,000	2,528,800

CA Muni. Fin. Auth. COP (Cmnty. Hosp. Central CA), 5 1/4s, 2/1/37	Baa1	1,800,000	1,818,126
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CA Muni. Fin. Auth. Rev. Bonds (Biola U.), 5s, 10/1/42	Baa1	500,000	513,955
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CA Poll. Control Fin. Auth. Rev. Bonds (San Jose Wtr. Co.), 5.1s, 6/1/40	A	3,500,000	3,623,550
(Pacific Gas & Electric Corp.), Class D, FGIC,			

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4 3/4s, 12/1/23	A3	2,500,000	2,653,874
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CA Poll. Control Fin. Auth. Solid Waste Disp. FRB (Waste Management, Inc.), Ser. C, 5 1/8s, 11/1/23	A-	850,000	888,429
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CA Poll. Control Fin. Auth. Wtr. Fac. Rev. Bonds (American Wtr. Cap. Corp.), 5 1/4s, 8/1/40	A-	1,000,000	1,020,160
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CA State G.O. Bonds			
6 1/2s, 4/1/33	A1	12,000,000	14,604,960
5 1/2s, 3/1/40	A1	7,450,000	8,374,322
5s, 4/1/42	A1	4,000,000	4,285,480
5s, 10/1/29	A1	3,000,000	3,289,410
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CA State Pub. Wks. Board Rev. Bonds			
Ser. I-1, 6 1/8s, 11/1/29	A2	1,000,000	1,187,100
Ser. A-1, 6s, 3/1/35	A2	1,600,000	1,861,088
(Dept. of Forestry & Fire), Ser. E, 5s, 11/1/32	A2	1,575,000	1,699,205
(Capital Projects), Ser. A, 5s, 4/1/29	A2	2,000,000	2,205,560
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CA Statewide Cmnty. Dev. Auth. COP (The Internext Group), 5 3/8s, 4/1/30	BBB+	2,575,000	2,581,077
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CA Statewide Cmnty. Dev. Auth. Rev. Bonds (Irvine, LLC-UCI East Campus), 6s, 5/15/40 (Sutter Hlth.), Ser. A, 5s, 11/15/43	Baa2 Aa3	2,000,000 2,485,000	2,138,980 2,524,760
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Cathedral City, Impt. Board Act of 1915 Special Assmt. Bonds (Cove Impt. Dist.), Ser. 04-02, 5.05s, 9/2/35	BB+/P	770,000	767,952
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Chula Vista, Indl. Dev. Rev. Bonds (San Diego Gas), Ser. B, 5s, 12/1/27	Aa2	1,915,000	1,999,011
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Foothill-De Anza, Cmnty. College Dist. G.O.			