



# Tax reforms and stock return volatility: The case of Japan<sup>☆</sup>



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## ABSTRACT

Although global financial turmoil in recent years has resulted in renewed interest in taxing financial markets, the existing evidence is inconclusive regarding the effect of stock transaction taxes (STT) on stock return volatility. In this respect, Japan provides an excellent opportunity to address the issue, as the country enacted major tax reforms during the long recession beginning in the early 1990s, not only abolishing STT in 1999, but also reducing the capital gains and dividend taxes in 2003. The present paper exploits these tax reform episodes and examines whether and how they affected stock return volatility. In so doing, it employs GARCH-type models using standard daily stock data, as well as HAR models based on realized volatility constructed from high-frequency, intraday data. The estimation results are consistent with the views that, in line with some earlier findings, the STT abolition in 1999 reduced volatility, and that the tax reforms in 2003 also reduced volatility through a cut in the dividend tax, but not in the capital gains tax.

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## 1. Introduction

Global financial turmoil in recent years has resulted in renewed interest in taxing financial markets. As world leaders gathered in summit meetings in Pittsburgh in 2008 to discuss how to prevent the recurrence of such turmoil, some openly talked about the Tobin tax.<sup>1</sup> In response to growing interest within G20 meetings, in 2010 the IMF published a report recommending a few new taxes for policy consideration.<sup>2</sup> A number of academics echoed these developments, by advocating the introduction of a transaction tax in the securities market.<sup>3</sup> The movement has seen further advancement in actual policy-making more recently in Europe: in response to a request from 11 Member States, the European Commission introduced a proposal implementing a broad-based financial transaction tax in their jurisdictions, for the European Council's approval, on

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<sup>1</sup> They include Angela Merkel, Nicolas Sarkozy and Gordon Brown.

<sup>2</sup> *Global Financial Stability Report: Meeting New Challenges to Stability and Building a Safer System*.

<sup>3</sup> For instance, many economists from all over the United States co-signed "An Open Letter from Economists in Support of Financial Transaction Taxes", in December 2009, which was made public through the Center for Economic Policy Research.

February 14, 2013.<sup>4</sup> Some countries have also considered other types of taxes, such as bank levies and financial activity taxes proposed within the IMF report.<sup>5</sup>

Interest among policymakers and academics in the relationship between taxes on stock trading, a stock transaction tax (STT) in particular, and market stability is by no means new. In the aftermath of the Black Monday market plunge in 1987, a debate occurred in the United States on whether the country should re-introduce a STT, which had been abolished many years prior. Those supporting the idea claimed that the tax would increase the cost of transaction, keep out noise traders, and stabilize the market (Stiglitz, 1989; Summers & Summers, 1989). Those opposing the tax, on the other hand, argued that a higher transaction cost would adversely affect rational traders more than noise traders and, therefore, that the tax would destabilize, rather than stabilize, the market (Hakkio, 1994). Similar debates occurred in other countries, such as France, Germany, and Sweden, but eventually faded out as these countries abolished their transaction taxes anyway, seeking an international competitive edge for their stock markets.

It is only natural that these policy debates have initiated academic discourse and prompted rigorous research.<sup>6</sup> Several studies have addressed the issue empirically to date. For example, Roll (1989) examined the issue with cross-country data from 23 countries and found that transaction taxes are inversely but insignificantly correlated with volatility. With data from Sweden, Umlauf (1993) found that volatility did not decline in response to the introduction of a transaction tax in 1984, but that the variance of daily returns did increase after the rate increase in 1986. Hu (1998) examined 14 tax changes in four Asian countries, and concluded that, on average, the tax has no effect on volatility. Lindgren (1994) used data from 14 countries for 11 years and concluded that a transaction tax of above 0.5% increases volatility, while one with a lower rate has no effect. Using Chinese data, Baltagi, Li, and Li (2006) conclude that the market's volatility significantly increased after an increase in the tax rate in 1997, while Su and Zhen (2011) found that both increase and reduction in the STT rate resulted in significant increase in market volatility over the period from 1991 to 2008. Wang and Dong (2012) focused on more recent STT changes in China; using various methodologies including comparisons of stocks dually listed in mainland China (A-shares) and Hong Kong (H-shares) on the dates of events, they draw mixed results for the effect of STT changes on volatility.

While these studies are all based on the concept of historical volatility, a few advances have been made in analyzing stock return volatility in the finance literature. First, a generalized auto-regressive conditional heteroskedasticity (GARCH) models and its variants have been proposed and widely used to analyze return volatility. However, only a few studies have explored the issue of taxes in these frameworks. Saporta and Kan (1997) examined the UK stamp duty in a standard GARCH model and found no significant effect on volatility. Phylaktis and Arisidou (2007) examined the Athens stock market and found that the STT increased volatility during bull periods, but had no effect during bear periods. Another line of advancement is the use of high-frequency, intraday data paired with the concept of realized volatility. To the best of the authors' knowledge, no study has been conducted to date along this line, to address the issue of taxes and return volatility. All in all, the academic evidence has failed to exhibit a clear-cut picture as regards the effect on volatility of a transaction tax, although there seems to be more evidence that a STT would increase, rather than decrease, volatility.

Compared with empirical studies, rigorous theoretical investigation is scarce. An important exception is Song and Zhang (2005), who model utility-maximizing behaviors of two types of traders, rational and noise traders. Interestingly enough, they show that, depending on the degree of noise traders' participation and the existing level of volatility in the market, the transaction tax can either reduce or increase stock market volatility. If proven to be correct, their work may offer a reason why findings of empirical studies with respect to STT are not uniform. In addition, because their framework can extend to incorporate other types of taxes, the paper allows for investigations of the effects of those taxes.

In this respect, Japan provides an excellent opportunity. As is well known, starting in 1990 the country experienced a severe recession that extended for over a decade. As the most important cause was generally believed to be an inefficient financial sector, the country enacted a series of reforms in quest of a more competitive financial sector and to revitalize its ailing stock market. Tax reform was a main pillar of the reform. In April 1999, the 40-year-old STT was abolished, in the hope that a reduction of transaction costs would maintain the Tokyo market's standing as a world financial center. Further, in 2003, to attract more individual traders, the country implemented a tax reform known as the *New Securities Tax System*; it streamlined the complicated systems of its capital gains tax and of the dividend income tax, and reduced the statutory rates of these taxes.

In view of these developments, this paper exploits the tax reform episodes in Japan with GARCH-type models, in order to re-address whether and how the tax reforms affected return volatility. Our investigation then continues with the concept of realized volatility constructed from high-frequency, intraday data of stock returns, employing the Heterogeneous Interval Autoregressive (HAR) model as the standard model to utilize such data. The investigation contributes to the literature by adding one more clinical data point and thereby shedding new light on the issue.

The paper is organized as follows. The next section explains the institutional details of the Japanese tax reforms in question. The third and fourth sections explain the methodology and data and report the estimation results for GARCH-type

<sup>4</sup> COM/2013/71. See the European Commission's website for details.

<sup>5</sup> Examples include the UK, France, and Germany.

<sup>6</sup> Beside the following studies on volatility, there are a number on transaction volume, including Epps (1976), Jackson and Donnell (1985), Lindgren and Westlund (1990), and Ono and Hayashida (2009, 2011) which are unanimous that the tax reduces transaction volume.

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