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Using tax return data to simulate corporate marginal tax rates

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Abstract

We document that simulated corporate marginal tax rates based on financial statement data [Shevlin, T., 1990. Estimating corporate marginal tax rates with asymmetric tax treatment of gains and losses. The Journal of the American Taxation Association 11, 51–67; Graham, J., 1996a. Debt and the marginal tax rate. Journal of Financial Economics 41, 41–73] are highly correlated with simulated rates based on corporate tax return data. We provide algorithms that can be used to estimate the book or tax simulated rates when they are not available. We find that the simulated book marginal tax rate does a better job of explaining financial statement debt ratios than does the analogous tax return variable and discuss how the book-simulated rate is likely to be an appropriate measure in settings with global, long-term considerations.

JEL classification: G32; H25; M41

Keywords: Marginal tax rate; Simulated tax rates; Tax return data; Financial statements; Book tax difference; Capital structure

1. Introduction

The marginal tax rate (MTR) is an important input into many corporate decisions. For example, high MTR firms are hypothesized to use more debt, restructure via Chapter 11 when in distress, and participate in tax shelters. Low MTR firms are thought to pay employees with deferred and/or stock compensation rather than salary, operate as corporations rather than partnerships, and lease rather than buy assets. The corporate MTR also is a key input into the cost of capital and, therefore, affects many capital budgeting decisions.[1] Given the significance of these issues, it is important to measure corporate marginal income tax rates accurately and choose a rate appropriate to the research question.

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[1]We measure the MTR as the present value of incremental taxes paid on an additional dollar of current-period income, consistent with Scholes et al.'s (2005) corporate income marginal tax rate. This measure of the MTR on the next dollar of income differs from the concept of the marginal effective tax rate on an investment, which is estimated as the expected pretax return minus the expected after tax return, divided by the expected pretax return. See Fullerton (1999) for a brief description.

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Ideally, to test for tax effects, researchers would construct the tax variable(s) that managers use in their actual decision making. In theory, such tax rates should incorporate the effects of net operating losses (NOLs), projections of future income, and various features of the tax code (for all jurisdictions), as appropriate. For economic decisions that are tied to an incremental dollar of income or deduction, like those mentioned above, tax incentives should be measured by a marginal income tax rate.

In practice, much prior research has relied on simple static tax variables created from financial statement data, such as the presence of an NOL carryforward, to measure tax incentives. The value of a static variable is limited, however, when dynamic considerations are important, such as when a firm's tax status is expected to change in the near future. Shevlin (1990) and Graham (1996a) address this concern by simulating marginal tax rates that capture important dynamic features of the tax code such as the effects of NOL carrybacks and carryforwards. While a simulated tax variable based on financial statement information (hereafter, the book simulated rate) is only an approximation of the theoretical, "true" tax variable that managers use in their actual decisions, it appears to be a reasonable proxy because it loads as expected in many economic settings (see Graham, 2003, for a summary of findings). In addition, the simulated book MTR performs well in experiments that compare it to benchmark tax rates that are believed to capture important elements of the "true" tax variable.

In one such experiment, Graham (1996b) compares financial statement tax variables to a benchmark MTR that models dynamic features of the tax code and is based on "perfect foresight" future book income. He finds that the simulated book MTR is most highly correlated with the perfect foresight benchmark. In a second experiment, Plesko (2003) tests how closely book MTRs approximate a benchmark MTR that is based on tax return data. Plesko (2003) examines a small sample of homogeneous, single-entity firms, chosen to eliminate firms for which the reporting entity is likely to vary between financial and tax reporting. He uses 1992 data to form a static tax return tax rate benchmark against which to compare a collection of financial statement MTRs. Plesko (2003) finds that Graham's (1996a) simulated book MTRs are the closest approximation to his benchmark static tax return MTR.

While the book-simulated MTR performs well in these two experiments, there are still unanswered questions. In particular, how closely does the book-simulated rate approximate a tax return benchmark that incorporates dynamic features of the tax code? Also, do the results validating the book-simulated rate hold for large, complex corporations for which tax and book consolidated entities differ? The answers to these questions are important because they relate to issues often studied by researchers and to companies that are responsible for much of the world's economic activity.

Our paper fills this void by comparing, for a sample of large, complex firms, a collection of financial statement tax rates to a dynamic tax return MTR benchmark. In particular, we use a panel of confidential U.S. tax return data from 1992 to 2000 to simulate corporate income MTRs for the years 1998–2000. We compare these benchmark tax rates to a collection of financial statement MTRs to determine which is most highly correlated. As an alternative, we also benchmark against a simple static tax return MTR that is based on realized future taxable income.

We find that, among the candidate financial statement tax variables, the book simulated MTR is most highly correlated with the dynamic tax return benchmark, further validating the book simulated MTR. The book-simulated rate also performs well when benchmarked against the static tax return variables that are based on realized future taxable income. We also identify the "second best" book variables, in this case, categorical variables that combine information about NOLs and the sign of pretax income; however, as detailed below, the amount of correlation lost by relying on second best, and even which variable is second best, varies by setting and benchmark.[2] Taking all this evidence together, we conclude that researchers should use the simulated rate when it is available. For situations where the simulated rate is not available, we report algorithms that researchers can use to estimate the simulated book MTR. We also provide an algorithm to estimate the simulated tax return MTR for settings where tax returns provide the ideal data to measure corporate tax incentives.

[2]For example, the superiority of the simulated rate is greater when comparing MTRs based on pre-interest income than it is for MTRs based on post-interest income.