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A Tobin tax only on sellers

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ABSTRACT

A market trading model shows that a Tobin tax affects the portfolio weight of the risky asset and thus the portfolio risk. As risk changes, the demand under a Tobin tax becomes more elastic for buyers and sellers but more inelastic for short sellers. Imposing a Tobin tax lowers market volatility for trading that does not involve a short seller. In addition, it is shown that imposing the tax solely on the seller, in comparison with splitting the tax equally between the buyer and the seller, further reduces market volatility. Simulation results confirm these predictions of the model.

1. Introduction

A financial transaction tax (FTT) is also known as a Tobin tax after James Tobin who in the early 1970s proposed taxing foreign exchange transactions as a means to reduce foreign exchange rate volatility. On September 28, 2011, the European Union (EU) announced that it would tax financial transactions starting in 2014. Besides the desire to curb market volatility, there is also a need to raise funds for past and future bailouts of big businesses (Pollin et al., 2003). The current EU proposal splits the tax equally between the buyer and the seller.[1]

This value-based FTT is the focus of the paper. This paper follows the approach of computational economics and develops a market trading model to analyze whether imposing a Tobin tax solely on sellers, rather than splitting it evenly between the buyer and the seller, will further dampen market volatility. Different from the equilibrium approach used for a welfare analysis of traders, the market trading model allows traders with different parameters in price forecasting ability and risk aversion engage each other in the marketplace, from which price volatility is analyzed. The market trading model includes three types of traders, i.e., a buyer, a seller, and a short seller. These traders engage each other in two market micro-structures: a call auction market and a continuous auction. Exchanges use a call auction for both opening session and closing session and a continuous auction for regular trading session.

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[1] The proposed tax charges a flat rate of 0.1% on the value for stocks and bonds and 0.01% for derivatives, http://europa.eu/rapid/pressReleasesAction.do?reference=IP/12/300.

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The rest of the paper is organized as follows. Section 2 presents the theoretical model and derives the demand functions. Section 3 discusses whether to impose a Tobin tax on both buyers and sellers or to the tax solely on sellers. Section 4 provides a discussion and concludes.

2. The model

The model assumes two assets in the economy: a risk-free asset with a constant tax-free return r.[2] The second asset is the risky asset. At $T = 0$, investors make portfolio decisions for the purpose of liquidating their positions for consumption at the end of time 1 by trading among themselves or with another generation of investors. Based on their price forecasts, traders take the optimal positions (Q^0) in the risky asset at $T = 0$ to maximize the following utility function.

$$\max_{Q^0} U_i = E(\tilde{W}_i^1) - \frac{1}{2} A_j \sigma^2_{\tilde{W}_i^1} \tag{1}$$

where U_i is the utility function for trader i. $E(\tilde{W}_i^1)$ is a trader's expected wealth level. Risk-aversion measure A_j is positive. $\sigma^2_{\tilde{W}_i^1}$ is the variance of the wealth. As a standard economic model, this framework is widely used in De Long et al. (1990); Kupiec (1996) and Song and Zhang (2005), who reached conflicting conclusions on the effect of a Tobin tax on market volatility. A similar model is also used by Jeanne and Rose (2002); Damette (2009), and Shi and Xu (2009) to examine the effects of a transaction tax on foreign exchange rate volatility.

In a secondary market, there are three types of investors with different initial positions in the risky asset and subsequent trading direction. The first type is a buyer (b), buying either to increase a position in the risk asset, e.g., initial public offering (IPO) shares. The second type is a seller (s) who is selling some of the holdings. The third type is someone taking a short position, a short seller (ss).

A trader can migrate from one group to another after some proper trades with corresponding changes in price forecasts. In their noise trader models, Jeanne and Rose (2002); Damette (2009), and Shi and Xu (2009) allow the number of noise traders to be endogenously determined based on the rate volatility and entry costs. Albeit very useful, endogenizing the number of each group and the migration of traders from one group to another adds little value in this model other than complicating model tractability. As a result, trading motivations are treated as exogenous in the model. For simplicity, transaction costs such as commissions and margin costs for shorting the risky asset are ignored. Each group is assumed to have many traders who have different forecasts on the expected risky asset returns. Again, for model tractability, as in De Long et al. (1990); Jeanne and Rose (2002), and Damette (2009), traders in the same group share the same parameters. Let $\tilde{P}_i^t$ be trader i's forecast of the returns of the risky asset. These forecasts are assumed to have the following moments.

$$E(\tilde{P}^t_{i,j}) = \bar{P}_i,\ j \in (b, s, ss) \tag{2a}$$

$$Var(\tilde{P}_{i,j}) = \sigma_j^2 \tag{2b}$$

$$Cov(\tilde{P}_i^t, \tilde{P}_j^t) = 0, i\&j \in (b, s, ss) \tag{2c}$$

where *Var* is the variance and *Cov* is the covariance. In essence, the assumption in Eq. (2c) reflects the weak-form efficient market hypothesis of Eugene Fama.

2.1. Demand functions under a Tobin tax

Let I_i^0 be a trader i's initial cash balance and Q_i^0 be the number of shares of the risky asset invested. P_i^0 is the transaction price for the risky asset. Let the tax rate of τ be divided into τ_b for the buyer and τ_s for the seller such that $\tau_b + \tau_s = \tau$. With the initial holdings of the risky asset of S_i^0, the wealth level under a value-based Tobin tax at $T = 1$ for the ith buyer is $\tilde{W}_i = \left[I^0_{b,i} - P^0_{b,i} Q^0_{b,i}(1+\tau_b)\right](1+r) + \tilde{P}_{b,i}(S^0_{b,i} + Q^0_{b,i})(1-\tau_s)$. Thus, the utility functions for the three types of traders are the following (with subscript i suppressed).

$$E(U_b) = \left[I_b^0 - P_b^0 Q_b^0(1+\tau_b)\right](1+r) + \bar{P}_b^1 (S_b^0 + Q_b^0)(1-\tau_s) - \frac{1}{2} A_b \sigma_b^2 [(S_b^0 + Q_b^0)(1-\tau_s)]^2 \tag{3a}$$

$$E(U_s) = \left[I_s^0 + P_s^0 Q_s^0(1-\tau_s)\right](1+r) + \bar{P}_s^1 (S_s^0 - Q_s^0)(1-\tau_s)] - \frac{1}{2} A_s \sigma_s^2 [(S_s^0 - Q_s^0)(1-\tau_s)]^2 \tag{3b}$$

[2] Under the current EU proposal, refinancing transactions by financial institutions with the European Central Bank is exempted from the FTT. However, interest incomes from investing in the government bonds are not exempted. So long the risk-free rate is constant and not correlated with the risky asset returns, taxing the interest from the risk-free asset will not change the results in the paper. I thank an anonymous reviewer for highlighting this legislative detail.

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