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# The economic effects of financial derivatives on corporate tax avoidance<sup>☆</sup>



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## ABSTRACT

This study estimates the corporate tax savings from financial derivatives. I document a 3.6 and 4.4 percentage point reduction in three-year current and cash effective tax rates (ETRs), respectively, after a firm initiates a derivatives program. The decline in cash ETR equates to \$10.69 million in tax savings for the average firm and \$4.0 billion for the entire sample of 375 new derivatives users. Of these amounts, \$8.75 million and \$3.3 billion, respectively, are incremental to tax savings that theory suggests are a byproduct of risk management. Collectively, these findings provide economic insight into the prevalence of derivatives-based tax avoidance.

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## 1. Introduction

Financial derivatives are a leading source of corporate tax noncompliance (Organisation for Economic Co-Operation [OECD], 2011; U.S. Government Accountability Office [GAO], 2011). Experts claim the legal patchwork of derivatives taxation encourages the development of tax planning strategies (Raskolnikov, 2011), while the Internal Revenue Service (IRS) concedes it is “falling farther and farther behind” financial innovation (Raghavan, 2007). Although it is clear from government reports (U.S. Treasury, 1999; GAO, 2011; U.S. Congress Joint Committee on Taxation [JCT], 2011), anecdotes (Warner, 2008), and academic studies (McDonald, 2004; Warren, 2004) that companies *can* avoid tax with derivatives, no

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study directly examines the economic tax effects of these financial instruments (Shevlin, 1999, 2007). I fill this void by answering the question: How economically significant are the corporate tax savings from derivatives?<sup>1</sup>

Nearly two-thirds of non-financial firms in the U.S. participate in the \$710 trillion derivatives market (Bank for International Settlements, 2013). In general, derivatives help firms manage risks relating to interest rates, foreign currency exchange rates, and commodity prices. However, as a notoriously complex and ambiguous area of tax law, derivatives also promote tax avoidance. Many groups, including academics (Schizer, 2000; Warren, 2004), lawmakers (Baucus, 2011; Hatch, 2011), and regulators (GAO, 2011, 2012; JCT, 2011; OECD, 2011), characterize derivatives as a significant threat to global tax revenue.

Derivatives facilitate two types of tax avoidance. The first type is a benign byproduct of risk management as theory suggests that hedging (reducing) risk can lower taxes by reducing the volatility of taxable income when firm-level tax functions are convex (Smith and Stulz, 1985). The second type results from both the general and aggressive means in which firms navigate the extensive ambiguity in derivatives taxation (e.g., Schizer, 2000, 2004). In particular, the tax code takes a categorical approach to derivatives taxation by prescribing rules for only a few types of instruments. However, because derivatives can replicate the economic profile of virtually any underlying asset and also create innovative economic profiles, these sophisticated instruments do not fit neatly into a categorical tax system. Instead, similar (and even identical) economic positions are taxed differently depending on a versatile transactional form. A firm with a specific economic objective can therefore choose a transactional form that offers an optimal tax outcome in terms of the timing, character, and source of related gains/losses. Many of these choices are perfectly legal, while others aggressively push the envelope of tax law (GAO, 2011; JCT, 2011).

There are no overall tax savings estimates for derivatives; however, prior research provides an important first step by evaluating the tax byproducts of risk management. In particular, Graham and Smith (1999) use a simulation to estimate the tax savings that result from any type of reduction in taxable income volatility, while Graham and Rogers (2002) gauge the debt-related tax benefits of lower average volatility. I extend this research by directly estimating the tax savings attributable to derivatives, both overall and incremental to reductions in volatility. These estimates are important because, while lawmakers are calling for a complete reform of derivatives taxation (Baucus, 2011; Hatch, 2011), “our knowledge of [tax] revenue losses from [derivatives] is largely anecdotal, wholly unsystematic, and woefully incomplete” (Raskolnikov, 2011, 1). Moreover, not all firms that use derivatives necessarily engage in derivatives-based tax avoidance. Surveys indicate that risk management is a primary objective among derivatives users (Bodnar et al., 2003), and other forms of tax avoidance likely produce comparable tax savings with far less complexity and scrutiny from tax authorities (JCT, 2011). Thus, whether the tax savings of derivatives are economically significant is an open empirical question.

I use both levels and difference-in-differences designs to investigate the economic tax effects of derivatives. The levels design examines whether firms that use derivatives on an ongoing basis indeed avoid more tax than firms that do not use derivatives. The difference-in-differences design examines the tax effects of derivatives *initiation* and provides a focused setting in which to estimate the tax savings of derivatives. I measure tax avoidance with three different forward-looking effective tax rates (ETRs) estimated over a three-year horizon ( $t$  to  $t+2$ ), where lower ETRs imply higher levels of tax avoidance. Corroborating evidence across both designs allows for stronger inferences about the link between derivatives and tax avoidance.

The levels analysis reveals that, on average, derivatives users avoid more tax than non-users. Specifically, after controlling for endogeneity and factors that explain corporate tax avoidance, I find that derivatives users have three-year current and cash ETRs that are 0.9 percentage points lower than those of non-users. These amounts are economically significant and indicate that current and cash ETRs for derivatives users are nearly 3.3 percent smaller than those of non-users. However, I find no difference in book ETRs (i.e., total tax expense reported under ASC 740, *Income Taxes*) among derivatives users and non-users, suggesting that the tax savings of derivatives largely result from tax-timing opportunities.

The difference-in-differences analysis reveals economically significant tax savings for firms that *begin* using derivatives in the sample period. Relative to a propensity score matched control sample of non-users, I find that new derivatives users realize a 3.6 and 4.4 percentage point reduction in three-year current and cash ETRs, respectively, after derivatives initiation. The decline in cash ETR equates to \$10.69 million in cash tax savings over a three-year period for the average firm and roughly \$4.0 billion in savings for the entire sample of 375 new derivatives users. These effects are not entirely a byproduct of hedging risk as new derivatives users *without* a convex tax function or a reduction in taxable income volatility after initiation realize more tax savings than new derivatives users with these features. Specifically, the incremental decline in cash ETR equates to an average savings of \$8.75 million for each new user and \$3.3 billion in aggregate. Overall, these estimates are comparable to those for other sophisticated tax planning strategies, including some tax shelters (Wilson, 2009; Brown, 2011).

Finally, I mitigate alternative explanations by documenting that the economic tax effects of derivatives are not driven by (1) reductions in earnings or cash flow volatility; (2) changes in risk management incentives at the time of derivatives initiation; (3) effective management of risk exposures; or (4) economies of scale. Instead, I find that the tax savings of

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<sup>1</sup> I define corporate tax avoidance as the reduction of explicit taxes (Hanlon and Heitzman, 2010). Tax avoidance does not necessarily imply that firms are engaging in improper behavior as managing tax costs is an appropriate component of a firm's long-term strategy (Atwood et al., 2012). Section 2 describes derivatives-based tax avoidance.

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