



Report to the Chairman, Committee on
Ways and Means, House of
Representatives

June 2014

DEBT MANAGEMENT

Floating Rate Notes
Can Help Treasury
Meet Borrowing
Goals, but Additional
Actions Are Needed
to Help Manage Risk

GAO Highlights

Highlights of [GAO-14-535](#), a report to the Chairman, Committee on Ways and Means, House of Representatives

Why GAO Did This Study

To continue meeting its goal of financing the federal government's borrowing needs at the lowest cost over time, Treasury began issuing a new type of security—a 2-year floating rate note (FRN)—in January 2014. The FRN pays interest at a rate that resets periodically based on changes in the rate of the 13-week Treasury bill (to which the FRN is indexed). GAO was asked to review Treasury debt management, including this product and other debt management issues.

This report (1) evaluates Treasury's rationale for introducing FRNs and (2) identifies the demand for Treasury securities from a broad range of investors to assess whether changes would help Treasury meet its goals. To address these objectives, GAO used Treasury auction data from 1980 - 2014 to simulate the costs of Treasury FRNs, reviewed Treasury documents, surveyed a non-generalizable sample of 82 large domestic institutional investors across sectors, and interviewed market participants and academic experts. (For the survey and results, see [GAO-14-562SP](#).)

What GAO Recommends

GAO recommends that Treasury (1) track and report a measure of interest rate risk in its debt portfolio, (2) analyze the price effects of the difference between the term of the index rate and the reset period, (3) examine opportunities for additional new types of securities, such as FRNs of other maturities, and (4) expand outreach to certain market participants. Treasury agreed with the recommendations and said that they had already taken steps to begin implementing them.

View [GAO-14-535](#). To view the e-supplement, click on [GAO-14-562SP](#). For more information, contact Susan J. Irving at (202) 512-6806 or irvings@gao.gov.

June 2014

DEBT MANAGEMENT

Floating Rate Notes Can Help Treasury Meet Borrowing Goals, but Additional Actions Are Needed to Help Manage Risk

What GAO Found

Issuing floating rate notes (FRN) is likely to help the Department of the Treasury (Treasury) meet its goals to borrow at the lowest cost over time, extend the average maturity of the debt portfolio, and increase demand for Treasury securities, but it also presents risks related to changes in interest rates.

GAO simulated the costs of 2-year Treasury FRNs using historical Treasury auction data and found that interest costs of the FRNs were generally less than costs of fixed-rate 2-year notes, but could be either more or less than costs of 13-week bills, depending on assumptions about how investors price the FRNs. GAO also found that in rising interest rate environments, the FRNs may be more costly than these alternatives.

Multiple components contribute to achieving lowest cost financing over time: issuing FRNs is part of Treasury's approach to achieving this goal. GAO analysis identified a number of design elements that may affect how FRNs contribute to that goal. Treasury officials believe it is prudent for Treasury to extend the average maturity of its debt portfolio because the debt level is already high and is expected to grow. Relative to issuing shorter-term debt, 2-year FRNs will help Treasury extend the average maturity of the debt portfolio and thereby reduce the risk inherent in going to market. Because the interest rate on a FRN can change during the life of the security, FRNs expose Treasury to the risk of rising interest rates whereas fixed-rate securities of the same maturity do not. These shifts in risk are likely to be small because currently FRNs are expected to constitute a small proportion of Treasury debt. Although managing interest rate risk is an important aspect of Treasury's goal to borrow at the lowest cost over time, Treasury does not track and report a measure of the average maturity of the portfolio that captures the additional interest rate risk of FRNs.

One element of the design of the 2-year FRN—the difference between the term of its index rate (13 weeks) and the length of its effective reset period (one week)—is not typical for floating rate notes and creates tradeoffs in interest rate risks but also may result in additional demand for the product. The risks could affect the pricing of FRNs and raise Treasury's borrowing costs in environments of high and volatile interest rates. Treasury officials told us they examined design elements, including this difference, before issuing the 2-year FRN. However, Treasury had not analyzed how the difference may affect FRN pricing.

FRNs give Treasury debt managers additional flexibility by increasing demand for Treasury securities and by adding a new security that meets the high demand for short-term securities. Results from GAO's survey of a broad range of investors and interviews with market participants found that market participants likely will purchase Treasury FRNs primarily as a substitute for other Treasury securities, but they will also purchase the FRNs as a substitute for non-Treasury securities, bringing new and potentially growing demand to Treasury. To provide the lowest cost of financing the government over time, Treasury must consider investor demand for new and existing products. Survey respondents indicated an interest in FRNs of additional maturities and in other new Treasury products. Treasury currently offers many ways for market participants to provide input, but GAO's survey identified opportunities for Treasury to enhance input from some sectors—including state and local government retirement fund managers.

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Abbreviations

CMT	Constant Maturity Treasuries
FRBNY	Federal Reserve Bank of New York
FRN	floating rate note
GSE	government-sponsored enterprise
RMSE	root mean square error
TBAC	Treasury Borrowing Advisory Committee
TIPS	Treasury Inflation-Protected Securities
Treasury	Department of the Treasury
WAM	weighted average maturity

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June 16, 2014

The Honorable Dave Camp
Chairman, Committee on Ways and Means
House of Representatives

Dear Mr. Chairman:

The U.S. Treasury market is the deepest and most liquid government debt market in the world, and throughout history the Department of the Treasury (Treasury) has been able to borrow the money it needs to finance the federal government. In recent years federal debt held by the public has risen dramatically, more than tripling in 10 years, from \$3.9 trillion at the end of fiscal year 2003 to \$12 trillion at the end of fiscal year 2013.¹ The economic slowdown and global financial crisis that contributed to this recent, rapid run-up in debt also brought about regulatory changes and a “flight to quality”: this increased the demand for Treasury securities and helped keep the interest rates that Treasury paid to its investors near historic lows. Low rates meant that, while the debt more than tripled, the interest expense on Federal debt held by the public increased by only 58 percent from fiscal year 2003 through 2013 to \$248 billion. But with debt projected to continue to grow and interest rates expected to rise, this cost will increase.

To continue to meet its goal of financing the federal government’s borrowing needs at the lowest cost over time, in 2013 Treasury announced that for the first time in more than 15 years, it would begin issuing a new type of security—a Treasury floating rate note (FRN). FRNs differ from Treasury’s traditional fixed-rate notes in that the FRNs pay interest at a rate that can rise and fall during the life of the security.

¹Total federal debt consists of two components: debt held by the public and debt held by government accounts. Debt held by the public is the value of all federal securities held by the public, i.e., investors outside of the federal government. Debt held by government accounts represents balances in the federal government’s accounts—primarily trust funds, including the Social Security and Medicare trust funds—that accumulate surpluses. See GAO, “Fiscal Outlook: Understanding the Federal Debt,” *Key Issues*, (Washington, D.C.: 2014), accessed Apr. 22, 2014, http://www.gao.gov/fiscal_outlook/understanding_federal_debt/overview and GAO, *Financial Audit: Bureau of the Fiscal Service’s Fiscal Years 2013 and 2012 Schedules of Federal Debt*, GAO-14-173 (Washington, D.C.: Dec. 12, 2013).

According to Treasury officials, FRNs will help Treasury to (1) borrow at the lowest cost over time, (2) increase the maturity profile of the debt portfolio, and (3) expand Treasury's investor base by attracting new buyers.

Floating Rate Note (FRN)

An FRN pays interest at a rate that is indexed to another rate, which can rise and fall during the life of the FRN. Treasury's 2-year FRN is indexed to the rate from Treasury's most-recent 13-week bill auction.

You asked us to review Treasury debt management in the context of its growing debt portfolio, including the introduction of FRNs. The objectives of this report are to (1) evaluate Treasury's rationale for introducing FRNs and (2) identify the demand for Treasury securities from a broad range of investors to determine whether changes would help Treasury meet its goals. To address these objectives, we did the following:

- Simulated the costs of 2-year FRNs, based on Treasury auction data from 1980 to 2014 using two models, each with different assumptions about the interest rates that Treasury would pay on the FRNs. We compared those costs to Treasury's actual costs of funding with 13-week bills and 2-year notes. We also analyzed how those costs varied over different interest rate environments. For more information on our cost simulations, see appendix I.
- Reviewed the analysis Treasury conducted in developing the 2-year FRN and the input Treasury received from market participants.
- Administered an online survey to 82 (62 completed the survey) of the largest domestic institutional holders of Treasury securities in the following sectors: money market mutual fund managers, mutual and exchange-traded fund managers, state and local government retirement fund managers, retail and commercial banks, life insurance providers, property-casualty insurance providers, and securities broker-dealers. Respondents were selected to achieve 50 percent of the total amount of Treasury holdings for each sector. The survey results are not generalizable to all investors in Treasury securities. For more information on our survey methodology, see appendix II. For aggregate survey results reproduced as an e-supplement, see [GAO-14-562SP](#).
- Interviewed market participants—including six primary dealers and four asset managers—regarding the market for FRNs, the structure of FRNs, other actions Treasury could consider to expand demand for Treasury securities, and opportunities for investors to provide input to

Treasury.² We selected primary dealers and asset managers based on their holdings of Treasury securities and their public comments on Treasury's FRN proposals. The views expressed in these interviews are not generalizable to all market participants. Finally, we also interviewed five academics recognized as having expertise in the Treasury market, regarding the market for FRNs, the structure of the FRN, and models for pricing the FRN.

To assess the reliability of the data used in this study, including Treasury auction data and information on the largest holders of Treasury securities, we reviewed related documentation, conducted testing for missing data, outliers, obvious errors, and traced data from source documents, where possible and appropriate. To the extent possible, we also corroborated the results of our data analyses and interviews with other sources. Based on our assessment we believe that the data are reliable for the purposes of this report.

We conducted this performance audit from April 2013 to June 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

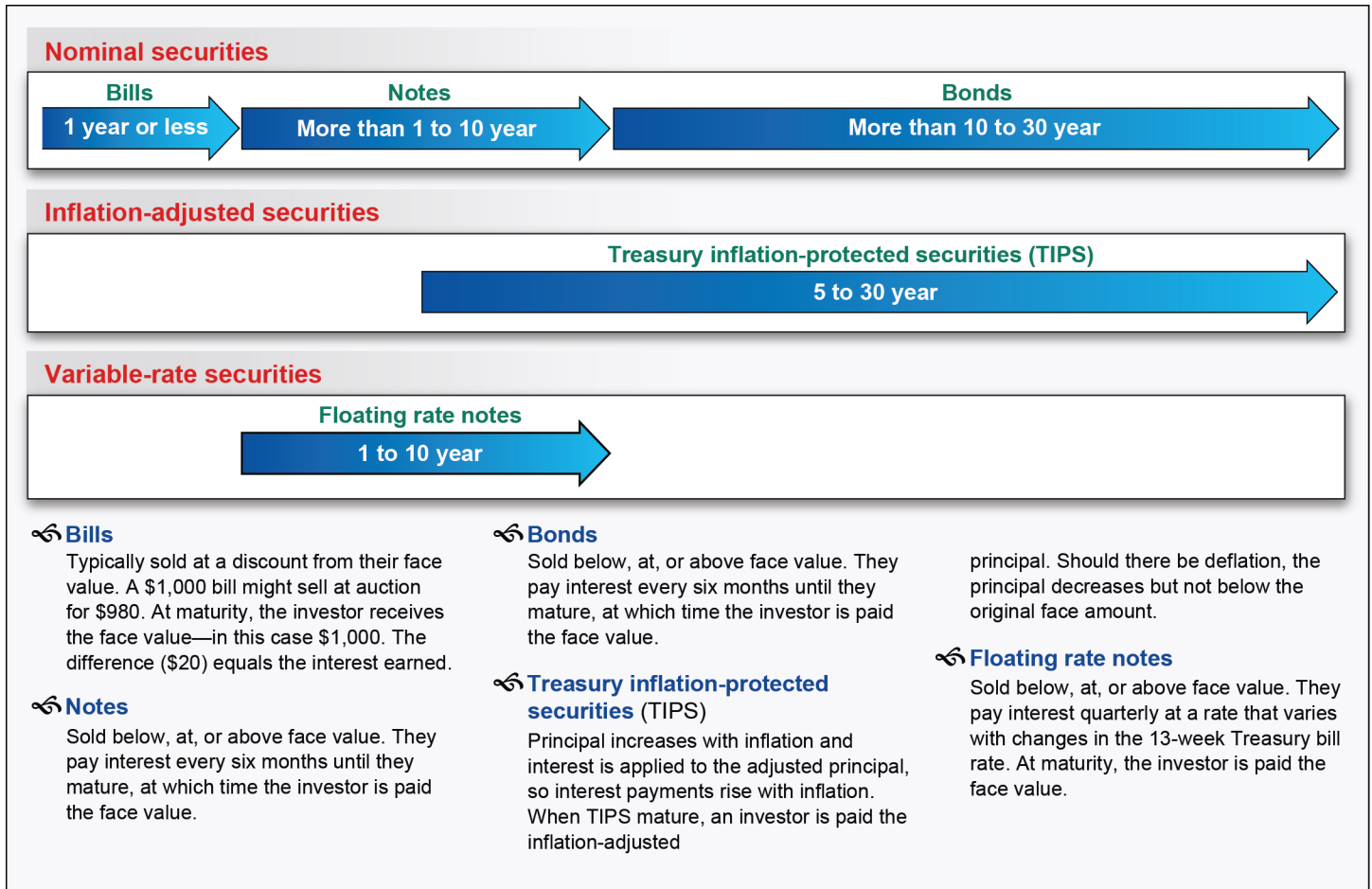
To achieve its primary debt management objective of financing the federal government's borrowing needs at the lowest cost over time, Treasury issues debt through a regular and predictable schedule of auctions across a wide range of securities. Most of the securities that are issued to the public are marketable, meaning that once the government

²Twenty-two banks and securities broker-dealers are currently designated by the Federal Reserve Bank of New York (FRBNY) as primary dealers and are expected to participate meaningfully in every Treasury auction by bidding for, at a minimum, an amount of securities representing their share of the offered amount (based on the number of primary dealers at the time of the auction). Primary dealers also have a role in making a secondary market for Treasury securities. (The secondary market is the market in which previously issued Treasury marketable securities are bought and sold among investors.)

issues them they can be resold by whoever owns them.³ Marketable debt consists of bills, notes, bonds, Treasury Inflation-Protected Securities (TIPS), and, since January 2014, FRNs (see figure 1). Currently, Treasury issues bills with maturities ranging from a few days to 52 weeks; notes with maturities of 2, 3, 5, 7, and 10 years; bonds that mature in 30 years; TIPS with maturities of 5, 10, and 30 years; and FRNs that mature in 2 years.

³In addition to marketable securities, Treasury issues nonmarketable securities that cannot be resold, such as U.S. savings bonds and special securities for state and local governments.

Figure 1: Marketable Securities Offered By Treasury



Source: GAO analysis of Treasury information.

Treasury issues securities in a wide range of maturities to diversify its portfolio and to appeal to the broadest range of investors. Issuing at multiple points across a wide range of maturity lengths both ensures high demand for Treasury securities and improves the general functioning of the financial markets by providing price transparency. Investors in Treasury securities include

- domestic private investors, such as individuals, banks, and pension funds;
- investment funds and asset managers;

-
- state and local governments; and
 - foreign investors, including both private investors and foreign official institutions, such as central banks and national government-owned investment funds.

Treasury auctions securities on a regular and predictable schedule to reduce market uncertainty, facilitate investor planning, and enhance the liquidity of Treasury securities, thereby helping Treasury to borrow at the lowest cost over time.⁴ Regular and predictable issuance means that Treasury debt managers choose the times and maturities of series of securities—rather than of individual issues—as part of their strategy for debt management. While this means that Treasury does not “time the market,” issuing on a regular and predictable schedule does not preclude Treasury debt managers from considering fiscal conditions and the contemporaneous costs and benefits of shorter-term versus longer-term financing. Treasury also announces significant changes long before they are implemented and facilitates investor planning by giving market participants advance notice of its issuance plans through regular quarterly refunding statements. For example, Treasury published a notice and request for comments on its potential issuance of FRNs in March 2012, almost two years before the first Treasury FRN auction.

At least in the near term, FRNs will constitute a small proportion of Treasury’s debt portfolio. Treasury held its first FRN auction on Jan. 29, 2014, and it plans to issue the 2-year FRN every 3 months with a reopening auction in each of the 2 intervening months.⁵ Treasury auctioned \$15 billion at the first FRN auction in January 2014 and \$13 billion at each of the reopening auctions in February and March. Assuming Treasury FRN issuance amounts remain constant, at the end of calendar year 2015 outstanding Treasury FRNs will total \$328 billion, which is less than 3 percent of the current amount of debt held by the

Total Federal Debt

Total federal debt consists of two components: debt held by the public and debt held by government accounts.

1. Debt held by the public

Debt held by the public represents federal debt issued by Treasury and held by investors outside of the federal government, including individuals, corporations, state or local governments, the Federal Reserve, and foreign governments.

2. Debt held by government accounts

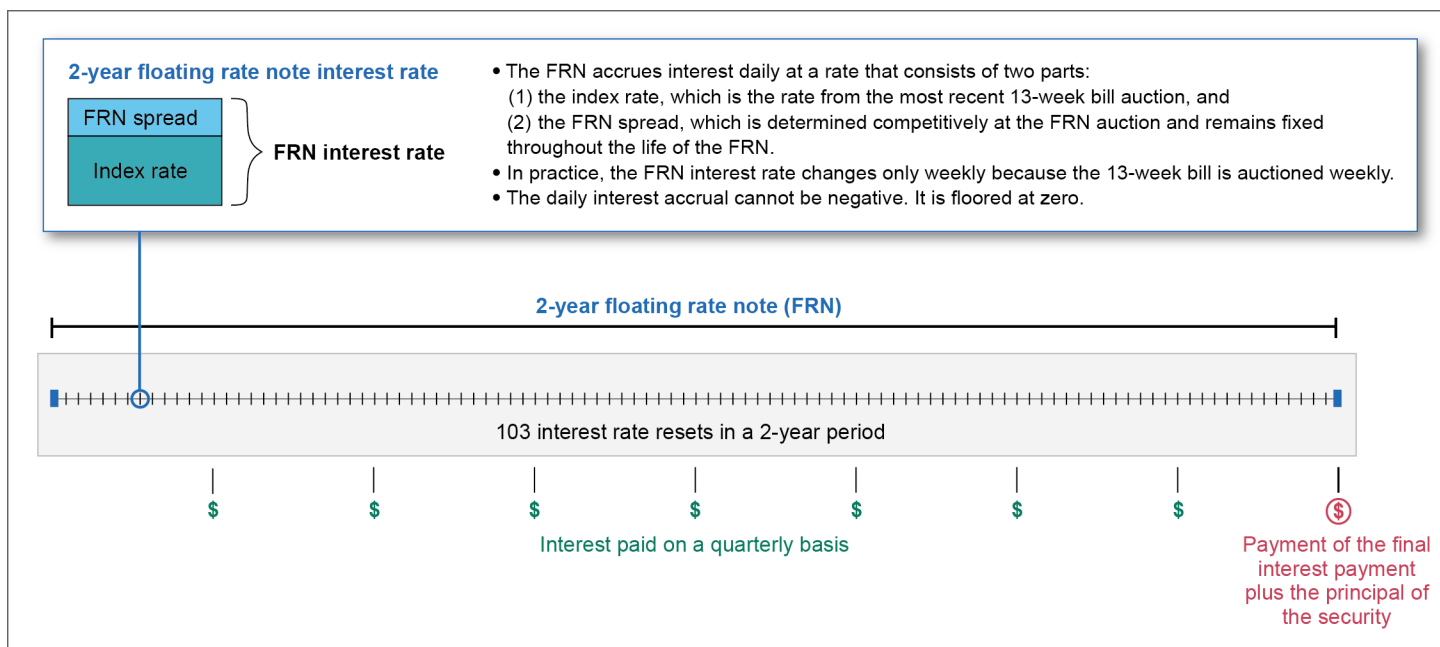
Debt held by government accounts represents balances in the federal government’s accounts (primarily trust funds, including the Social Security and Medicare trust funds) that accumulate surpluses.

⁴In a liquid market, trading can be completed at will and the offer and purchase prices differ only slightly. Liquidity is important to Treasury because investors are willing to pay more for liquid securities that can be easily traded, resulting in lower borrowing costs for Treasury.

⁵In a reopening, Treasury auctions additional amounts of a previously issued security. Reopened securities have the same maturity date and coupon interest rate or spread as the original securities, but have a different issue date and usually a different purchase price.

public.⁶ The first FRNs have a 2-year maturity. Although Treasury regulations allow it to issue FRNs with maturities ranging from 1 to 10 years, Treasury has not announced plans to issue FRNs with other maturities.⁷ The interest rate on Treasury's 2-year FRN is indexed to the 13-week Treasury bill and resets daily. Although the interest rate resets daily, in practice it will change only weekly because the 13-week bill is currently auctioned weekly. The 2-year FRN pays interest quarterly and accrues interest daily at a rate that equals the index rate from the most recent 13-week Treasury bill auction plus the FRN spread, which is determined competitively at the FRN auction (see figure 2).⁸

Figure 2: Design Elements of the Treasury 2-Year Floating Rate Note



Source: GAO representation of Treasury information.

Note: Although the interest rate on the FRN is reset daily, the interest rate paid on the FRN will only change weekly because its index rate, the 13-week bill rate, is currently auctioned weekly.

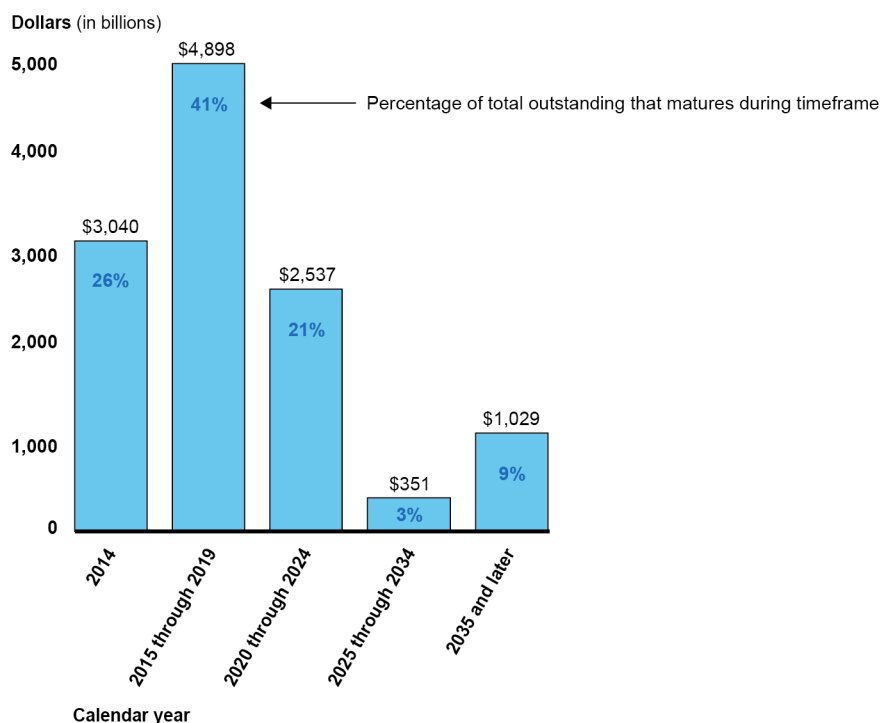
⁶Consistent with its practice for other securities, Treasury does not announce specific FRN offering amounts until shortly before each auction.

⁷31 C.F.R. § 356.5(b)(3).

⁸The FRN index rate is the high rate from the 13-week Treasury bill auction converted to a simple-interest money market yield on an actual/360 basis.

The mix of outstanding Treasury securities can significantly influence both rollover risk and the federal government’s borrowing cost. Rollover risk includes two types of risk: (1) interest rate risk—the risk that Treasury will have to refinance its debt at less favorable interest rates, and (2) market access risk—the risks inherent in coming back to the market to refinance the debt.⁹ As shown in figure 3, as of December 31, 2013, \$7.9 trillion (or 67 percent) of outstanding marketable Treasury securities mature by 2019 and will need to be rolled over (i.e., refinanced)—potentially at higher interest rates.

Figure 3: Marketable Interest-Bearing Securities by Year of Maturity, as of December 31, 2013 (Total Outstanding: \$11.9 trillion)



Source: GAO analysis of Treasury data.

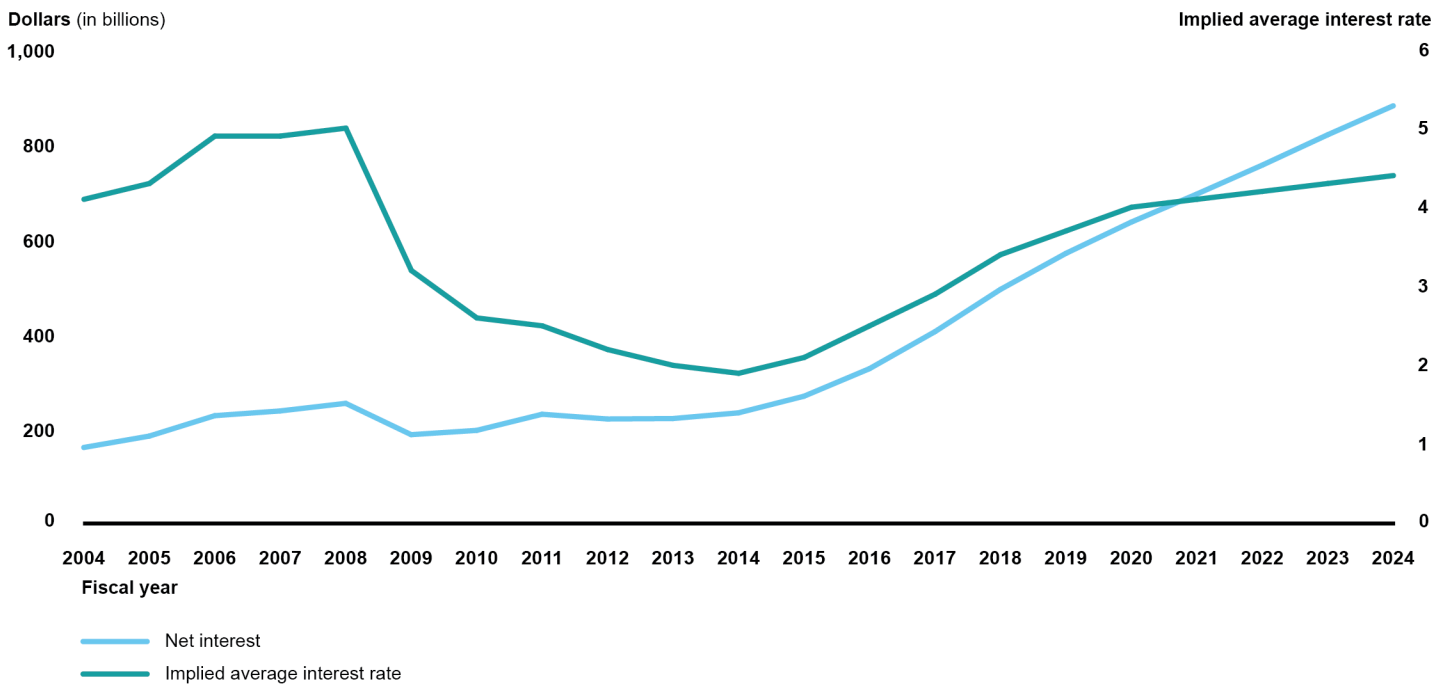
Note: This includes only debt outstanding as of December 31, 2013. As Treasury refinances maturing debt, the dollar amount that will mature in subsequent times will increase. Included in this data is a

⁹In times of federal budget deficits, all maturing debt must be rolled over into new issuances. Rollover risk also includes operational risk, such as the risk that a Treasury auction cannot be held due to technical problems with the auction systems.

small amount of marketable debt held by government accounts. This data does not include \$15 billion of long-term marketable securities issued by the Federal Financing Bank and held by government accounts that are not currently traded in the market.

One measure Treasury uses to manage rollover risk is the weighted average maturity (WAM) of outstanding marketable Treasury securities.¹⁰ A high WAM could indicate that Treasury is paying higher rates on its debt because longer-term securities generally have interest rates higher than shorter-term securities. On the other hand, when they need to be refinanced, shorter-term securities expose Treasury to the risk of rising interest rates and market access risk. The introduction of the new Treasury FRN comes at a time when both interest rates and interest costs are expected to rise (see figure 4).

Figure 4: Actual and Projected Net Interest Outlays and Implied Average Treasury Interest Rates, 2004-2024



Source: GAO analysis of Congressional Budget Office data, including February 2014 baseline net interest payment projections.

¹⁰The weighted average maturity of outstanding marketable Treasury securities is calculated by averaging the remaining maturity of all outstanding marketable Treasury securities, weighted by the dollar value of the securities.

Note: Actual values through the end of fiscal year 2013; projected values 2014-2024. Net interest outlays are interest expenses on Treasury debt held by the public and exclude other interest costs, including interest received by other federal entities, such as trust funds, and interest on debt issued by agencies other than Treasury (primarily the Tennessee Valley Authority).

Floating Rate Notes Are Likely to Help Treasury Borrow at the Lowest Cost over Time, Extend the Average Maturity, and Increase Demand, but They Also Present Certain Risks

2-Year FRNs Are Likely to Cost Less than 2-Year Fixed-Rate Notes but Could Cost More or Less Than Bills, and the Cost Will Vary by the Interest Rate Environment

We analyzed the potential cost to Treasury of issuing 2-year FRNs and found they are likely to have interest costs lower than 2-year fixed-rate notes and not substantially different than 13-week bills. As a result, FRNs will likely result in savings over the long run, helping Treasury achieve its goal of borrowing at the lowest cost over time. Our simulations found interest costs and savings varied depending on the security to which the FRN is compared, how the FRN is treated by investors, and the interest rate environment. We found that the cost of 2-year FRNs was generally less than that of fixed-rate 2-year notes, but that it could be either more or less than the cost of 13-week bills depending on assumptions regarding investor treatment of the FRN. In addition, in all cases and in all environments, savings tended to be greater—or added costs lower—under a model that sets the FRN spread based on its weekly reset than under an alternative model where the FRN spread is influenced by its final maturity of 2 years. We also found that, while issuing 2-year FRNs generally results in cost savings, they may be more costly than other alternatives in certain rate environments, such as rising rate environments.

Floating Rate Note (FRN) Spread

The difference (i.e., spread) between the index rate and the interest rate for the FRN. The FRN spread is determined at the FRN auction and is fixed over the life of the FRN.

Prior to issuance of the first FRN, Treasury conducted its own analysis of the potential cost of FRNs. Treasury's analysis found that from 1982 to 2010, issuance of 2-year FRNs would have led to cost savings compared to fixed-rate notes. Treasury's analysis, however: (1) compared the cost

of 2-year FRNs only to 2-year notes and not to other alternatives, and (2) assumed a fixed spread of 15 basis points (or 0.15 percentage points).

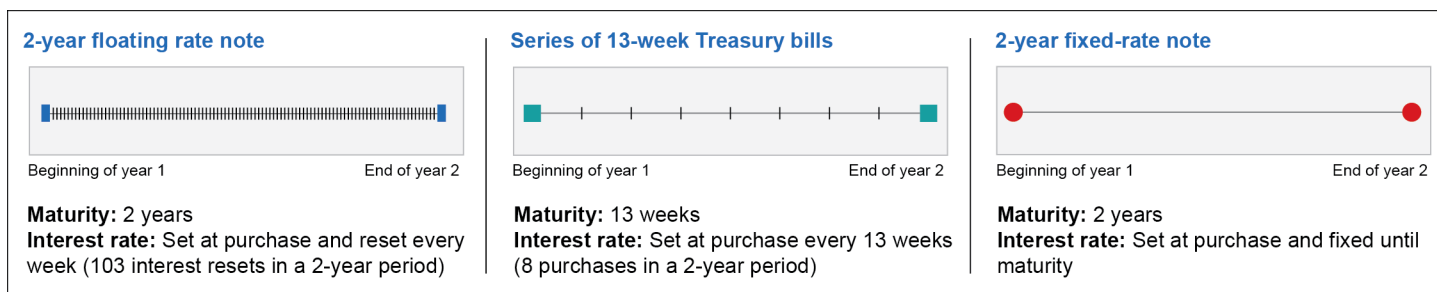
To estimate the potential cost of FRNs to Treasury, we compared the cost of hypothetical 2-year FRNs both to the cost of 2-year fixed-rate notes and to series of rolling 13-week bills, using historical auction data from January 1980 to March 2014 (see figure 5 below). We made these comparisons using two models, each with different assumptions about the spread over the index rate that Treasury would pay. We also compared the cost of FRNs in the various interest rate environments.

Floating Rate Note (FRN) Index Rate

The rate to which the interest rate of an FRN is indexed. Treasury's 2-year FRN is indexed to the rate from Treasury's most-recent 13-week bill auction.

Although it is uncertain what Treasury would issue in the absence of FRNs, Treasury has indicated that, at least initially, the FRNs would be a substitute for Treasury bill issuance. Both in interviews and in our survey of large holders of Treasury securities, market participants also indicated that they see the FRNs as a substitute for bills. However, Treasury has also indicated that it intends to reduce the share of debt funded by bills in order to increase its WAM. Without the 2-year FRN, Treasury might have increased the WAM by the same amount by instead increasing its issuance of 2-year fixed-rate notes, making them an appropriate benchmark with which to compare the costs of the FRNs.

Figure 5: Three Different Approaches to Investing in Treasury Securities over 2 Years



Source: GAO presentation of Treasury information.

Note: Although the interest rate on the FRN is reset daily, the interest rate paid on the FRN will likely only change weekly because its index rate, the 13-week bill rate, is currently auctioned weekly.

Our analysis used two models for how the FRN spread—the spread between the index rate and the interest rate for the FRN—may vary over time. The FRN spread is set at auction and is expected to vary in response to changes in the level and volatility of interest rates. Because there is uncertainty about how market participants will price the FRN

relative to other products, we considered two different models of the response of spreads to changes in different interest rates:

- A “maturity-based” model, where the spread estimate is influenced by the 2-year term of the FRN.
- A “reset-based” model, where the spread estimate is derived from the weekly reset term, which determines the nature of the interest rate risk faced by investors in FRNs.

These two models are designed to approximate the range of potential spreads at which the 2-year FRN would have been expected to have been auctioned in historical interest rate environments. For more details on our models for FRN cost, including other models we considered, see appendix I.

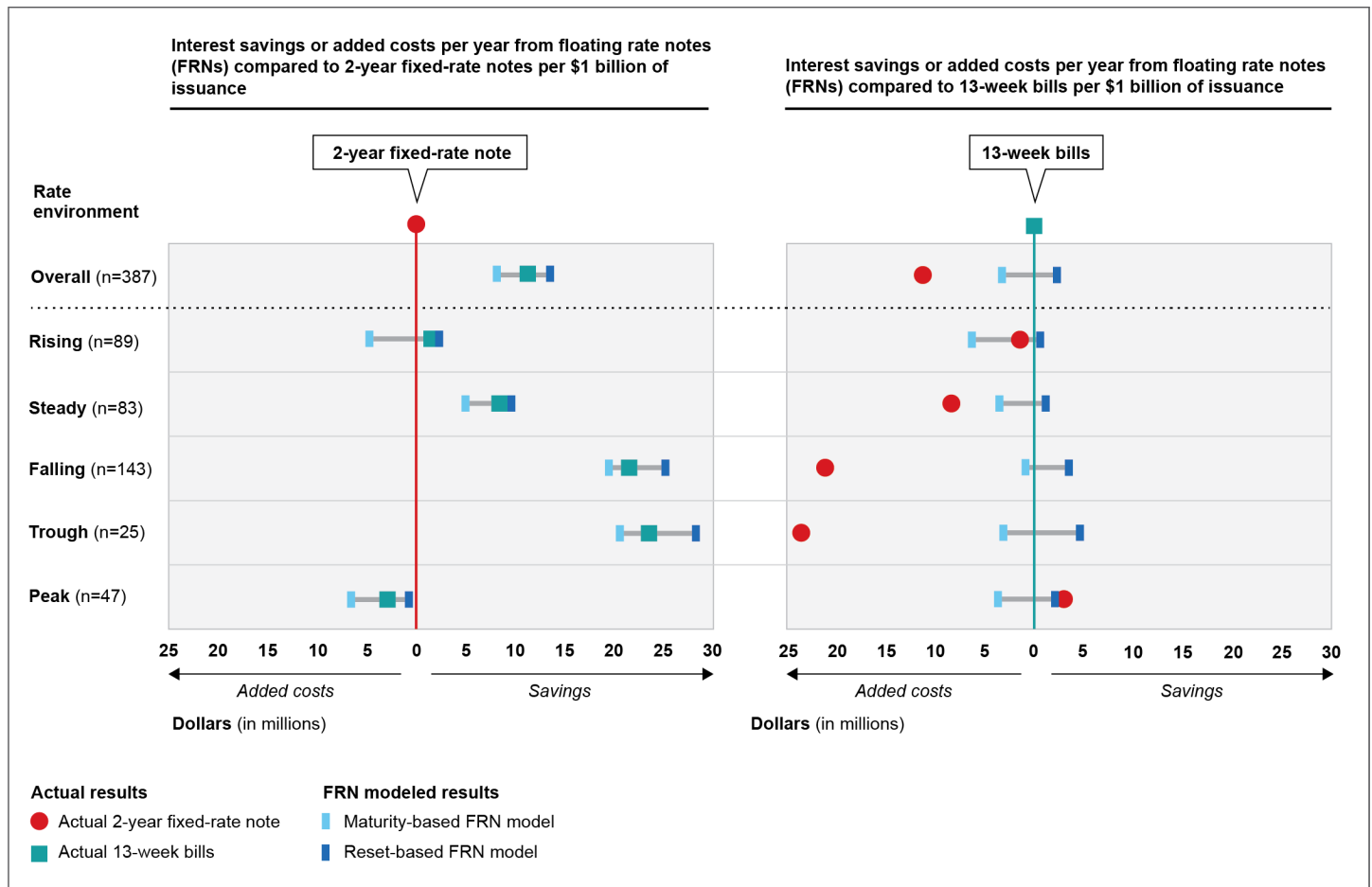
Because interest rate environments vary substantially over time, we also compared how the cost of FRNs may vary based on changes in the level and volatility of interest rates.¹¹ Although these views are not generalizable, market participants and experts we interviewed expect the demand for FRNs to vary based on the interest rate environment. In addition, 58 of 62 respondents to our survey indicated that FRNs would be more attractive when interest rates are expected to rise; 49 of 62 indicated that FRNs would be less attractive when interest rates are expected to fall.

¹¹Definitions of the interest rate environments we used can be found in appendix I.

Costs of 2-Year FRNs Vary Based on What Treasury Would Have Issued Instead, Investor Treatment of FRNs, and Interest Rate Environment

We found that compared to 2-year fixed-rate notes, FRNs are likely to result in interest savings to Treasury regardless of how the FRN is treated by market participants; however, compared to 13-week bills, they could result in either savings or additional costs (see figure 6). Compared to 2-year fixed-rate notes, 2-year FRNs historically would have saved between \$8.1 million in interest costs annually per billion in issuance under our maturity-based model, and \$13.6 million under our reset-based model. Compared to 13-week bills, the FRN would have resulted in annual savings of \$2.4 million per billion of issuance under our reset-based model but additional annual costs of \$3.1 million per billion of issuance under our maturity-based model.

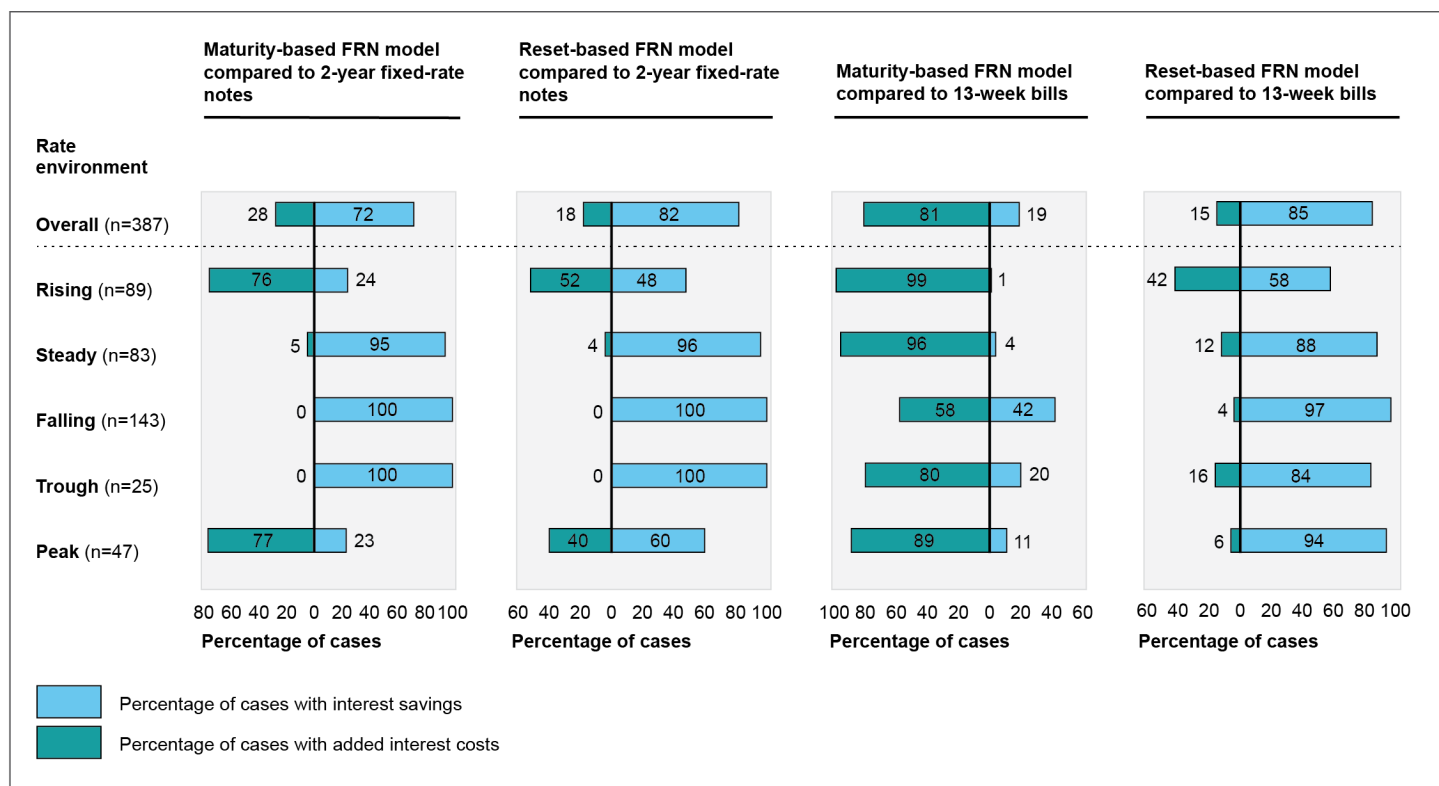
Figure 6: Interest Savings or Added Costs from 2-Year Floating Rate Notes Compared to 2-Year Notes and 13-Week Bills, by Rate Environment



Source: GAO simulation based on Treasury and Federal Reserve data.

In addition to examining estimates of the relative savings and costs from issuing 2-year FRNs, we also analyzed the share of cases in our simulations where FRNs save or add to interest costs across different interest rate environments (see figure 7). We found that compared to 2-year fixed-rate notes, the 2-year FRN would have resulted in savings in 82 percent of cases under our reset-based model and in 72 percent of cases under our maturity-based model. Compared to 13-week bills, 2-year FRNs would have resulted in savings in 85 percent of cases under our reset-based model but added to costs in 81 percent of cases under our maturity-based model.

Figure 7: Percent of Cases Where 2-Year Floating Rate Notes (FRN) Save or Add to Interest Costs Compared to 13-Week Bills and 2-Year Notes, by Rate Environment



Source: GAO simulation based on Treasury and Federal Reserve data.

We also found that the interest savings or added costs from 2-year FRNs varied with the interest rate environment regardless of how the FRN is treated or whether it is being compared to 2-year fixed-rate notes or 13-

week bills. Relative to 2-year fixed-rate notes, FRNs tended to be more costly in rising rate environments compared to other environments. Compared to 13-week bills, FRNs tended to be more costly (in the case of our maturity-based model) or to produce less savings (in the case of our reset-based model). The extra cost or reduced savings in rising rate environments, however, tended to be less than the savings in steady and falling rate environments. As shown in figures 6 and 7 above, under our maturity-based model

- in rising rate environments, 2-year FRNs were less costly than 2-year fixed-rate notes in only 24 percent of cases and, on average, increased Treasury interest costs by 0.48 percentage points, resulting in \$4.8 million in annual interest costs per billion in issuance; and
- in falling rate environments, 2-year FRNs were less costly than 2-year fixed-rate notes in all cases and, on average, reduced interest costs by 2.07 percentage points, resulting in \$20.7 million in annual interest savings per billion in issuance.

We also analyzed the potential costs and savings from FRNs in environments with different levels of rate volatility and found that, at all levels of volatility, there was little variation between our two models. In periods of low, moderate, and high volatility, 2-year FRNs tended to produce savings compared to 2-year fixed-rate notes, but compared to 13-week bills, could produce either costs or savings, depending on which model is used. In periods of extreme (i.e., higher than “high”) volatility, FRNs produced savings under both models. For more information on the results of this analysis, see appendix I.

Technical Demand May Increase Savings to Treasury, While a Liquidity Premium May Increase Costs

Factors other than interest rates may affect demand for FRNs, and Treasury could realize additional savings from FRNs due to these elements of technical demand. Both of the models we used to estimate the cost of FRNs assume the FRN spread is based solely on the relative value of FRNs compared to other Treasury securities. However, both our interviews with market participants and our survey responses indicate that demand for FRNs is also likely to be affected by technical factors, such as investment guidelines or regulatory requirements to hold certain types of investments. For example, Treasury officials and market participants told us that Treasury structured the FRNs in a way that makes them

especially attractive to money market investors.¹² To meet investment guidelines and regulatory requirements, these funds tend to hold mostly short-term securities like Treasury bills and, because their interest rate resets frequently, FRNs.¹³ These factors would create some technical demand for Treasury FRNs that is less sensitive to the relative value of the FRN. This generally would lower Treasury's costs since some investors would be willing to accept a lower interest rate at auction.

Technical Demand

Technical demand is driven by factors such as investment guidelines or regulatory requirements and is less sensitive to the relative value of the security.

Our survey results confirm that technical factors affect the attractiveness of FRNs for at least some investors. Twenty-seven of the sixty-two survey respondents said that FRNs' consistency with client or fund investment guidelines make them attractive to a great or very great extent. Results of our survey also show that 2-year FRNs are more attractive because they conform to regulatory requirements for certain sectors. Six of the seven money market mutual fund managers that responded to our survey indicated that conformance with limits on their holdings make the FRNs attractive to a great or very great extent. Similarly, five of the nine retail and commercial banks that responded to our survey indicated that conformance with new capital requirements made the FRNs attractive to a great or very great extent.

Treasury's costs could be increased if Treasury FRNs have a higher liquidity premium than other Treasury securities. Debt issuers, including Treasury, generally have to pay a liquidity premium on less liquid products—products that cannot be easily bought and sold in large volumes without meaningfully affecting the price—to compensate investors for the possibility that they might not be able to sell the security as readily as a more liquid product. A liquidity premium on FRNs that is greater than the premium on other Treasury securities could increase costs compared to our estimates. Although Treasury securities are generally considered very liquid and have very low liquidity premiums, market participants we interviewed said that FRNs might be less liquid than bills—Treasury's most liquid product—but more liquid than TIPS—its

¹²A money market fund is a type of investment fund that is required by law to invest in low-risk securities. These funds have relatively low risks compared to other mutual funds and pay dividends that generally reflect short-term interest rates. Money market funds typically invest in government securities (including Treasury bills and notes), certificates of deposit, commercial paper of companies, or other highly liquid and low-risk securities.

¹³17 C.F.R. § 270.2a-7(c)(2).

least liquid product.¹⁴ FRNs are expected to be less liquid than bills because (1) investors are more likely to buy and hold rather than to trade FRNs, and (2) FRNs are expected to have a smaller relative market size. Several market participants said that liquidity is likely to be lower initially and to improve as Treasury issues more FRNs.

Results of Initial FRN Auctions Were Within the Range Estimated by Our Models

The results of Treasury's first three FRN auctions were within the range estimated by our models. At the first FRN auction in January 2014, FRNs were auctioned with an FRN spread of 0.045 percentage points. At the February and March 2014 auctions, FRNs were auctioned with discount margins of 0.064 and 0.069 percentage points, respectively.¹⁵ The actual auction results appear linked to the spreads predicted by our reset-based model. In each of the three auctions, the actual auction results equaled the spread predicted by our reset-based model plus a small and consistent premium.

Mismatch Between the FRN's Index Rate Maturity and Reset Frequency Poses Risk That Treasury Has Not Fully Analyzed

One element of the design of the Treasury 2-year FRN is that it is what the market refers to as a "mismatched floater." The difference (i.e., the mismatch) between the term of its index rate (13 weeks) and the length of its reset period (stated as daily, but effectively weekly) may introduce the risk of price instability on the reset date that is not typical of most floating rate securities. This is particularly the case if market participants treat the FRNs more like series of rolling 1-week bills. This might affect demand for the product in certain interest rate environments and, if so, could raise Treasury's borrowing costs.

For most floating rate securities, the maturity of the index rate and the frequency of the interest rate reset match. For example, a floating rate note indexed to the 3-month LIBOR—an interbank lending rate that is the

¹⁴Previously, we recommended that Treasury take actions to increase TIPS liquidity; Treasury has implemented each of our recommendations. See GAO, *Debt Management: Treasury Inflation Protected Securities Should Play a Heightened Role in Addressing Debt Management Challenges*, [GAO-09-932](#) (Washington, D.C.: Sept. 29, 2009).

¹⁵In a Treasury FRN auction, bids are made in terms of a desired discount margin. The highest accepted discount margin in the initial auction for a given FRN (which we refer to as the FRN spread) becomes the spread for that FRN, and bidders pay the full value of the FRN. At subsequent reopening auctions of the FRN, the spread is fixed based on the results of the initial auction. Bidders at the auction still bid on a discount margin basis and may pay more, less, or the same as the full value, depending on whether the discount margin is less, more, or the same as the initial auction.

most common index for non-Treasury floating rate notes—would typically reset every 3 months. Absent a change in the credit risk of an issuer, the value of a typical floating rate security returns to par—the value at maturity—at each reset. This leads to a higher level of price stability in floating rate securities compared to fixed-rate securities of the same maturity. This price stability is highly desirable to some investors.

Yield Curve Risk

The risk that interest rates at different maturity points—for example the rates for a one-week bill and a 13-week bill—will change relative to one another.

The Treasury 2-year FRN is different from a typical floating rate security in that it will reset every week to a 13-week rate. This mismatch introduces a tradeoff between yield curve risk and interest rate risk. Unlike a typical FRN, the price of the Treasury 2-year FRN will not reliably return precisely to par at each reset date before its 2 year maturity. This is because investors factor in changes between the 1-week bill rate and the 13-week bill rate. However, the price of the Treasury 2-year FRN should return close to par weekly, which is more frequent than if it had a 13-week reset. Treasury officials told us they believe that the frequent resets provide increased price stability for the FRN. They said that they expect investors to price the 2-year FRN in a way that reflects the expectation that the yield curve risk for Treasury’s 2-year FRN is likely to be small relative to its reduced interest rate risk. However, if the difference between the 1-week rate and the 13-week rate changes substantially over the two year term, either in fact or in expectations, then the yield curve risk that the investor faces would be more substantial. It is possible that in higher and changing interest rate environments, the tradeoff between yield curve risk and interest rate risk may not be favorable to investors. This could be reflected in the spread, as investors bid for FRNs at auction in a way that compensates them for this additional risk, which could raise Treasury’s borrowing costs.

Money Market Fund

A money market fund is a type of investment fund that is required by law to invest in low-risk securities. These funds have relatively low risks compared to other mutual funds and pay dividends that generally reflect short-term interest rates. Money market funds typically invest in government securities (including Treasury bills and notes), certificates of deposit, commercial paper of companies, or other highly liquid and low-risk securities.

The mismatch between the index rate maturity and the frequency of the interest rate reset could have adverse effects on the costs of FRNs to Treasury. Treasury officials told us they discussed the design of the 2-year FRN both internally and with market participants and structured the 2-year FRN in this way for two reasons. First, as both those who commented on Treasury’s proposal and Treasury have noted, the 13-week bill market is a large, liquid, and transparent market. Second, Treasury designed the 2-year FRN to meet high demand for short-term securities, and both Treasury officials and the market participants we spoke with cited the 2-year FRN’s frequent reset as a reason for greater demand from money market funds. These funds face constraints on the average maturity of their holdings, which the weekly reset of the Treasury 2-year FRN helps address. This additional demand would likely result in lower costs and helps establish the new product for Treasury, which may

outweigh the potential cost of the mismatch. Results of our survey show that overall, the FRN's index rate and the frequency of its interest rate reset chosen by Treasury—as well as the difference between the two—made the FRN more attractive to investors (see table 1).

Table 1: Effect of Floating Rate Note Design Features on Attractiveness to Investors

Feature	Effect on attractiveness of FRN			
	More attractive	Neither more nor less attractive	Less attractive	No basis to judge/ no opinion
Index rate maturity	24	28	6	4
Interest rate reset frequency	34	12	12	4
Difference between index rate maturity and interest rate reset period	16	34	7	5

Source: GAO analysis of survey data.

Although Treasury officials told us they discussed the potential benefits and risks of the mismatch, Treasury had not analyzed how the mismatch could affect pricing. After we briefed Treasury officials on the issue in April 2014, Treasury began taking steps to study the mismatch to more fully understand its potential pricing risks. While its practice of regular and predictable issuance means Treasury issues all products in all environments, it is important that the risks of different securities are considered when making decisions about the mix of securities to issue. Treasury did analyze and consider how other design elements would affect pricing of the 2-year FRN and incorporated the results of that analysis into their final design. For example, Treasury analyzed how setting a minimum spread for the FRN would affect pricing. This analysis led Treasury officials to conclude that a minimum spread would unnecessarily complicate pricing, and it was excluded from the final structure of the FRN.

FRNs Can Help to Extend the Maturity of the Debt Portfolio, but They Make Treasury's Weighted Average Maturity an Incomplete Measure of Rollover Risk

Consistent with its goal of borrowing at the lowest cost over time, Treasury tracks and manages the average maturity of the debt portfolio. Relative to issuing bills, 2-year FRNs will help Treasury extend the average maturity of the debt portfolio, but only slightly. The effect that the FRNs will have on the average maturity is likely to be small because at least at the onset, FRNs are expected to constitute a small proportion of overall Treasury debt. Even so, Treasury officials said it is prudent to reduce Treasury's rollover risk by extending the average maturity. Treasury officials told us that FRNs will help Treasury continue to

Weighted Average Maturity (WAM)

The WAM of outstanding marketable Treasury securities is calculated by averaging the remaining maturity of all outstanding marketable Treasury securities, weighted by the dollar value of the securities.

Rollover Risk

Rollover risk includes two types of risk:

1. Interest rate risk

For a borrower, such as Treasury, interest rate risk is the risk of having to refinance its debt at less favorable interest rates and, for floating rate debt, of interest rates rising during the life of the security.

2. Market access risk

The risk associated with coming back to the market to refinance the debt. In times of federal budget deficits, maturing federal debt must be rolled over into new issuance.

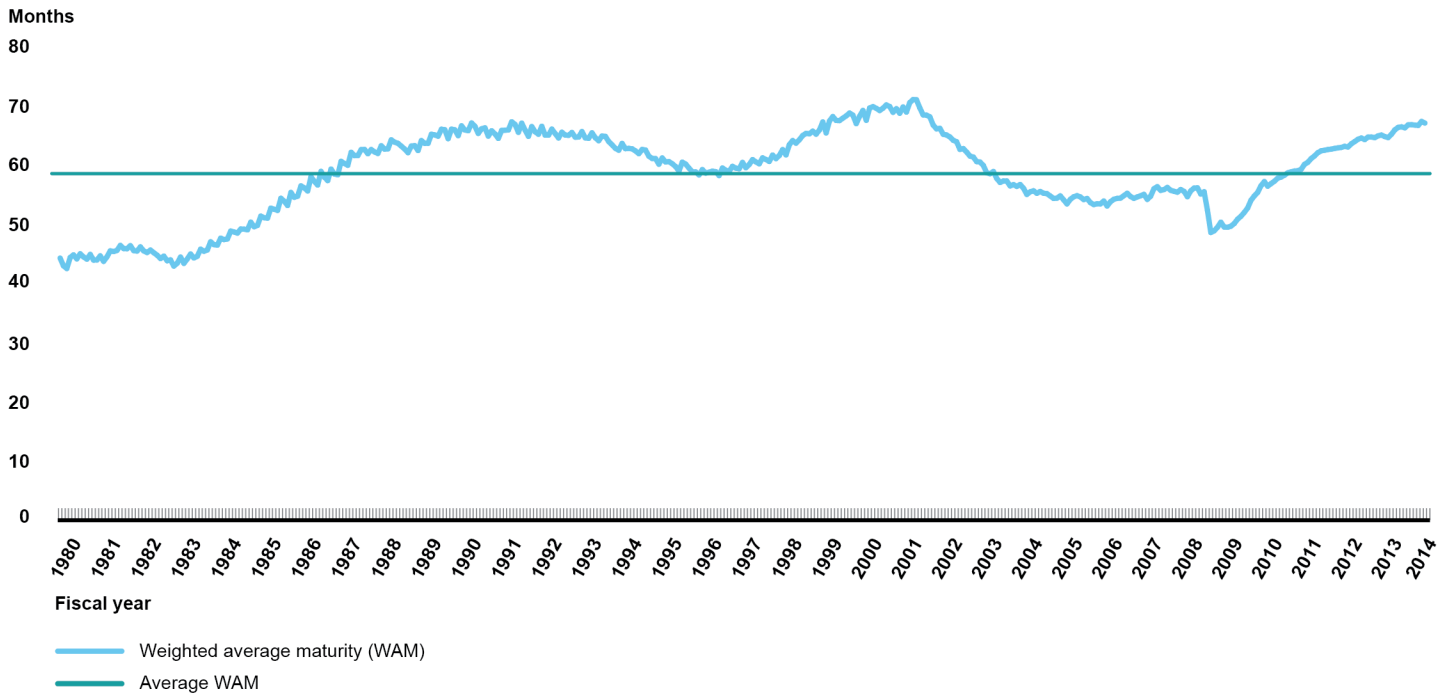
Marketable Debt

Marketable securities can be resold by whoever owns them. In addition to marketable securities, Treasury issues nonmarketable securities that cannot be resold, such as U.S. savings bonds and special securities for state and local governments.

increase the maturity profile of the debt portfolio while meeting high demand for high-quality, short-term securities. Treasury could extend the average maturity of the portfolio by replacing issuance of shorter term notes and bills with longer term fixed-rate notes and bonds, rather than issue FRNs. In deciding what to issue, however, Treasury is confronted with making prudent decisions about investor demand by product. If Treasury issues the wrong mix of products, its overall cost of funding would increase, as investors would express their preferences in prices bid at auction.

Treasury tracks the WAM of outstanding marketable securities and publicly releases WAM data quarterly. Treasury debt managers do not have a WAM target, but over the past 30 years they have generally kept the WAM between 50 and 70 months (see figure 8). As of February 28, 2014, the WAM of the Treasury's outstanding marketable debt was 67 months, well above the historical average of 58.6 months. As of January 2014, Treasury continued to increase the WAM in a way that Treasury officials stated is consistent with their long-term objectives of financing the government at the lowest cost over time and ensuring regular and predictable management of the debt portfolio.

Figure 8: Weighted Average Maturity of Treasury’s Marketable Debt Outstanding



Source: GAO analysis of Treasury data.

Before Treasury began issuing FRNs, its WAM metric captured both components of rollover risk—interest rate risk and market access risk. Increasing the WAM by issuing 2-year FRNs instead of bills does not have the same effect on Treasury’s risk profile that issuing 2-year fixed-rate notes would have. Since both 2-year securities have the same final maturity, they carry the same market access risk. The FRNs, however, carry a larger interest rate risk. The weekly reset means the interest risk on the FRN is similar to that of a 1-week bill, making it the shortest term product in Treasury’s regularly issued portfolio from an interest rate risk perspective.¹⁶ As noted above, it is uncertain what Treasury would issue in the absence of FRNs and whether 2-year FRNs will substitute primarily

¹⁶Treasury issues 4-week, 13-week, 26-week, and 52-week bills on a regular schedule. Treasury issues cash management bills of varying maturities only as Treasury financing needs require.

for 2-year fixed-rate notes, other fixed-rate notes, or bills. Relative to issuance of regularly issued bills, 2-year FRNs reduce Treasury's market access risk by locking in that funding for a longer period but increase interest rate risk due to the weekly reset.

As FRN issuance grows, Treasury's single WAM metric will remain a meaningful measure of market access risk; however it will no longer be an accurate measure of interest rate risk because floating rate securities carry higher interest rate risk than fixed-rate securities of the same term. Treasury debt management officials said that because Treasury issues in all interest rate environments and does not time the market, they primarily use the WAM metric as a proxy for market access risk in the portfolio. However, because market access risk and interest rate risk are related, Treasury understands the importance of both parts of the measure. Managing interest rate risk is an important aspect of Treasury's goal to borrow at the lowest cost over time; guidelines for sovereign debt management also emphasize the importance of managing the exposure of the debt portfolio to interest rate risk, as well as to market access risk.¹⁷ Market participants that hold both floating rate and fixed rate debt use more than one measure to assess the length of their portfolios. For example, certain money market mutual funds are required to measure the average term of the fund in two ways—one based on the final maturity dates of the securities in the fund and the other based on the interest rate reset dates of the securities in the fund.¹⁸ When we raised this issue with them, Treasury officials told us that they could easily publish another measure of interest rate risk.

FRNs Provide Treasury with Additional Flexibility in Its Debt Issuance

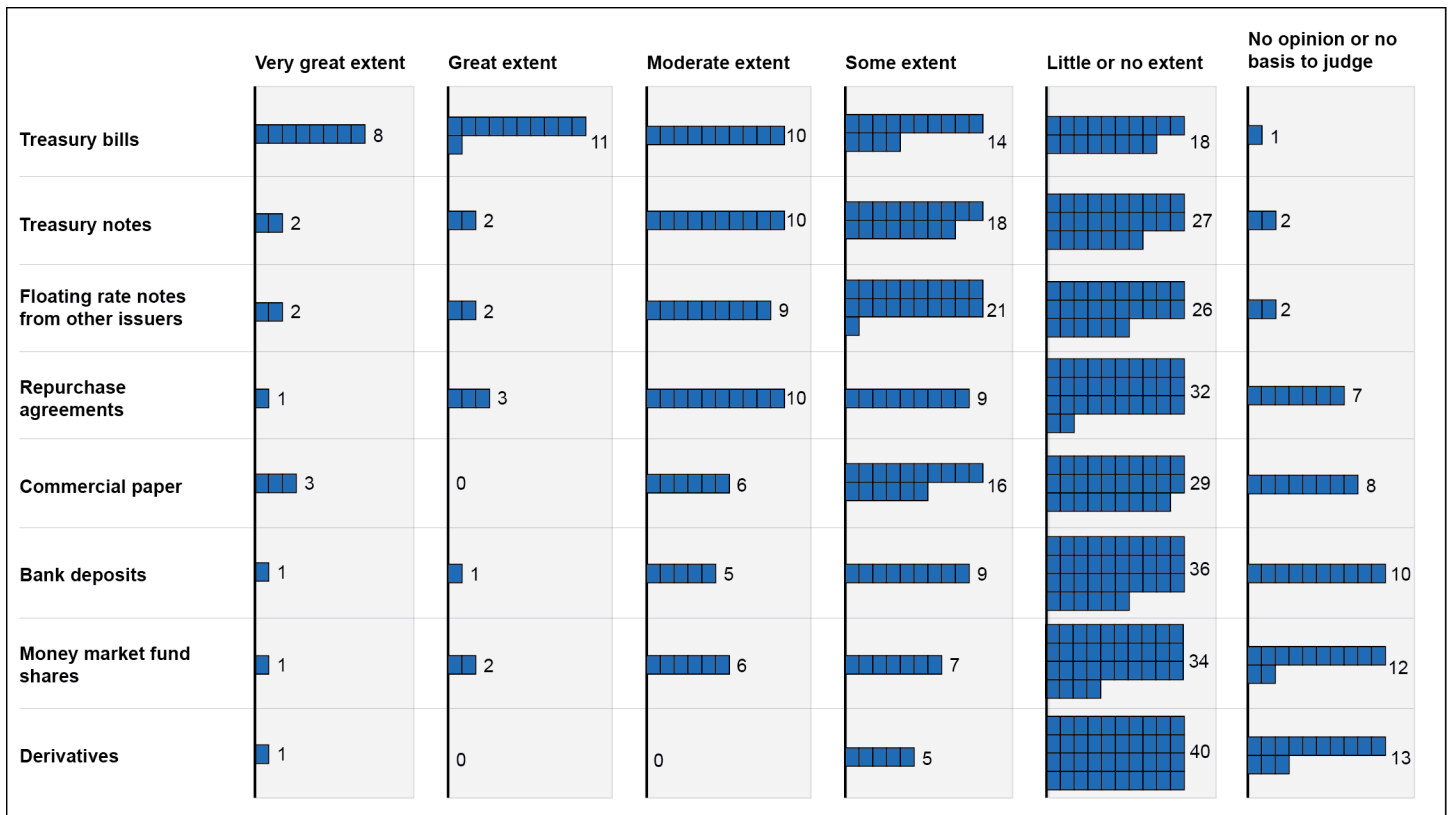
FRNs provide Treasury with additional flexibility in its debt issuance by adding a new type of security to Treasury's debt portfolio and by increasing overall demand for Treasury securities. If a new security brings incremental demand for Treasury securities, Treasury can grow its debt portfolio without increasing by as much as it might otherwise have had to the amount needed to finance the debt through existing securities. Our interviews and survey results found that although market participants will likely primarily purchase Treasury FRNs as a substitute for other Treasury

¹⁷International Monetary Fund and the World Bank, *Guidelines for Public Debt Management*, as amended Dec. 9, 2003.

¹⁸17 C.F.R. § 270.2a-7.

securities (especially bills), market participants will also purchase Treasury FRNs as a substitute for other investment options, including Treasury FRNs as a substitute for other investment options, including FRNs from other issuers and repurchase agreements (see figure 9).

Figure 9: Extent to Which Treasury Floating Rate Note Purchases Will Substitute for Other Investments, According to Survey Respondents



Source: GAO analysis of survey data.

The results of the early FRN auctions indicate high demand for the security. The bid-to-cover ratios at the first three FRN auctions were higher than bid-to-cover ratios for other Treasury securities auctioned around that time. The first auction on January 29, 2014 had a bid-to-cover ratio of 5.67 and the reopening auctions in February and March had bid-to-cover ratios of 5.29 and 4.67, respectively. This compares to the bid-to-cover ratios in 13-week bill and fixed-rate 2-year note auctions averaging 4.53 and 3.37, respectively, over the same January to March period. According to Federal Reserve Bank of New York (FRBNY) officials, trading for the FRNs in the when-issued market was limited ahead of the

Bid-to-Cover Ratio

In a Treasury auction the bid-to-cover ratio is the dollar value of all bids received in the auction, divided by the dollar value of the securities auctioned.

Reopening Auction

An auction of additional amounts of a previously issued security.

When-Issued Market

When-issued trades are contracts for the purchase and sale of a new security before the security has been auctioned. When-issued trades settle on the issue date of the new security, when the security is first available for delivery.

three FRN auctions; nevertheless, the rates quoted in the when-issued market were very close to the auction results, an indicator that the auctions came very close to market expectations. This suggests that the price discovery mechanism of the market was functioning well for FRNs and that the market embraces and understands the security, which in turn indicates strong current and continuing demand that helps Treasury borrow at lower cost over time.

Our survey results suggest demand for Treasury FRNs is likely to grow. Eighteen out of 61 survey respondents participated in the first Treasury FRN auction, but more said they plan to purchase Treasury FRNs this year. About half of all respondents (32 of 62) said their organizations definitely or probably will purchase Treasury FRNs in 2014.¹⁹ Survey respondents anticipate that money market mutual funds, corporate treasuries, and foreign central banks are likely to have the most demand for 2-year FRNs. Survey respondents noted a number of reasons why Treasury FRNs are an attractive investment option, including the interest rate risk protection they provide the purchaser, their price stability, their use as a cash management tool, their consistency with investment guidelines and regulatory requirements, and the liquidity of the securities. The successful launch of a new type of security relies both on the readiness of investors and on Treasury's own operational readiness. Overall, market participants felt prepared for the introduction of a new security. According to almost all of the market participants we surveyed, Treasury provided sufficient information regarding its plans to issue FRNs (53 out of 62 respondents noted that Treasury provided sufficient information and the remaining 9 noted that they had "no opinion or no basis to judge.") In addition, of the 48 survey respondents that said that they would need to make systems changes to purchase FRNs, 36 said that Treasury or the Federal Reserve had provided adequate assistance or information to make the necessary changes. Some respondents noted that as of March 2014, they had not yet completed systems changes that will be needed to purchase FRNs. Demand for FRNs may increase as additional investors complete systems changes.

Although issuance of FRNs brings incremental demand for Treasury securities and demand in the initial auctions was high and is likely to

¹⁹These planned purchases include purchases at Treasury auctions, in the secondary market, and in the when-issued market.

grow, one design feature of the 2-year FRN may constrain Treasury's flexibility in the issuance of 13-week bills. Treasury officials and market participants both told us that because the FRN is indexed to the 13-week Treasury bill rate, Treasury will have to be more judicious in adjusting the size or timing of Treasury auctions of 13-week bills. As some comments on the proposed rule noted, there is some risk in indexing a floating rate note to a product from the same issuer. However, given that the 13-week bill is one of Treasury's largest and most liquid markets, its selection as the index rate minimizes this risk.

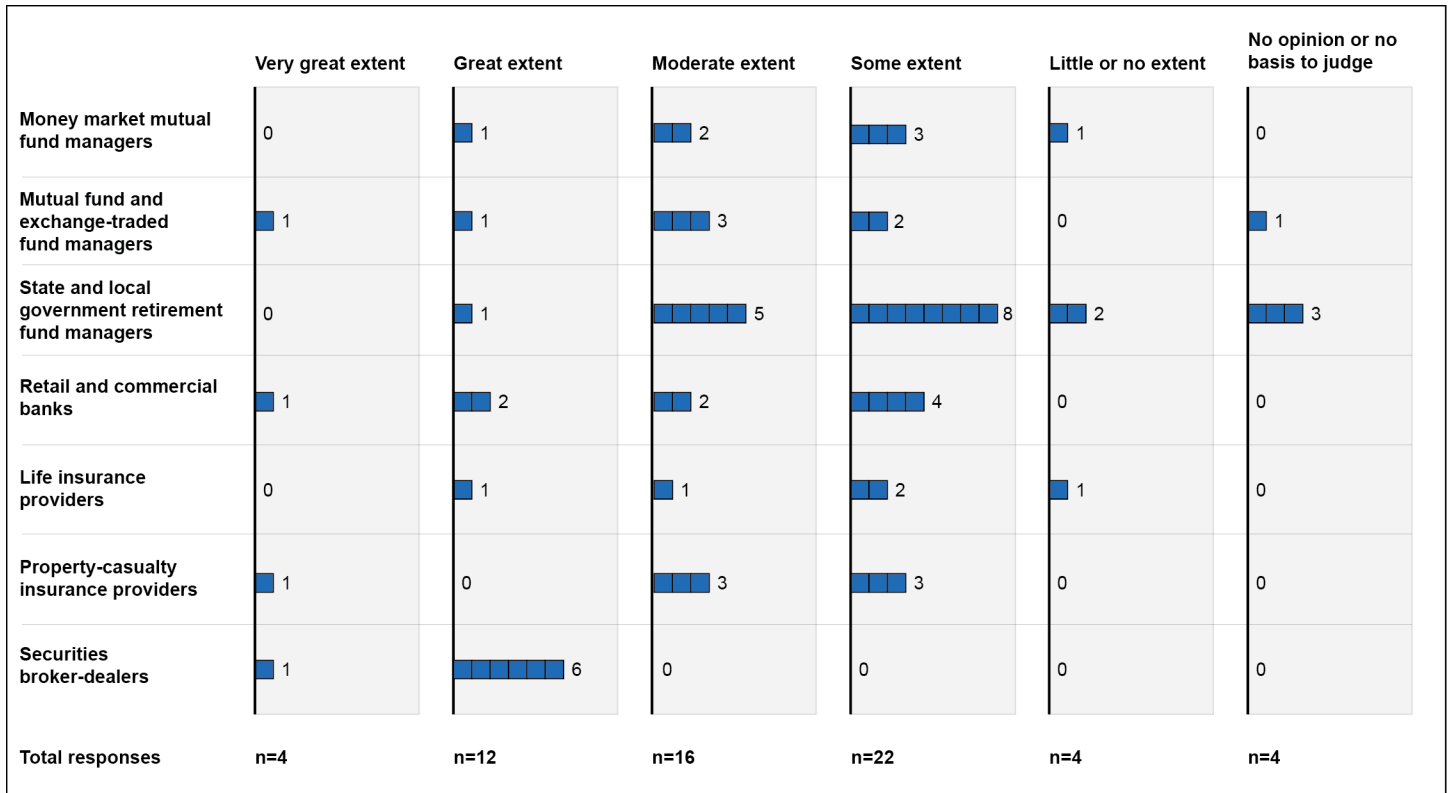
Market Participants Identified Opportunities for Treasury to Enhance Investor Input and Expand Product Offerings

Overall Treasury's Communication with Investors Is Strong, but Certain Sectors Said It Could Be Improved

As our prior work has found, communication with investors is essential as Treasury faces the need to finance historically large deficits expected in the medium and long term.²⁰ Overall, survey respondents said that Treasury provides sufficient information to investors on its debt management plans. Forty-three out of the 62 survey respondents said communication from Treasury occurred to a great or very great extent; no respondents said communication occurred to little or no extent (one had no basis to judge). In addition, most survey respondents said that they were able to provide sufficient input to Treasury, but respondents from some sectors reported lower levels of opportunity to provide input. The 26 respondents who reported opportunities existed to some or little to no extent included 10 state or local government retirement fund managers, 4 money market mutual fund managers, and 3 life insurance providers (see figure 10 below).

²⁰GAO, *Debt Management: Treasury Was Able to Fund Economic Stabilization and Recovery Expenditures in a Short Period of Time, but Debt Management Challenges Remain*, [GAO-10-498](#) (Washington, D.C.: May 18, 2010).

Figure 10: Extent to Which Market Participants Said They Have Opportunities to Provide Input to Treasury



Source: GAO analysis of survey data.

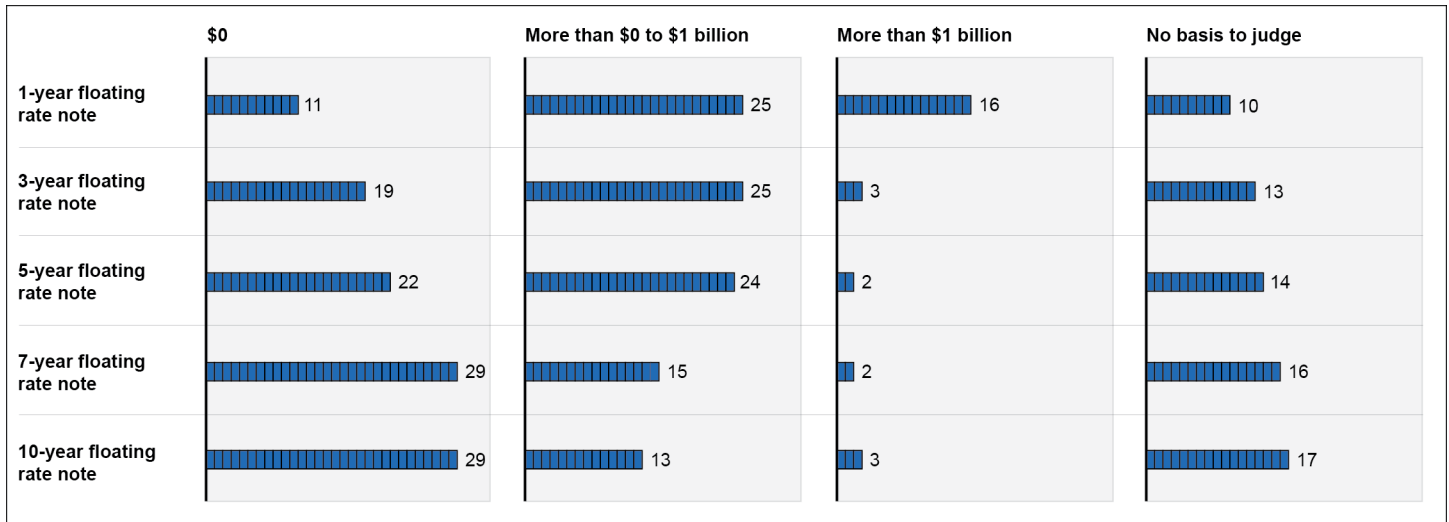
To manage risks associated with borrowing, Treasury monitors market activity and, if necessary, responds with appropriate changes in debt issuance based on analysis and consultation with market participants. Treasury offers a number of ways for market participants to give input, such as providing comments on regulations solicited through the Federal Register and through the email box on the Treasury website. The Treasury Borrowing Advisory Committee (TBAC) is comprised of senior representatives from investment funds and banks and holds quarterly meetings to provide insights to Treasury on the overall strength of the U.S. economy and recommendations on debt management issues. In addition, FRBNY administers the network of primary dealers that also provide market information and analysis to Treasury. However, Treasury's Office of Debt Management does not meet regularly with all sectors, such as state and local government retirement fund managers. Survey respondent suggestions for improving communication with

Treasury included administering surveys, holding regular meetings or calls with investors outside of the TBAC, polling investors on new product ideas, and providing a mechanism for submitting annual recommendations to Treasury from large investors. Without targeted outreach to all major sectors of investors in Treasury securities, Treasury could miss important insights to improve its debt management plans.

Survey Respondents Reported Interest Both in FRNs with Different Maturities and Other New Types of Treasury Securities

Responses from our survey of market participants indicate an interest in FRNs of both shorter- and medium-term maturities, but respondents expressed more limited interest in 7- and 10-year FRNs than in shorter-term FRNs (see figure 11). Survey respondents expressed the most interest in the introduction of a 1-year FRN. Interest in the 1-year FRN varied by sector, with mutual funds (including money market funds) expressing substantial interest in this maturity, while retail and commercial banks had little interest. Securities broker-dealers and state and local retirement fund managers expressed the most interest in FRNs with maturities other than 2 years, but other sectors—such as banks and property-casualty insurance providers—also showed some interest in these other securities. Treasury officials said they might consider issuing FRNs with longer maturities once both they and the market gain some experience with the 2-year Treasury FRN. Over the long run, Treasury FRNs with maturities other than 2 years are likely to provide a cost savings to Treasury relative to issuance of fixed-rate securities with the same maturity.

Figure 11: Market Participants' Reported Estimated Purchases of Floating Rate Notes with Different Maturities

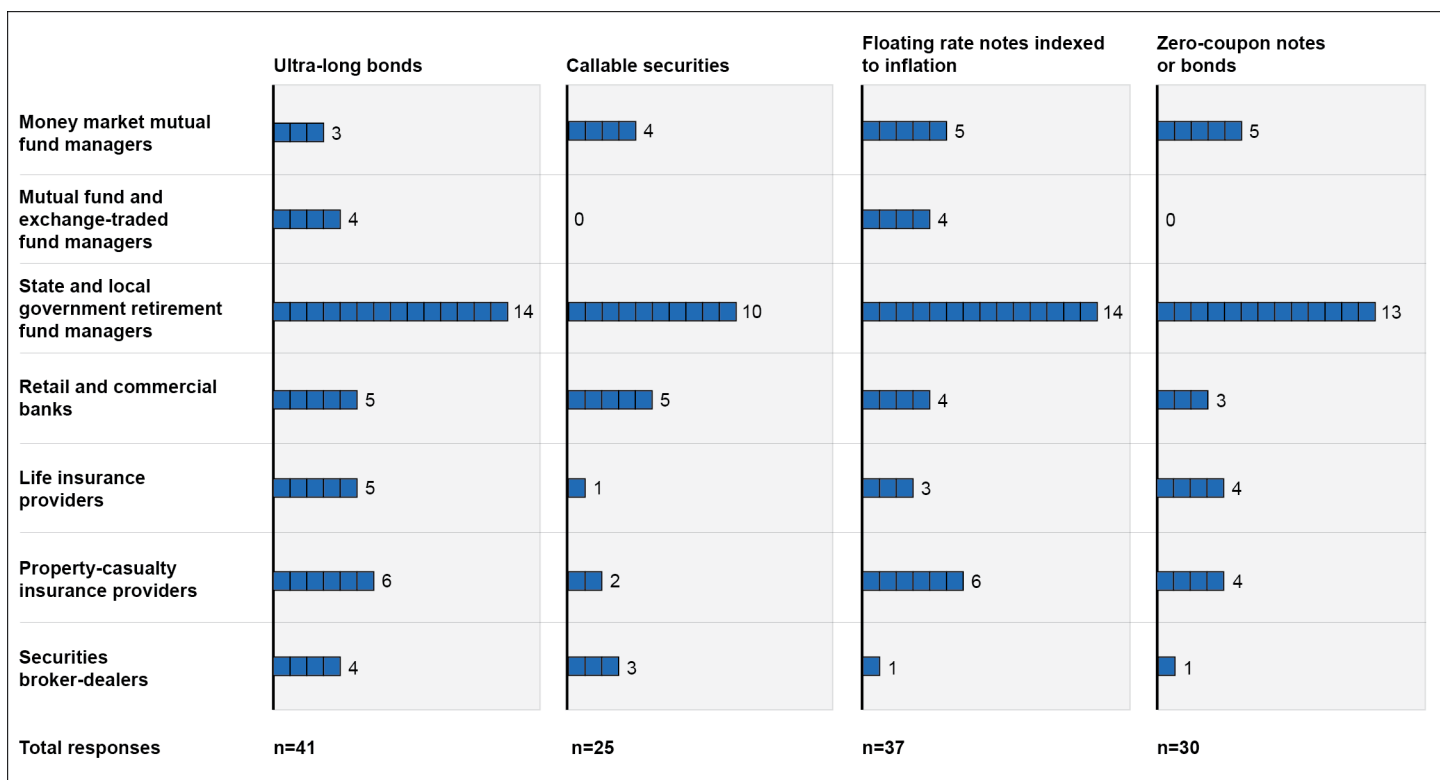


Source: GAO analysis of survey data.

Survey respondents expressed their views on certain design features of FRNs with maturities other than 2 years. For instance, if Treasury were to issue FRNs with different maturities, almost all survey respondents (57 out of 62) thought those FRNs should also be indexed to the 13-week Treasury bill. More respondents said they would prefer daily interest rate resets to any other reset period for FRNs with maturities other than 2 years. Of the respondents who wanted new FRNs to be indexed to the 13-week Treasury bill rate, 13 would also prefer daily resets for all hypothetical maturities, including 4 state and local government retirement fund managers and 5 securities broker-dealers. Although this suggests that these respondents would prefer a “mismatched floater,” as discussed earlier in this report, the mismatch feature may raise risks that result in higher costs to Treasury in certain interest rate environments. Additionally, respondents generally preferred quarterly interest payments for FRNs with other maturities and monthly auctions for 1-year and 3-year FRNs and quarterly auctions for FRNs with other maturities.

Survey respondents also expressed an interest in possible new Treasury securities. Suggestions were ultra-long bonds, callable securities, FRNs indexed to inflation, and zero-coupon notes or bonds (see figure 12).²¹

Figure 12: Treasury Products that Could Enhance Investor Demand, According to Survey Respondents



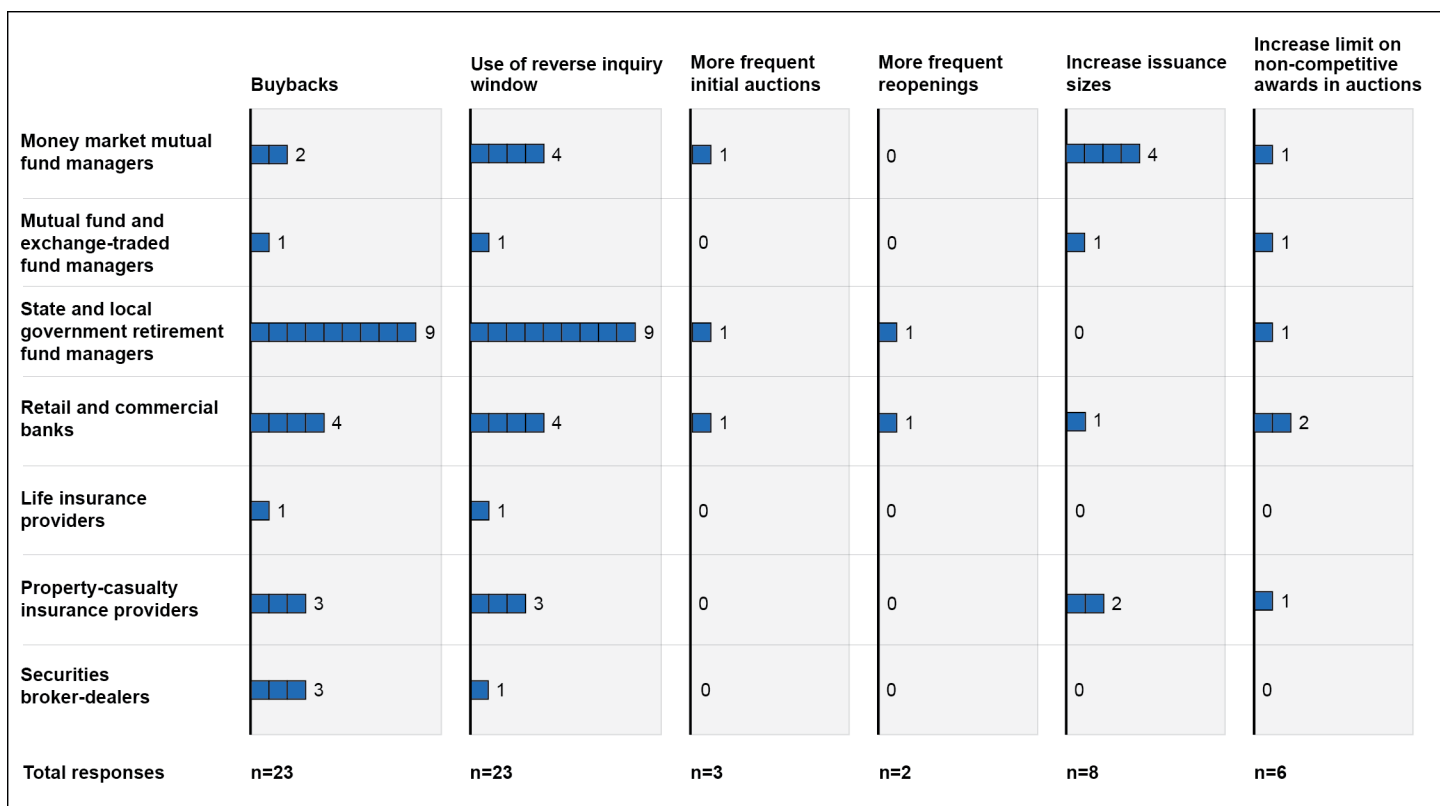
Source: GAO analysis of survey data.

In addition, respondents suggested that certain debt management practices, specifically buybacks and reverse inquiry window, would

²¹Ultra-long bonds are issued with a maturity greater than Treasury's current offerings, such as 40-, 50- or 100-years. Callable bonds are bonds that can be redeemed or paid off by the issuer prior to the bond's maturity date. FRNs indexed to inflation are floating rate notes that adjust the coupon rate for inflation while the principal is held constant. Zero-coupon bonds are bonds that do not pay interest during the life of the bonds. Zero-coupon bonds pay a lump sum, equal to the initial investment plus imputed interest, at maturity.

enhance demand for Treasury securities.²² However, respondents said that in general, changes to Treasury’s current debt management practices—such as frequency of initial and reopening auctions, issuance sizes, and non-competitive award limits—would not enhance demand (see figure 13).

Figure 13: Treasury Debt Management Practices That Could Enhance Investor Demand, According to Survey Respondents



Source: GAO analysis of survey data.

²²Buybacks are the redemption of marketable securities prior to their maturity dates. We previously recommended that Treasury build the capacity for a buyback program that could be used to respond to potential changes in market conditions during times of deficit. This recommendation has not been implemented to date. See GAO, *Debt Management: Buybacks Can Enhance Treasury’s Capacity to Manage under Changing Market Conditions*, GAO-12-314 (Washington, D.C.: Mar. 7, 2012). A reverse inquiry window is a method of purchasing securities where an investor consults with a broker-dealer who proposes to an issuer that a specific security be issued to meet the investor’s needs.

To achieve the lowest cost of financing the government over time, it is important that Treasury spread debt across maturities and take into account investor demand for new and existing products. The medium and long term fiscal outlook make evaluating the demand for Treasury securities, including new securities, increasingly important. Currently, Treasury feels unable to conduct a broad survey of market participants. For this reason, the insights on potential demand for new products from our survey can provide Treasury with a starting point so that it does not miss opportunities.

Conclusions

The U.S. Treasury market is the deepest and most liquid government debt market in the world. Nevertheless, Treasury faces challenges in managing the debt at a time when debt levels are high and projected to increase and when interest rates are also expected to rise. Given the market uncertainties and the federal government's fiscal challenges, increasing Treasury's flexibility to respond to changing market conditions in ways that minimize costs is prudent. FRNs are a tool that can help meet these goals. Over the long term, FRNs can reduce Treasury interest costs relative to fixed-rate securities that lock in funding for the same term. FRNs can also help enhance Treasury flexibility by marginally increasing demand for Treasury securities.

The design and implementation of FRNs has implications for Treasury's ability to minimize borrowing costs over time and for the balance of risks in Treasury's debt portfolio. Our cost analysis finds that in comparison to issuance of 2-year fixed-rate notes, Treasury is taking on additional interest rate risk but is likely to achieve interest cost savings while not increasing market access risk. The mismatch feature of Treasury's first FRN presents a tradeoff between different risks for both investors and Treasury that could raise Treasury's borrowing costs when interest rates are high and the yield curve is volatile. However, the mismatch also helps Treasury tap into the current high demand for high-quality short-term securities. Without analyzing how the mismatch between the frequency of the reset period and the maturity of the index could affect pricing, however, Treasury is unable to judge either (1) the risks (and therefore the ultimate cost) of FRNs in a different interest environment, or (2) whether the additional demand from money market funds due to the mismatch feature outweighs the potential costs it creates. A better understanding of these tradeoffs will be important when Treasury considers issuing FRNs with maturities other than 2 years. Furthermore, with the addition of FRNs to Treasury's debt portfolio, the weighted average maturity length of securities in the portfolio (i.e., the WAM) is now

an incomplete measure of rollover risk because it does not accurately measure interest rate risk. Tracking and reporting an additional measure of the length of the debt portfolio that captures interest rate risk could help Treasury debt managers understand and weigh risks in the portfolio, and publicly reporting that measure would facilitate transparency and market understanding of Treasury debt management decisions.

Introducing FRNs at this time—when demand is high—can help Treasury and market participants become more familiar with the new security so that Treasury can expand to FRNs with different maturities if Treasury determines that doing so would enhance its flexibility and advance its debt management goals. It will also be important for Treasury to gauge market demand for FRNs and other products by soliciting input from all sectors of Treasury investors, specifically state and local government retirement fund managers. Such input can help inform Treasury decisions about changes to Treasury issuance or debt management practices that could enhance overall demand for Treasury securities. When deciding what to issue, Treasury must make prudent decisions about investor demand by product. If Treasury issues the wrong mix of products, its overall cost of funding will increase, as investors express their preferences in prices bid at auction.

Recommendations for Executive Action

To help minimize Treasury borrowing costs over time by better understanding and managing the risks posed by Treasury floating rate notes and by enhancing demand for Treasury securities, we recommend that the Secretary of the Treasury take the following four actions:

1. Analyze the price effects of the mismatch between the term of the index rate and the reset period;
2. Track and report an additional measure of the length of the portfolio that captures the interest rate reset frequency of securities in the portfolio;
3. Expand outreach to state and local government retirement fund managers; and
4. Examine opportunities for additional new security types, such as FRNs with maturities other than 2 years or ultra-long bonds.

Agency Comments and Our Evaluation

We provided a draft of this product and the accompanying e-supplement ([GAO-14-562SP](#)) to Treasury for comment. On May 23, 2014 the Assistant Secretary for Financial Markets told us that Treasury thought it was an excellent report, that they agreed with the recommendations, and that they had already taken steps to begin implementing them. For example, he told us that Treasury's new Office of State and Local Finance will bolster outreach to investors in the state and local sectors. Treasury also provided technical comments that were incorporated as appropriate. Further, Treasury told us they had no comments on the e-supplement.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 7 days from the report date. At that time, we will send copies to the Secretary of the Treasury, the appropriate congressional committees, and other interested parties. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

Should you or your staff have any questions about this report, please contact me at (202) 512-6806 or irvings@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

Sincerely yours,



Susan J. Irving
Director for Federal Budget Analysis
Strategic Issues

Appendix I: Simulations of Floating Rate Note Costs

To estimate the potential cost of floating rate notes (FRN) to Treasury, we simulated the costs of 2-year FRNs based on Department of the Treasury (Treasury) auction data from January 1980 to March 2014 using two models, each with different assumptions about the spread over the index rate that Treasury would pay. We compared those costs to Treasury's actual costs of funding with 13-week bills and 2-year notes. We also analyzed how those costs varied over different interest rate environments.

Estimating Spreads

To estimate the range of potential costs from FRNs, we used two models of the costs of FRNs to Treasury:

1. A “maturity-based” model where the spread estimate is influenced by the 2-year term of the FRN.

In the maturity-based model, the FRN spread—the difference between the index rate and the interest rate on the FRN—split the difference between the 13-week bill and 2-year note yields on the date of the FRN auction:

$$Spread_{FRN} = \frac{1}{2}(Yield_{2y\ fixed} - Yield_{Index})$$

This model was suggested to us by a market participant as one way to estimate the likely spread for the Treasury FRN, and we found it to be reasonable.

2. A “reset-based” model where the spread estimate is derived from the weekly reset term, which determines the nature of most of the interest rate risk faced by investors in FRNs.

In the reset-based model, the FRN spread adjusted the yield of the FRN from the 13-week index rate to a yield equivalent to what a 1-week bill would provide. We imputed a 1-week bill rate based on a straight-line extension of the 13-week bill and 26-week bill rates on the date of the FRN auction. Where possible, we used the Constant Maturity Treasuries (CMT) series issued by the Board of Governors of the Federal Reserve System, which calculates rates for 13- and 26-week bills on a daily basis using secondary market data. However, the CMT series only begins in 1982, so for our simulations in 1980 and 1981, we used the weekly Treasury auction data. Once we imputed the 1-week bill rate, we subtracted the current index rate to compute the predicted spread:

$$Spread_{FRN} = -\frac{12}{13}(Yield_{26w} - Yield_{13w}) + Yield_{13w} - Yield_{Index}$$

This frequently results in a negative FRN spread, meaning that, under this model, the FRN generally has a yield lower than a 13-week bill. We allowed for negative spreads under this model because Treasury regulations allow the FRN to auction with a negative spread and, in very low interest rate environments, short term bills on the secondary market have sometimes traded with a negative yield.

While we considered other models for determining the cost of FRNs, these two models are designed to approximate the range of potential spreads Treasury's 2-year FRN would be expected to have been auctioned at in historical interest rate environments. We also considered models based on:

- **FRNs from government-sponsored enterprises (GSEs).** Several market participants we spoke with indicated that FRNs issued by Fannie Mae and Freddie Mac would be the closest comparison for Treasury FRNs. However, we determined that GSE FRNs were not sufficiently comparable for our purposes due to the issuance practices and FRN structures used by Fannie Mae and Freddie Mac.
- **Swap prices.** Several market participants also suggested interest rate and asset swaps could be used to estimate spreads on Treasury FRNs. We reviewed results of simulations of FRN spreads published by one market participant, and found the estimates from this model usually to be within our own estimates for the FRN spread.
- **Theoretically derived formula.** We explored modifying the formulas used in Don Smith's "Negative Duration: The Odd Case of GMAC's Floating-Rate Note" to derive a theoretically correct spread price.¹ This approach predicted FRN spreads comparatively very close to zero and which generally lie within the costs predicted by the maturity- and reset-based models. This pricing model did not incorporate the pricing consequences of the mismatch between the reset rate and the maturity of the index, and so does not fully capture the pricing risks faced by the FRN.

¹D. J. Smith, "Negative Duration: The Odd Case of GMAC's Floating-Rate Note," *Journal of Applied Finance*, vol. 16, no. 2 (2006).

Defining Interest Rate Environments

Because interest rate environments vary substantially over time, we compared the relative costs of the FRNs in various interest rate environments. The different environments, as used in our analysis and discussed in our report, are described below (see table 2).

Table 2: Definitions of Interest Rate Environments

Change in Rates	Rising	Cases where the trend of the 13-week bill rate increases by 1 percentage point or more over 2 years.
	Steady	Cases where the trend of the 13-week bill rate changes by less than ±1 percentage point over 2 years.
	Falling	Cases where the trend of the 13-week bill rate decreases by 1 percentage point or more over 2 years.
	Trough	Cases where the trend in interest rates initially falls, but then rises, over 2 years and where the trend in interest rates changes at least 0.5 percentage points in each direction.
	Peak	Cases where the trend in interest rates initially rises, but then falls, over 2 years and where the trend in interest rates changes at least 0.5 percentage points in each direction.
Volatility in Rates	Low	Cases where the root mean square error (RMSE) of 13-week bill rates in the sample is less than 0.112.
	Moderate	Cases where the RMSE of 13-week bill rates in the sample is between 0.112 and 0.219.
	High	Cases where the RMSE of 13-week bill rates in the sample is between 0.235 and 0.500.
	Extreme	Cases where the RMSE of 13-week bill rates in the sample is above 0.521.

Source: GAO definitions using Treasury auction data.

To determine the trend of 13-week yields over a two year period, we estimated a linear time trend on the first difference of weekly yields (where t is an index of the number of weeks since the start of the two-year window):

$$Yield_{t+1} - Yield_t = \alpha + \beta * t$$

This is essentially equivalent to fitting a second degree polynomial to the yields, allowing us to capture changes in direction of the interest rate trend (i.e., peaks and troughs) as well as the slope of a linear trend. The estimated curves were used in classifying the interest rate environments.

The cut-offs for assigning an interest rate trend to a category of rising or falling—versus steady—were based on our professional judgment. Other approaches—such as using traditional statistical significance tests—conflate volatility with assessment of the presence of a trend and therefore are not appropriate for this determination.

We were able to use a data-derived approach to assign 2-year periods to our volatility categories. We use the RMSE statistic as an aggregate measure of the weekly yields' total deviation from the trend. We then used a k-mean cluster analysis to divide the sample into four volatility groups: low, moderate, high, and extreme.

Estimating Interest Costs

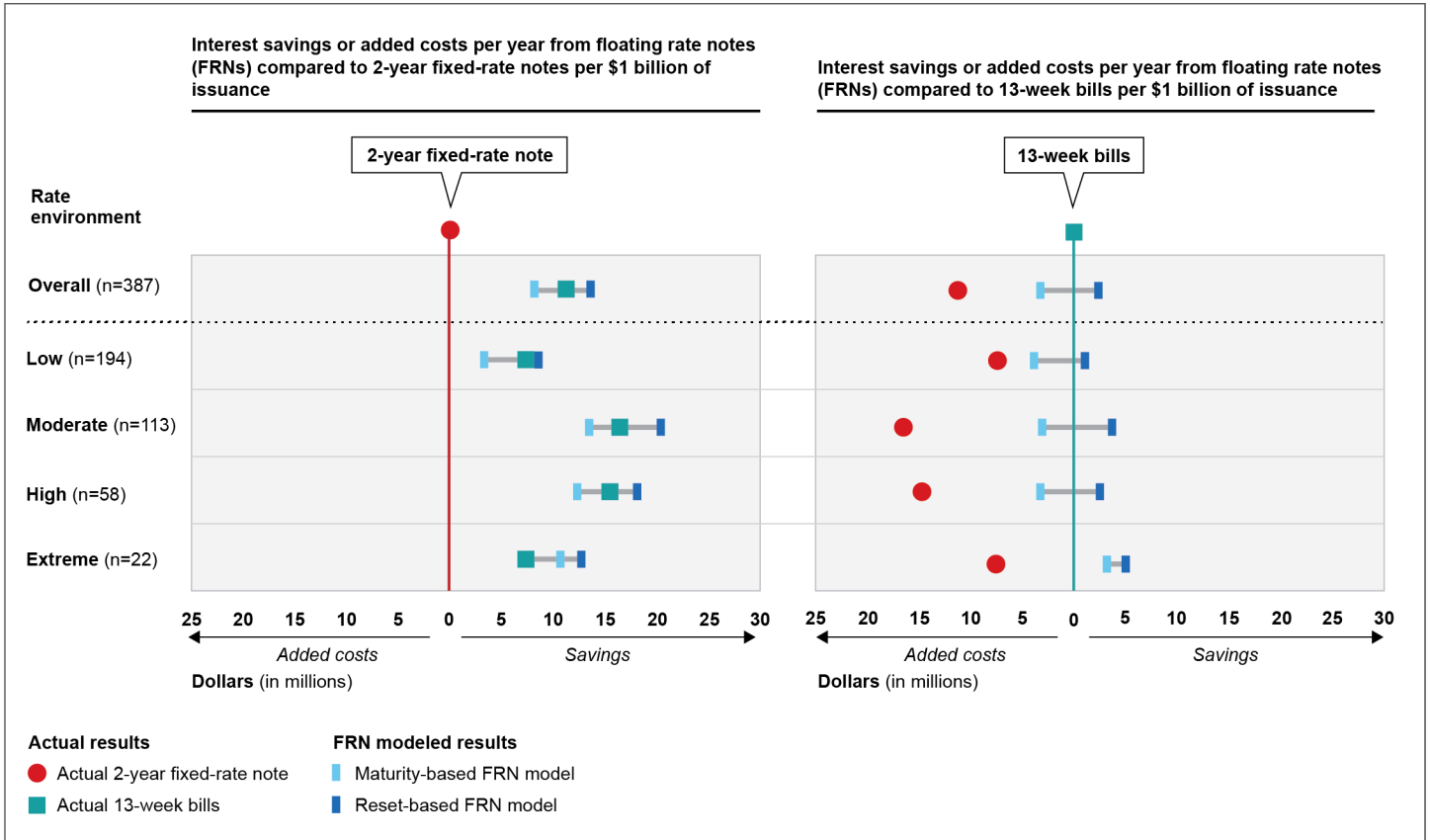
Using the maturity- and reset-based models, we estimated what the spread would be for FRNs auctioned on the same day as actual 2-year fixed-rate notes from January 1980 to March 2012, resulting in 387 simulated FRNs. We then applied these estimated spreads to the actual weekly 13-week bill auctions from January 1980 to March 2014, and calculated what the total interest cost would have been for each simulated FRN during this period. Like the actual 2-year FRN, we used a floor of zero for the daily interest accrual of our simulated FRNs.

To determine the relative interest cost of the FRN, we compared the estimated costs of the simulated FRNs to the costs of the actual 2-year fixed-rate notes and a rolling series of 13-week bills for each 2-year period. We estimated the average interest costs relative to 2-year notes and 13-week bills as well as the percent of cases where FRNs generate savings or additional costs compared to bills or notes.

Results of Simulations of FRN Costs by Volatility in Rates

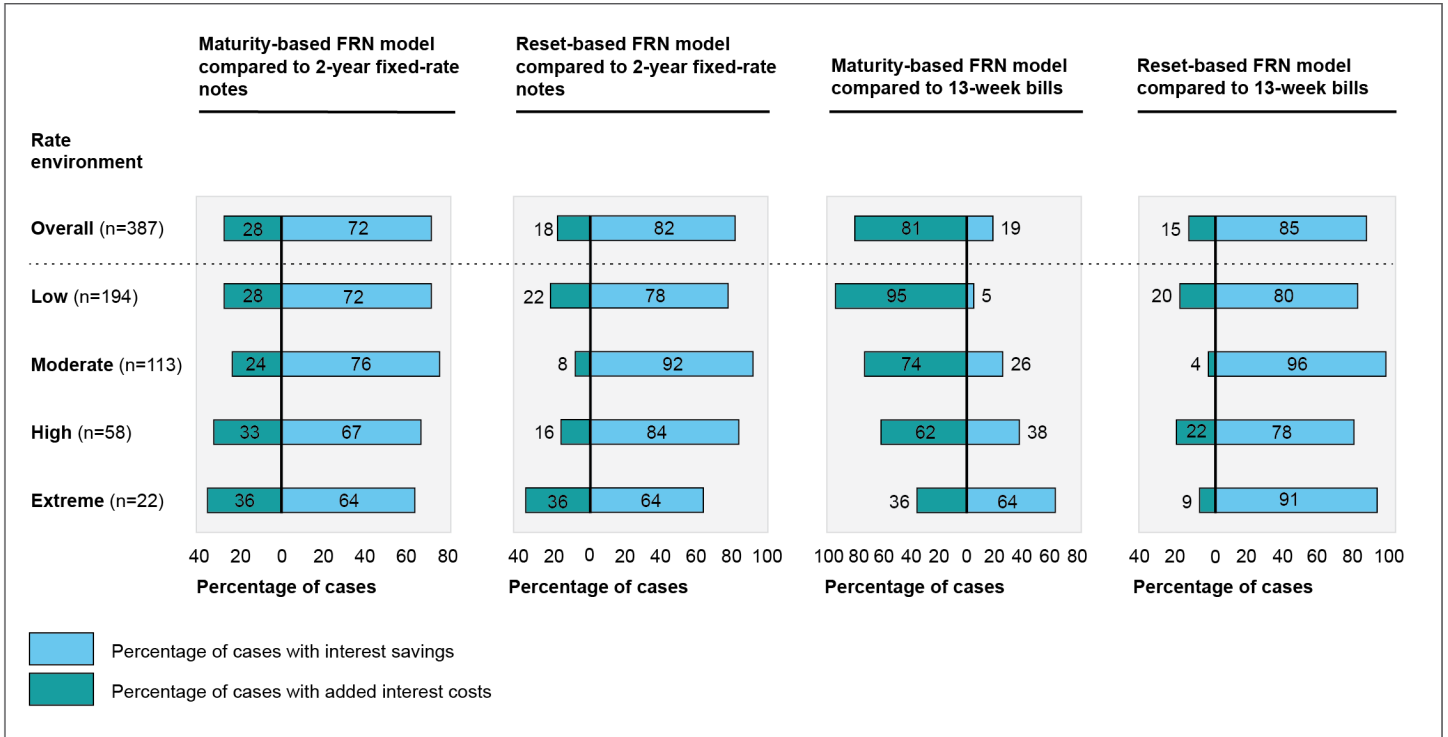
In addition to the results presented in the body of our report, we estimated the cost of 2-year FRNs by volatility of the rate environment. As shown in figures 14 and 15 below, we found that, at all levels of volatility, there was little variation between our two models. In periods of low, moderate, and high volatility, 2-year FRNs tended to produce savings compared to 2-year fixed-rate notes, but could produce either costs or savings compared to 13-week bills depending on which model is used. In periods of extreme volatility, FRNs produced savings under both models.

Figure 14: Interest Savings or Added Costs from 2-year Floating Rate Notes Compared to 13-Week Bills and 2-Year Notes, by Volatility in Rates



Source: GAO simulation based on Treasury and Federal Reserve data.

Figure 15: Percent of Cases Where 2-Year Floating Rate Notes Save or Add to Interest Costs Compared to 13-Week Bills and 2-Year Notes, by Volatility in Rates



Source: GAO simulation based on Treasury and Federal Reserve data.

Appendix II: Survey Scope and Methodology

To address both of our objectives, we surveyed and interviewed market participants regarding (1) the market for FRNs, (2) the structure of FRNs, (3) other actions Treasury may consider to expand demand for Treasury securities, and (4) communication between Treasury and investors. To gather information from a broader range of investors, we administered an online survey to 82 of the largest domestic institutional holders of Treasury securities in the following sectors: money market mutual fund managers, mutual and exchange-traded fund managers, state and local government retirement fund managers, retail and commercial banks, life insurance providers, property-casualty insurance providers, and securities broker-dealers (see table 3). Results of the survey are not generalizable. For aggregate survey results reproduced as an e-supplement, see [GAO-14-562SP](#).

Table 3: Survey Responses by Recipient Type

Sector	Total recipients of survey	Total completed surveys	Response rate (percent)
Money market mutual fund managers	9	7	78
Mutual fund and exchange-traded fund managers	10	8	80
State and local government retirement fund managers	26	19 ^a	73
Retail and commercial banks	10	9	90
Life insurance providers	8	5 ^b	63
Property-casualty insurance providers	12	7	58
Securities broker-dealers	7	7	100
Total	82	62	76

Source: GAO analysis of survey results.

^aThree state-local government retirement funds refused to answer the survey; two specifically told us they fell outside the scope of our review.

^bOne life insurance provider refused to answer the survey.

To identify sectors for our sample, we reviewed data from the Federal Reserve's *Financial Accounts of the United States*, (table L.209, third quarter 2013) to identify which sectors have at least \$60 billion in Treasury holdings. We excluded some sectors due to challenges in contacting certain entities, such as foreign monetary authorities, other foreign investors, and the household sector.

To identify the organizations within each sector that would receive our web-based survey, we used rankings of the largest organizations in each sector based on total assets or an equivalent financial indicator, such as

assets under management or direct premiums written. From these ranked lists, we determined Treasury holdings for each organization and selected as many organizations as needed to represent at least 50 percent of the total amount of Treasury holdings for that sector (based on table L.209 of the Federal Reserve's *Financial Accounts of the United States*) or in the case of mutual funds, exchange traded funds, and money market funds, based on information from the Investment Company Institute on total assets under management in Treasury- and government-focused funds.

Appendix III: GAO Contacts and Staff Acknowledgments

GAO Contact

Susan J. Irving, (202) 512-6806 or irvings@gao.gov

Staff Acknowledgments

In addition to the contact named above, Tara Carter (Assistant Director), Susan E. Murphy, (Analyst-in-Charge), Abigail Brown, Emily Gruenwald, Daniel Ramsey, and Albert Sim made key contributions to this report. Amy Bowser, Dianne Guensberg, Stuart Kaufman, Risto Laboski, Donna Miller, Dawn Simpson, and Stewart W. Small provided subject matter assistance.

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