DID STEVE FORBES SCARE THE
MUNICIPAL BOND MARKET?

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ABSTRACT

Evidence from daily market data is consistent with the view that the implicit tax rate on 5-year municipal bonds was affected by the chance of a flat tax becoming law, as proxied by the price of Steve Forbes' shares on the Iowa Electronic Market for political candidates; the spread was also affected by the likelihood of a Republican president and the impact of deficit reduction. No similar evidence for the impact of the flat tax could be found for the 30-year municipal market, although that spread does seem to be affected by the probability of a Republican winning the White House, and the lower taxes on capital income that presumably implies.

These findings are consistent with market participants taking the flat tax seriously as a short-run possibility, but believing that over a three-decade period the taxation of capital is more likely to be influenced by the party in power than the tax reform fad of the moment. Alternatively it may reflect the fact that, due to several features of 30-year bonds, the changing likelihood of a flat tax is not clearly reflected in that market.

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1. Introduction

The relative yield of taxable and tax-exempt securities should be affected by not only the existing tax system, but also by the prospect of changes in the tax system. Previous research that has attempted to verify the asset price response to changes in the likelihood of future tax changes has been hampered by the lack of continuously available measures of the probability of such changes, forcing researchers to rely on studies of discrete events, such as the proposal or passage of a tax change. Because these events are generally anticipated, precisely when to look for the impact on security prices is unclear, which forces researchers to investigate long and imprecise windows of time.

In this paper we remedy that problem by investigating the relationship between the daily relative yield on tax and tax-exempt municipal securities and a daily indicator of the probability of passage of a tax reform – the "flat tax" -- which would eliminate the preferential tax treatment of municipal securities and thus the (risk-adjusted) spread between taxable and tax-exempt bonds. We assume that the probability of flat tax passage is correlated with the political future of Steve Forbes, a Republican presidential candidate whose major campaign issue was the flat tax. Because his election chances are measured by the daily price of two distinct shares in Forbes' prospects in the Iowa Electronic Market, the probability of a tax change is proxied on a daily basis by a market price.

Although Steve Forbes and his postcard-sized flat tax form made it on to the covers of *Newsweek* and *Time* magazines, it is arguable that he was never a viable candidate for the Republication nomination, and thus it would be unlikely that the rise and fall of his popularity

would affect bond prices. However, there is anecdotal evidence that the municipal bond market

did indeed take notice of the fortunes of Steve Forbes and the flat tax. For example, page one of

the *Wall Street Journal* on February 28, 1996, after Forbes' political fortunes had fallen from

their peak, reported the following:

GOP BICKERING helps bolster the battered tax-exempt bond market.

During the past year, many investors have been shying away from tax-exempt bonds. They feared the huge $1.2 trillion municipal-bond market would be hurt by growing speculation of possible tax-law changes that might remove any incentive for investors to own tax-exempt bonds. Some proposals, such as the Forbes flat tax, would eliminate taxes on interest income and other investment income.

But lately, those fears appear to be fading somewhat. GOP clashes "make Clinton look like a stronger candidate," which means "a diminishing probability of a flat tax anytime soon," says Richard Ciccarone, executive vice president of Everen Securities in Chicago. Christopher M. Dillon of J.P. Morgan Securities in New York says: "With fortunes of proposals such as the flat tax seemingly in decline, stepped-up purchasing by investors has helped municipals to out-perform" taxable bonds in recent weeks.

In the past month, while Treasury bond prices have tumbled, muni-bond prices generally have fallen only slightly, Mr. Dillon says.

Furthermore, Fortune (1996, p. 31) notes that, in the May 13, 1996 issue of its Fixed Income

Research Relative Value Report, Lehman Brothers reported that "After spending most of 1995 in

fear of a flat tax, the municipal bond market has rallied relative to taxables for the first several

months of 1996." This paper investigates whether there was a statistically robust relationship

between daily relative yields of taxable and tax-exempt bonds and a daily measure of the strength

of Steve Forbes' candidacy.

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2. Previous Research

In the simplest model of bond market equilibrium in which only individuals hold securities, the equilibrium is defined by $r_m = (1 - \tau)r_T$, where r_m and r_T are the pre-tax rates of return on tax-exempt municipal bonds and risk-equivalent taxable bonds, respectively, and τ is that marginal personal tax rate on debt income which equates the supply and demand for classes of bonds, something referred to as the implicit tax rate. Because historically banks and other financial institutions were major holders of municipal bonds, much previous empirical research on the determination of the yield spread has focused on the effect of changes in the (actual or expected) tax rates applying to various classes of potential holders of municipal securities.[1] Because individuals now dominate this market, this issue is no longer as salient.

Poterba's (1989) investigation of tax policy events between 1960 and 1986 provided what he interpreted as clear evidence that the yield spread responded to changes in expected individual tax rates, a finding that is inconsistent with theories of the municipal bond market equilibrium that focus exclusively on commercial banks and other financial intermediaries. This is in contrast with the earlier results of Poterba (1986), which suggested that both personal and corporate tax changes affected the yield spread. Both Poterba studies relied on monthly average data about yields and required judgments about which months contained significant tax policy events, including proposed IRS rulings on the tax treatment of municipal interest payments, developments during Congressional debates, and announcements of plans for radical changes in tax structure. This methodology provides no way to assess the magnitude of effects across

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[1] See Miller (1977) and Fama (1977) for theoretical treatments, and Trzcinka (1982), Skelton (1983), and Buser and Hess (1986) for important early empirical contributions.

events. Furthermore, it assumes that expectations change only during the month characterized as the "event."[2]

Fortune (1996) extends Poterba's methodology forward to 1996, using an updated list of 32 tax policy events to explain the implicit tax rate on 5-year, 10-year, and 20-year bonds. He finds that of 96 event effects estimated, two-thirds have the correct sign; however, only 16 percent of the coefficients have both the correct sign and statistical significance. Of particular relevance to the topic at hand, Fortune finds that the introduction and debate of the Armey-Shelby flat tax bill (July to December, 1995) showed correct signs in two of the three regressions, but neither was statistically significant, and the 1996 Presidential primary debates over the flat tax (January to February, 1996) showed correct signs in only one of the three cases, again with no statistical significance. Fortune concludes that there is no evidence linking the municipal spread to the flat tax debates. However, analysis of monthly data, and broadly defined tax policy event windows, is a very blunt instrument to identify the reaction of markets to daily changes in the political fortunes of the flat tax, and our own regression analysis, reported below, reaches a different conclusion.

3. The Flat Tax

Although the models of bond market equilibrium offer differing predictions about exactly how the tax system affects the yield spread, they share the prediction that, in the absence of taxation, the risk-adjusted rates should be equal. Although no one has proposed to abolish all

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[2] Poterba (1986) reports that he experimented with defining indicator variables for the month preceding and following the events, with no change in the qualitative results. See also Mankiw and Poterba (1996), who present a model with two types of investors: tax-exempt institutions, which hold taxable bonds and no tax-exempt bonds, and wealthy personal investors, who hold tax-exempt bonds, but not taxable bonds.

taxation, in the fall of 1995 Steve Forbes centered his candidacy for the Republican presidential nomination on a proposal to abolish the income tax in favor of the "flat tax." This tax, originally outlined in Hall and Rabushka (1995), would eliminate all taxes on capital income. This would be implemented by a personal and business tax that effectively exempted from taxation the normal return to capital. At the personal level neither interest, dividends, nor capital gains would be subject to tax; at the business level, the tax base is sales receipts minus purchased inputs and labor costs, so that there are no tax implications of corporate financial policy -- neither interest nor dividend receipts are taxed, interest payments are not deductible, and capital gains are not taxable.

If the flat tax were to become the law of the land, the relative value of tax-exempt bonds would decline, not because of a direct change in their tax status, but because of a (favorable) change in the tax status of competing investments such as (formerly) taxable bonds and corporate equities. If the flat tax was expected to permanently be the law of the land, the (risk-adjusted) spread between taxable and tax-exempt bonds would be zero.

4. Methodology

All of the formulations of the capital market equilibrium with municipal bonds share the prediction that the implicit tax rate of $\frac{(r_T - r_m)}{r_T}$, is a positive, monatomic, function of tax rates. Denote as t^* the implicit tax rate if the flat tax has no chance of passage, and let t be the actual implicit tax rate. If p is the probability that a flat tax will be immediately and permanently implemented, then t will approximately equal $(1 - p)t^*$. More generally,

(1) $t = (1 - \alpha p)\, t^*,$

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where α is the fraction of the present value of the tax preference accorded to municipal bonds that will be lost due to the probability that the flat tax will become law at some time in the future, where α adjusts for both the delay and implementation of the tax code and the possibility that it would later be repealed.

We do not have a direct measure of p, the probability of a flat tax becoming law. We do, though, have a measure of the probability that Steve Forbes will become the Republican nominee, or that he will be elected President. Denote the probability that a flat tax will pass, conditional on Forbes becoming President, as β, and the unconditional probability that Forbes will be elected as p_F, so that $p = \beta p_F$[3], and

(2) $t = a - \alpha\beta p_F$.

Our empirical strategy is to estimate equation (2) separately for 5-year and 30-year bonds, using the price of Forbes' shares in the Iowa Electronic Market as an indicator of p_F. If p_F refers to the probability of the flat tax becoming law permanently, then one would expect that α will be higher for 30-year bonds than for 5-year bonds; the prospect of a flat tax becoming law as of tax year 1998 would, from an early 1996 perspective, eliminate a higher fraction of the present value of the tax advantage for a 30-year tax exempt bond compared to a 5-year bond. If, however, it is presumed that any flat tax that did become law would not long survive the political process, it is conceivable that α is higher for 5-year bonds than for 30-year bonds.

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[3] This formulation assumes that the flat tax would pass only if Steve Forbes were elected President. If there is some probability that the flat tax would pass in the absence of Forbes' election, that effect would be subsumed into the constant term.

5. Data

To calculate the yield spread between tax-exempt bond yields and taxable bond yields, we utilized four indices compiled by Bloomberg Financial Services: an index of 5-year, AAA-rated general-obligation municipal bonds, an index of 30-year, AAA-rated general-obligation municipal bonds, an index of 5-year, AAA-rated bank and finance bonds, and an index of 30-year, AAA-rated bank and finance bonds. Bloomberg compiles these indices using the plethora of bonds that happen to be listed on its financial information services network. The daily yield quotes for each index are derived by averaging the daily yields of every bond listed on the network that will come to maturity in the given number of years. The daily yield quotes of the Bloomberg index of 30-year, AAA-rated bank and finance bonds are consistent with the daily yield quotes of the Merrill Lynch corporate bond index as printed in the *Wall Street Journal.* While the daily yield quotes of the Bloomberg index of 30-year, AAA-rated municipal bonds are certainly different from the daily yield quotes of the Bond Buyer index of long-term (twenty-eight year average) municipal bonds as printed in the *Wall Street Journal*, the daily yield quotes of the two indices are almost perfectly correlated.

We utilize the probability of Steve Forbes achieving political success as an indicator for the probability of his flat tax being enacted. As a measure of Steve Forbes' political strength, we draw on data from the Iowa Electronic Market, a political stock market operated by the University of Iowa's College of Business Administration. The Iowa Electronic Market allows individuals to buy and sell "shares" of candidates in return for a monetary payoff per share held of each successful candidate at the time of the election or Republican convention. Therefore, the price of a given candidate's shares reflects the expected political fortunes of that candidate; in

past elections such share prices have proven to be at least as accurate predictors of vote outcome as poll results.

We make use of three different specific political markets operated as part of the Iowa Electronic Market. The first market used is the 1996 Republican National Convention Winner-Takes-All Market. In this market, individuals buy shares of candidates based on who they think will be chosen as the Republican party's presidential nominee. Individuals holding shares of the nominated candidate receive $1.00 for each share they hold. Shares of other candidates are declared worthless. Since the return per share of the nominated candidate's stock is fixed at $1.00, the price of the candidate's shares at any point in time is a measure of the market-determined probability that this candidate will be nominated. In order for a new candidate-specific contract to be created in the Republican nomination market, at least 10% of registered Republicans, as indicated in a major nationwide poll, must favor the nomination of the candidate in question. We denote the price of a Forbes share in this market, which was offered for sale beginning on January 12, 1996, as FORBCONV.

The second market that we use is the 1996 Presidential Election Vote-Share Market. In this market, individuals buy shares of candidates based on what percentage of the popular vote in the general election they think each candidate will receive. If a given candidate will receive x percentage of the vote in the general election, owners of shares of that candidate will receive x cents per share. Shares of candidates who do not make it to the general election are declared worthless. Consequently, the price of a candidate's shares represents not only the expected success of that candidate in the general election, but also the perceived probability that that candidate will make it to the general election. In order for a new candidate-specific contract to be created in the Vote-Share market, the shares of the candidate in question must be worth at

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least $0.10 in the Republican nomination market. We denote the price of a Forbes share in this market as FORBVOTE. This share was offered for sale beginning on February 5, 1996. To extend this series backwards, we extrapolate based on a linear regression of FORBVOTE on FORBCONV over the period both are available.

The third market we make use of is the 1996 Presidential Election Winner-Takes-All Market. In this market, individuals may buy shares of four contracts based upon who they believe will receive the largest number of popular votes in the general election. The four contracts were: Clinton, a Democrat other than Clinton, the Republican nominee, and an "other" option representing neither the Democratic nor the Republican nominee. Individuals who hold shares of the winning contract will receive $1.00 per share. Shares of contracts that do not receive the largest number of popular votes are declared worthless. Since the return per share of the winning contract is fixed at $1.00, the price of a given contract's shares at any point in time is the market-determined probability that that contract will receive the largest number of popular votes in the general election. We denote the price of the Republican nominee in this market as REPV.[4]

One possible confounding factor is that over much of this period the Republican-controlled Congress was engaged in negotiations with President Clinton over a multi-year budget plan that would eventually eliminate the budget deficit. At one point in late 1995, an agreement on such a plan seemed likely. Instead, the negotiations led to deadlock, a government shutdown, and no deal was eventually reached. The changing likelihood of a budget-balancing deal could arguably affect the time series of the level of interest rates over this period. More to the point,

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[4] Although the Iowa Electronic Market is open each and every day without exception, bond markets are not open on weekends and certain holidays. As a result, we excluded data for days on which bond markets were closed.

following the logic of Park[5] (1997), it could affect the expected path of future tax rates on capitol income, conditional on the flat tax not becoming law; specifically, the more likely is a deficit-reducing budget deal, the lower are expected future tax rates, and therefore the lower is the implicit tax.

As a measure of this effect, we make use of the level of nominal interest rates, specifically the simple average of the taxable and tax-exempt yields, denoted AVGINT. If our presumption is correct, this variable should be positively correlated with the spread, holding constant our proxy for the probability that a flat tax would be instituted. More to the point, we hope that including a measure of this potentially confounding factor will sharpen our estimates of the "Forbes effect" on the municipal bond market.

6. Results

We estimate each of the basic regression equations over the period beginning when the Forbes share denoted FORBCONV began to be traded -- January 12, 1996 -- until when Forbes dropped out of the race on March 14. Means of all variables are shown in Table 1.

Tables 2 and 3 display the results of the regression analyses, which all feature a Prais-Winston first-order autocorrelation. As Table 2 shows, all of the proxies for Steve Forbes' popularity have a negative association with the implicit tax rate for 5-year bonds. However, the extent to which the negative association is both statistically and economically significant varies

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[5] Park (1997) investigates the hypothesis that investors expect tax rates to rise when the federal government faces financial difficulties, where expected changes in tax rates are measured by the difference between the 20-year implicit tax rate and the one-year implicit tax rate. He finds that a positive relationship exists between the expected tax rate and federal debt and inflation; the latter suggests that investors may expect tight fiscal policies when inflation is high.inflation is high.tax rate and federal debt and inflation; the latter suggests that investors may expect tight fiscal policies when inflation is high.

depending on the specification. For example, the results in column 4 suggest that, at his peak of of popularity (FORBVOTE=.12), Forbes was responsible for reducing the spread by 0.20 (.12 x .168), compared to a mean spread of .301.[6] This is the largest estimated effect of all eight specifications investigated. Although FORBVOTE always attracts a statistically significant coefficient, FORBCONV does not. It is worth noting that FORBVOTE is arguably a more direct measure of the probability of Forbes becoming President. In all of the cases, REPV has a statistically significant negative sign, suggesting that market participants believe that a Republican president is more likely to preside during the passage of a flat tax and/or a reduction of capital income taxes more generally.

As Table 3 shows, though, the relationship for 30-year bonds is much more tenuous, with no statistically significant negative relationship existing for FORBVOTE or FORBCONV. However, the proxy for the Republicans' odds of winning the presidency retains its negative association with the implicit tax rate for 30-year bonds, although it is only about half the size of the estimated coefficient for 5-year bonds.

The results of including the AVGINT variable are as expected only for the 5-year bond market: the coefficient on the level of interest rates is positive and significant. For the 30-year market, the results are not as strong, smaller in sign and not always significant. This result is consistent with the view that the possible budget agreement was not viewed to be significant in terms of the long-term U.S. fiscal situation.

There are two possible explanations for this general pattern of results that the prospect of a flat tax reduced the spread of 5-year bonds, but not for 30-year bonds. The first explanation is

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[6] We also investigated as an explanatory variable the product of FORBCONV and REPV, as a measure of Forbes' probability of being elected president. The results were qualitatively similar to those reported here.

that market participants believed that any cutback in the municipal bond tax preference due to the flat tax would be temporary, and would thus be insignificant considering a 30-year horizon. Furthermore, a better indication of the long-term path of marginal tax rates on capital income is Republican control of the legislative process, rather than any one candidate's ascendancy; our proxy for that is generally significant for both markets.

The second explanation is simply that the 30-year bond spread is too noisy a measure of an implicit expected tax rate. Fortune (1996) argues strongly that several differences between municipal and taxable bonds with long maturity -- in duration, callability, and credit risk -- contaminate the tax interpretation of the yield spread. The difficulty of accounting for these factors led Fortune to eliminate from his analysis bonds with more than 10 years to maturity, on the grounds that these are the ones most tainted by these factors, especially callability. In this study these factors may have added enough noise so as to overwhelm any Forbes factor.

7. Conclusion

Evidence from daily, market data is consistent with the view that the implicit tax rate on 5-year municipal bonds was affected by the chance of a flat tax becoming law as well as by the likelihood of a Republican president and the impact of deficit reduction on future tax rates. No evidence of the flat tax's prospects can be found for the 30-year municipal bond market, although the spread on 30-year bonds does seem to be affected by the probablity of a Republican winning the White House, and the lower taxes on capital income that prospect presumably implies.

These findings are consistent with market participants taking the flat tax seriously as a short-run possiblity, but believing that over a three-decade period the taxation of capital is more likely to be influenced by the party in power than by the tax reform fad of the moment.

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Alternatively, it may reflect the fact that, due to several features of 30-year bonds, the changing

likelihood of a flat tax is not clearly reflected in that market.

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Table 1
Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
T5	.301	.020	.268	.334
T30	.227	.012	.208	.246
FORBCONV	.106	.065	.005	.215
FORBVOTE	.057	.041	.004	.129
REPV	.415	.023	.383	.458
FORBREP	.045	.028	.002	.091
AVGINT	6.08	.173	5.86	6.48

Table 2

Analysis of How the Prospect of the Flat Tax Affected
Tax-Exempt Bond Spreads for 5-year Bonds

Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FORBCONV	-.050 (.043)		-.098 (.042)		-.002 (.039)		-.028 (.040)	
FORBVOTE		-.111 (.055)		-.168 (.056)		-.096 (.048)		-.115 (.051)
REPV			-.322 (.109)	-.248 (.098)			-.397 (.091)	-.345 (.085)
AVGINT					.056 (.015)	.053 (.014)	.050 (.014)	.045 (.012)
Constant	.305 (.006)	.305 (.006)	.444 (.044)	.413 (.041)	-.041 (.091)	-.018 (.084)	.166 (.095)	.175 (.088)
Rho	.800 (.094)	.843 (.084)	.591 (.128)	.696 (.114)	.826 (.089)	.852 (.083)	.481 (.140)	.519 (.137)
Time Period	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96	1/12/96- 3/14/96
R^2	.893	.912	.858	.890	.926	.937	.881	.897
Durbin-Watson	1.18	1.26	1.42	1.27	1.10	1.17	1.36	1.18

Table 3
Analysis of How the Prospect of the Flat Tax Affected
Tax-Exempt Bond Spreads for 30-year Bonds

Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FORBCONV	.011 (.034)		.014 (.033)		.021 (.034)		.023 (.036)	
FORBVOTE		-.015 (.046)		-.023 (.044)		-.010 (.045)		-.019 (.047)
REPV			-.177 (.082)	-.162 (.077)			-.182 (.083)	-.163 (.080)
AVGINT					.022 (.013)	.021 (.013)	.008 (.013)	.003 (.012)
Constant	.223 (.006)	.225 (.005)	.298 (.033)	.295 (.032)	.089 (.080)	.098 (.079)	.251 (.089)	.275 (.087)
Rho	.847 (.083)	.847 (.083)	.689 (.115)	.684 (.115)	.828 (.089)	.838 (.086)	.675 (.118)	.676 (.118)
Time Period	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96	1/12/96-3/14/96
R^2	.824	.824	.797	.796	.832	.834	.795	.794
Durbin–Watson	1.45	1.46	1.18	1.15	1.16	1.18	1.07	1.09