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Securities Transaction Taxes for U.S. Financial Markets

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1. Introduction

What are the most effective means of regulating volatile financial markets? Such a question may have appeared quaintly old-fashioned after the repeal in 1999 of the Glass-Steagall regulatory system in the United States and the corresponding dismantling of financial market regulations throughout the world. But, like a hardy perennial, the question has quickly returned, as one consequence of the deflating stock market bubble in the United States. Similar questions were also posed in the aftermath of the 1998 Asian financial crisis, which prompted widespread discussions on the need for a "new financial architecture." Many proposals were made after the Asian crisis. But they varied widely as to what form this new structure should take. Meanwhile, as this debate proceeded, the process of deregulation continued to advance.

This paper is an attempt to examine with some specificity the viability of security transaction excise taxes (STETs) as one significant component of a new financial architecture. The focus of the paper is on designing a STET as it would apply to the contemporary U.S. financial markets. But we also examine principles for designing a STET that will have general applications beyond any specific country setting.

STETs have been utilized extensively throughout the world both as a means of discouraging short-term speculative trading on financial markets and as a significant source of government revenue. Such a tax was proposed for the United States by then House of Representatives speaker Jim Wright after the 1987 stock market crash, and variations on this idea have been introduced fairly regularly in Congress in subsequent years, without ever having been passed into law.

The basic idea of a STET is simple. Imposing a small tax on a security transaction--for example a 0.5 percent tax on equity trades--would create a negligible burden on asset owners who intend to hold their asset for the long-term. However, if asset owners purchase equity with the intention of selling it at a profit in the short-term, the 0.5 percent tax would be imposed on each trade, and would thus constitute a significant burden. As James Tobin has put it, a STET "would

automatically penalize short-horizon round trips, while negligibly affecting the incentives for …

longer-term capital investments, " (1996, p. xi).

The so-called Tobin Tax--a STET that applies to foreign currency markets only--has

received increasing attention in recent years (e.g. ul Haq, Kaul, and Grunberg 1996), as the details

on the design of that idea have developed beyond Prof. Tobin's initial fundamental contribution

(1978). Beyond these discussions, however, little mention was made of STETs generally in the

wake of the multiple crises of 1998, perhaps in part because over the previous decade most

governments that had such taxes in place have either repealed them or sharply limited their scope.

Japan, for example, has completely abolished its STETs as of April 1999. As recently as 1989,

the STET generated more than four percent of the country's total government revenue (Japanese

Securities Research 1992, p. 244), but the government has been reducing the tax in stages through

the 1990s amid the country's long-term financial crisis.

But the case against STETs has not only been made in the political arena. In academic

research as well, multiple arguments have been raised against STETs over the past decade: they

are difficult design in ways that avoid severe distortions; they damage the competitive position of

domestic financial markets in countries that have STETs relative to countries that do not; they

raise the cost of capital and thereby discourage investment; and, finally, they are unlikely to either

significantly dampen market volatility or raise significant tax revenue.

General arguments in behalf of STETs have been made before, initially by Keynes in the

General Theory (1936), and recently by, among others, Summers and Summers (1989) and

Stiglitz (1989). The aim of this paper is not primarily to restate or amplify these general

positions. It is rather to explicitly address the critiques of STETs that have emerged in recent

years. In particular, for the U.S. financial market, we show how to design a STET in ways that

avoid the distortions noted by critics with respect to various STETs around the world.   Once

design problems are solved, we are then able to show that, for the U.S. case, the revenue

potential of a STET is formidable--on the order of $70 - 100 billion a year, or about five percent

of total federal government outlays--even if one allows for declines in trading volume up to an implausible 50 percent of existing levels. Of course, assuming the STET is designed well, such substantial increases in government revenue will be accompanied by a decline in short-term speculative trading, and thus an increase in the government's ability to handle macroeconomic problems resulting from unstable financial markets.

The paper is organized as follows. In Section 2, we present some basic arguments as to why financial markets will operate with greater stability when STETs are part of the policy mix contributing to financial stabilization. In reaching this conclusion, we consider the various factors affecting market volatility, and recognize the possibility that a STET could create ambiguous effects under some situations. We also point out that, even if a STET fails to reduce financial market instability, it will nevertheless generate a large amount of tax revenue through taxing unproductive activity.

In Section 3, we look at the general level of STETs, as they have been applied throughout the world. We also present evidence on the extent to which STETs are being reduced or repealed in most places in the world. We also report on the small STET that does now operate in the U.S., for the purposes of financing the Security and Exchange Commission.

Section 4 considers the major arguments against the STET that we raised above: that STETs are ineffective at reducing volatility; that they will raise the cost of capital and thereby discourage private fixed investment; and that they will create serious distortions between taxed and untaxed market segments.

Recognizing these potential problems, in Section 5 we show how the STET can be designed to minimize market distortions. Three main principles are elucidated: that coverage of the tax be as broad as possible, spanning all domestic market segments and foreign as well as domestic traders; that the tax rate be equivalent, based on the market value of assets being traded; and that the tax should also reflect existing differences in transaction costs in various markets.

From here, we can move, in Section 6, to estimating orders of magnitude for revenue estimates. As we will see, the revenue figures are quite large, on the order of $100 billion, even after allowing for implausibly large declines in both trading values and volumes. Section 7 offer some brief concluding comments.

2) Why A STET?

Investors in capitalist economies are faced with the unavoidable problem of uncertainty: forecasts and projections aside, "we simply do not know", as Keynes put it, how profitable a prospective investment project will be. The problem is compounded by the fact that current investment decisions will themselves influence future outcomes because they will affect the level of aggregate activity. A primary purpose of financial markets is to ameliorate problems due to uncertainty through increasing the liquidity of investments. When financial instruments are freely traded in relatively thick markets, illiquid investments in plant and equipment can be transformed into claims that are convertible into cash or other liquid assets as quickly as the institutional and technological structures permit.

Thick financial markets thus provide a social good because they enable people to purchase income-yielding assets as savings vehicles, without the purchaser having to make long-term commitments to holding these assets. However, according to the so-called "efficient market" theory of financial markets, the benefits of thick financial markets extend well beyond this basic contribution,. According the efficient market approach, thick financial markets correctly evaluate firms according to their "fundamentals"—i.e. their potential profitability. Thus, a thick financial market is engaged in crucial information processing and price discovery activities. The profit potential of firms becomes widely disseminated as a result. Moreover, the fact that information on fundamentals is widely disseminated forces firms to operate more efficiently. It becomes more difficult for firms to hide their deficiencies, and these deficiencies are widely recognized and punished by market participants. Correspondingly, financial market traders are rewarded for trading firms at prices that reflect fundamentals, and are punished for

trading at prices that misread fundamentals. Over time, in other words, good traders drive out bad traders. It follows from this perspective that any significant interference with the market, such as a STET, will be harmful.[1]

As a first principle, then, the case for a STET must flow out of a critique of the efficient markets perspective. Critics of course still recognize the social benefits of being able to easily trade in markets for existing assets.   At the same time, enhancing the liquidity of assets also creates problems for the functioning of the economy. Fundamentally, these problems flow from the fact that highly liquid financial markets promote speculative trading practices that distort pricing, resource allocation and investment, creating imbalances between financial and real activity, and thereby contributing to macroeconomic instability.

Keynes presented the most influential critique of speculative financial market practices in Chapter 12 of the General Theory. Moreover, Keynes briefly proposes in this same discussion a securities transaction tax for the U.S. economy "with a view to mitigating the predominance of speculation over enterprise," (p. 160).

But the critical literature has developed widely since Keynes. One important strand of work has been that of Robert Schiller (e.g. 1989, 2000), who emphasizes the role of investor psychology, independent of individual firm fundamentals, as a major determinant of stock market prices. As Schiller writes, stock prices "change in substantial measure because the investing public en masse capriciously changes its mind, (1989, p. 1)." Shiller's most recent book, Irrational Exuberance (2000) examines in detail the social and psychological "anchors" that determine stock market prices beyond what might be explained by fundamentals. Moreover, because these anchors are fragile by their nature, they are liable to unexpected and sometimes rapid reversals. In Schiller's view, this explains the fact that the stock market fluctuates to a degree well beyond what can be explained by fundamentsls.

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[1] Overviews of this efficient market framework are presented in Hubbard (1996) passim, Raines and Leathers (2000), Ch. 3, Shleifer (2000) Ch. 1, and Evans (2001) Chs 2-3.

Related to Schiller's critique are arguments about the centrality of asymmetric information in financial markets, and specifically the influence exerted by ill-informed "noise traders." For example, in Shleifer's (2000) presentation of the "behavioral finance" perspective, he models financial markets as containing contain two kinds of traders, fundamental traders and noise traders. But noise traders are not competed out of the market by the fundamental traders in this perspective. This is because arbitrage is risky, costly, and therefore limited. For example, when stock prices are inflated relative to fundamentals, arbitraurs who choose to sell short face potential losses from prices moving still higher under the influence of noise traders—that is, their short-selling will not necessarily drive prices down to fundamentals. Thus, the actions of noise traders are not merely ephemeral to market activity, but rather exert a sustained influence on price formation.

This perspective is developed further, and specifically in considering the case for a STET, in Subrahamanyam's (1998) recent modeling exercise. Subrahamanyam argues that

> Excessive rent seeking occurs in financial markets. That is, agents spend too many resources trying to acquire information just hours or days before other agents: this expenditure is a deadweight loss to society since it is unlikely that managers can benefit from information being incorporated into prices earlier by a matter of hours or a few days. A reasonable policy goal can thus be to reduce the efforts invested by agents in acquiring information just hours or days before others.

But a deeper point about Keynesian uncertainly also emerges from this perspective. If markets are persistently and unpredictably moved away from fundamentals by noise traders, it no longer becomes logical for even well-informed traders and professionals to try to trade on the basis of fundamental information. It rather follows that professional traders should proceed as Keynes argued, to trade by trying to outguess market sentiment, moving ahead of the herd by "anticipating what average opinion thinks average opinion to be," (1936, p. 156). As one important measure of this, Evans (2001) shows that the 1990s U.S. stock market bubble was significantly influenced by the large growth in mutual fund trading activity. Evans' econometric

findings show that the impact of these professional traders influenced equity prices to a statistically significant extent, independently of the behavior of firms' fundamentals, measured according to standard specifications.

Overall then, according to these critical perspectives, thick but unregulated financial markets operate inefficiently and irrationally. But this, in itself, doesn't mean such activities necessarily inflict serious damage on broader economic performance. Are there broader harmful effects?

One broader effect of excessively speculative financia l markets is that they tend to encourage short-term thinking among both investors and managers. The highly liquid financial markets enable investors to sell assets at low transaction costs whenever they are dissatisfied with a firm's performance, in response, for example, to a firm's unsatisfactory quarterly return. This creates persistent pressure for short-term success, to which managers in turn respond by gearing their investment projects and ongoing operations to satisfying the short-term horizons of financial market investors. As a result, highly speculative financial markets tend to discount projects which require long-term nurturing before generating profitable returns. Thus, for example, in surveying U.S. corporate managers in the early 1990s, Poterba and Summers (1995) found that U.S. managers believed that U.S. equity markets undervalue long-term investments, and that they therefore are forced to operate with shorter time horizons than they deemed appropriate. Were the firms valued more in accordance with the perceptions of managers, they believe that their long-term investments would increase, on average, by perhaps as much as 20 percent.

The more dramatic negative effect of speculative financial markets results, of course, when herd-like activities lead to market sell-offs, which in turn engender interactive asset deflations and financial crises. The destructive effects of financial crises are not hard to find: the 1997-98 Asian crisis, the 1995 Mexican crisis, and the U.S. Savings and Loan crisis of the

early 1990s are only some recent dramatic examples. [2]   Note here that markets for fixed-income

securities are just as susceptible as equity markets to the allure of the herd and that the social

costs of speculative finance are equivalent regardless of whether they originate in stock, bond or

derivative markets.

Finally, excessively liquid financial markets weaken the standard tools of

macroeconomic stabilization and expansion, and that a STET can therefore strengthen these same

tools. As Minsky (1986) argued, standard fiscal and monetary policy tools cannot bring the

economy to a full employment equilibrium when financial markets are highly speculative.

Depending on the specific circumstances, including those in the nonfinancial economy, full

employment will rather promote either euphoric expectations among those investors who would

benefit from a boom; or unfavorable expectations among investors whose fixed-income securities

would lose value in an inflationary environment.   As a result, policymakers then must respond to

the expectations of these investors rather than the underlying conditions of the nonfinancial

economy.

How effective would a STET be in discouraging these types of harmful effects of volatile

financial markets? We consider the question in some detail below in surveying the critics'

arguments against STETs. However, even before addressing the critics, it is crucial to recognize

that the STET can have only a limited impact in controlling financial volatility. This is because,

over the course of a business cycle, volatility is affected by three partially independent influences:

the underlying behavior of the nonfinancial economy; the herd behavior of financial market

participants; and the attempt to dig out of financial crises once they have already occurred. [3] The

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[2] As of this writing, it is still too soon to assess the broader ramifications of the collapse of the U.S. stock
market bubble in 2000. But the imbalances created by this bubble have been well-documented by Baker
(2000a, 2000b), Godley (2000), Godley and Izurieta (2001), among others. Kindleberger (1978) , discusses
the problem of financial instability over a 250-year history of Western capitalism between 1720-1975,
developing his analytic framework from Hyman Minsky's Keynesian theory of endogenous financial
fragility.

[3] One can readily extract these three sources of volatility over a business cycle via the Minsky analysis of
systemic financial instability (see Minsky 1986, Dymski and Pollin 1994). Madhaven, Richardson, and

first two sources of volatility should be moderated through a decline in the liquidity of financial

markets, and thus by a STET. However, the third source of volatility would be exacerbated by a

decline in market liquidity. This is because more liquidity in the short-term is precisely what

financial market participants need to prevent an interactive debt deflation. Thus, in the midst of a

crisis situation, the policy intervention needed is lender-of-last-resort intervention, not a STET. It

is therefore not surprising, as we will see, that the critical empirical literature on STETs finds that

the impact of higher transaction costs on volatility is ambiguous.

At the same time, the ability of lender-of-last-resort interventions to neutralize

speculative financial herds is greater when the size of the herd is smaller. This is most evident in

the case of currency markets. As of 1979, daily trading on world currency markets was 6.8

percent of central banks' foreign currency reserves. By 2000, daily currency market trading had

exceeded central banks reserve holdings. As such, central banks have far less capacity to serve as

a market-maker to counteract speculative stampedes. Thus, when a currency market crisis breaks

out, the fact that a STET has reduced the market's liquidity may not directly reduce volatility.

But it will have contributed toward stabilizing the market if, over a longer time-framework, it has

reduced the size of the market and thus enabled the market-maker to exert greater influence

during a crisis.

The effectiveness of the STET needs to be evaluated within a still broader perspective.

We have been considering the STET within the framework introduced by Keynes, as an

instrument for mitigating "the predominance of speculation over enterprise." However, to the

extent that the STET fails to reduce speculative trading, it will, nonetheless, generate government

revenues—and do so through taxing unproductive activity. In Section 6, we show that this

revenue source is potentially quite large, i.e. on the order of $70 - 100 billion per year. Further,

because financial market trading is heavily dominated by the relatively wealthy, the tax will be

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Roomans (1997) conduct a distinct exercise in seeking to decompose and measure the sources of equity
price volatility over the course of a trading day.

highly progressive in its incidence. In short, assuming the tax can be well-designed to minimize distortions, the STET offers a classic "win-win" opportunity: it will either succeed through reducing excessive financial speculation; or it will fail to reduce such activity, but consequently still be successful through generating a large amount of government revenue that can be applied to productive public purposes. A well-designed STET, moreover, also offers a middle ground between these alternatives: the tax rate could be adjusted up or down according to whether the primary concern of policy was to reduce excessive financial speculation or to increase government revenue. More generally, the STET would provide government policymakers with an important additional policy instrument, both for reducing financial market instability and to raise revenues in a progressive way.

3. Patterns of STETs throughout the World

Security transaction taxes have been a common policy tool throughout the world. Table 1 shows the range of taxes of roughly the magnitude we are proposing that have operated in 38 countries in the recent past. As the table shows, most of the major financial markets in the world have operated with some version of a STET. These include Japan, the U.K., Germany, Italy and France. The table also shows that smaller OECD economies such as Australia, Austria, Belgium, Denmark, Greece and Ireland, and many emerging economies, such as Chile, China, India and Malayasia, have also operated with STETS. The STET has thus been viewed and utilized as a policy tool in a wide range of countries. But in recent years, the STETs have been reduced or eliminated in most of the countries listed. We have tried to provide a summary picture of the current status of this trend in Table 1. Though we have not fully surveyed the debates in each country around the issue, we feel safe in saying that a primary motivation for reducing or eliminating the tax has been the perception that the taxes are distortionary, and that, in particular, removing the tax will make the domestic financial market more competitive in attracting foreign financial flows.

[TABLE 1 BELONGS HERE]

The United States stands out among the advanced OECD economies for never having instituted a significant STET. Nevertheless, there have been smaller STETs in the United States at various times. There was a federal stock transfer tax in place from 1914 to 1966. From 1960 to 1966, stocks were taxed at the rate of 0.1 percent at issuance and 0.04 percent on transfer. Bonds were taxed at the rate of 0.11 percent at issuance and 0.05 percent at transfer. New York State also imposed a stock transfer tax. The tax rate varied depending on the value of the shares being traded; the average rate in 1968 was approximately 0.19 percent (Epps 1976, p. 177).

While these taxes have been eliminated, the federal government still imposes a small tax on both the registration of new equity issues and their transfer, with the the primary purpose of the funds raised being to finance the operations of the Securities and Exchange Commission. In 2000, the taxes were 1/36th of one percent (0.028 percent) of the value of a share registered and the transfer fee was 1/300th of one percent (0.0033 percent) of the value of a transferred share. Together, these taxes generated \$2.2 billion in revenue, nearly six times more than 2000 budget allocation for the SEC of \$370 million. Thus at present, most of the funds generated by the SEC registration and transfer taxes are already being allocated to the general Treasury fund.[4]

Of course, these tax rates are much smaller and more narrowly targeted than the STET we propose. Moreover, the rates on both taxes are scheduled to fall in 2007—the registration tax to 1/150th of one percent, and the transfer tax to 1/800th of one percent. Still, their existence is significant in demonstrating that, at least in part, the federal government already has the apparatus in place and the experience in administering such a tax.

4. Objections to STETs

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[4] Details on the SEC budget are available at www.sec.gov.

In the past decade, a large literature has developed arguing against the STET. This literature is far more detailed than merely offering a general opposition derived from an efficient market approach. These more specifically targeted critiques fall into three broad categories[5]:

1) The STET will be ineffective at reducing financial market volatility, and may even contribute to volatility, by reducing the degree of trading and liquidity in financial markets.

2) The STET will raise the cost of capital and make risk management more difficult for non-financial firms. As such it will have a negative effect on economic growth and living standards.

3) The STET will inevitably create serious distortions between the taxed and untaxed segments of the markets. As such, funds will migrate from the taxed to the untaxed markets, and market innovations will be created to circumvent the tax. The tax will both engender a layering of market distortions without even serving as an effective revenue-generator.

We will address each of these issues in turn. However, we will consider the first two points on investment and volatility only briefly. The last issue of the distortions created by STETs brings us to the paper's main concern, which is precisely how to design the tax in such a way that its distortionary effects are minimized.

Transaction Costs and Volatility in Single Markets

The STET aims to reduce volatility by increasing the costs of short-term speculative trading. At the same time, the impact of the STET on investors holding assets over a long term will be negligible. However, some critics argue that discouraging traders from the market will not actually reduce volatility but may rather worsen it, by reducing the number of market participants and thereby reducing market liquidity.

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[5] A representative sample of this research includes Gruenfest and Shoven (1991), Umlauf (1993), Hakkio (1994), Campbell and Froot (1994), Lerman (1996), Jones and Seguin (1997), Davidson (1998) and Habermeier and Kirilenko (2001). Many of these arguments are pulled together in Hammond (1997). This volume collects papers by Schwert and Seguin, Hubbard, Heaton and Ho, Campbell and Froot, and McConnell.

Among others, Jones and Seguin (1997) conducted an empirical study whose results supported this conclusion. Jones and Seguin create an "event study" from the May 1, 1975 policy change on Wall Street, whereby fixed commissions on the New York Stock Exchange and American Stock Exchange were abandoned in favor of negotiated commissions. In practice, this policy change led to a lowering of commissions on both exchanges. At the same time, no policy change took place concerning over-the-counter transactions. Using daily data for one year before and one year after the change in commission rules, Jones and Seguin examined daily volatility in five sample portfolios sorted by size. They concluded that the fall in transaction costs on the exchanges did not raise, but rather lowered volatility. For them, this finding suggests that a transaction tax that raises overall transaction costs will, correspondingly, increase volatility rather than reducing it.

In an earlier study, Roll (1989) performed a more direct test of the impact of transaction taxes--as well as price limits and official margin requirements--on market volatility. He examined the financial market behavior of 23 countries around the time of the 1987 Wall Street crash, comparing the experiences of the United States and three other countries that had no transaction tax with those in 19 countries that did have some tax. Overall, Roll found that the transaction taxes did dampen volatility, though probably to an insignificant extent.

In a third related study, Brorsen (1991) examined the impact on U.S. stock markets of increasing market frictions in futures markets through raising transaction costs, as well as increasing margins, limiting arbitrage or even banning futures trading. As with Roll, Brorsen's results tend to support the idea that raising transaction costs and creating other market frictions will reduce volatility, though his evidence is mixed. Specifically, he finds that measures to create a less liquid futures markets will reduce stock market volatility in the short-run, but that, over the longer term, such measures will have no sustained effect.

 Hau and Chevallier (2000) consider these issues for the French stock market, while Hu(1998) examines evidence for Hong Kong, Japan, Korea and Taiwan. These authors test the

relationship between transaction costs and market volatility through a range of empirical strategies. Nevertheless, they also reach ambiguous conclusions. For the Asian markets, Hu finds that, with a small firm portfolio, a higher transaction tax does reduce volatility from noise traders. But this result is not robust across all tests. With the French market, Hau and Chevallier test whether an increase in the tick size regime, which affects overall transaction costs in a manner similar to a STET, reduces volatility. They find that trading with wider tick-size bands does reduce volatility in the French market. However, they conclude that while these volatility reductions are statistically significant, they are nevertheless small in magnitude.

Overall, the various empirical studies provide no clear conclusions regarding the relationship between transaction costs and volatility.[6] Such ambiguity is consistent with the analytic point made above, that three separate factors influence volatility--the underlying performance of the nonfinancial economy; the possibilities for herd behavior to become dominant on financial markets; and the prospects for quelling a herd that has already begun. A STET, or more generally, any change in transaction costs, will have the most influence on the second factor, and, taken by itself, may have little influence on the other two. Working from such an analytic framework, it is not difficult to imagine how the results on volatility would be ambiguous.

Davidson (1998) has developed one interpretation of the Jones/Seguin clearcut result that changes in transaction taxes will do nothing to inhibit volatility, though Davidson does not consider at all the more ambiguous findings of the other researchers. Nevertheless, Davidson's discussion is especially interesting in that, unlike most other STET critics, he presents his case from an explicitly Keynesian framework. Davidson believes that STET proponents conflate a decline in volume with a decline in volatility. A STET will no doubt reduce trading volume. But such a volume decline, in Davidson's view, may well *increase* volatility. This is because, if we

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[6] The IMF working paper by Habermeier and Kirilenko (2000) acknowledges the ambiguity of these empirical findings

recognize, along with Keynes, that financial markets are fundamentally uncertain, then thicker markets will be more stable, provided that market participants hold a diversity of views on market conditions. When traders hold a diversity of views in thick markets, pessimists and optimists will counterbalance each other. In reducing the size of such a market, the likelihood increases that pessimists and optimists will not balance out. This in turn will increase volatility.

But Davidson's discussion makes clear that a diversity of views is a *necessary* condition for increasing market size to reduce volatility. However, the basic idea in both Keynes and Minsky about the nature of unstable financial markets is that, far from encouraging a diversity of views, they rather encourage herd behavior, what Davidson terms a "bandwagon consensus." When markets are afflicted with a bandwagon consensus, Davidson says the appropriate policy intervention is to have a "market maker with sufficient financial resources to assure market price stability," (p. 11).

Davidson never explains why we should assume market participants are likely to hold a diversity of views rather than, as Keynes and Minsky would have it, a broad uniformity of perspective which at times will engender herd behavior. If our concern is with inhibiting the harmful effects of herd behavior and speculative excess, it follows from Davidson's own statement that the needed policy instrument is a market-maker, such as a central bank. But how does one know when the market-maker has sufficient resources? Clearly, we can measure the sufficiency of resources only *relative* to the size of the market they are seeking to influence. An effective STET is a crucial policy instrument in such a situation. First, it increases the costs of engaging in speculative behavior. But in doing so, it also reduces the size of the herd--thereby increasing the possibilities for effective market-maker counter-measures.

The Impact on Nonfinancial Investment

The only impact of a STET about which we can be certain is that, ceteribus paribus, it will raise transaction costs of financial market trading. Some critics of the STET draw from this two related conclusions: the STET will increase the cost of capital to a large enough extent, such

that it will reduce real investment; and the STET will increase the costs of risk management for nonfinancial firms to a large enough extent so that firms will be forced into assuming more risk averse real investment strategies.

The literature on the determinants of real investment is, of course, voluminous. While there is still considerable controversy within the literature, a few basic results have become increasingly well-founded with time. These results are that for most firms, accelerator effects and cash-flow effects exert predominant influence over investment. Cost-of-capital effects are often significant statistically in recent models of investment, but their relative influence is substantially weaker than accelerator and cash flow influences.[7]

To the extent this recent literature is sound, it suggests that, at most, a STET would have a negligible influence on investment. This is both because a low tax would have a small influence on the cost-of-capital, and second, because cost of capital influences themselves are not decisive in determining the level of investment.

But in addition, insofar as a STET is intended to provide a more stable financial environment, this will have countereffects both on the cost of capital and, more fundamentally, on investment. The cost of capital should fall if the STET succeeds in creating a less risky financial environment, thus lowering the risk/return trade-offs for investors. Moreover, if the STET succeeds in creating a more stable financial environment, this will enhance the opportunities for firm managers to lengthen their time horizons. As noted above, it will also strengthen the capacity of government policy to stabilize financial markets and support the growth of effective demand.

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[7] Kopcke's comprehensive econometric "horse race" on U.S. investment behavior (summarized in Berndt, 1991) finds that accelerator and profit/cash flow effects are significantly more powerful than cost of capital/interest rate changes. Chirinko's similarly comprehensive survey (1993) reaches similar conclusions. This same basic result is supported by Fazzari's (1993, 1994, and 1988 with Hubbard and Peterson) innovative micro-level research on the determinants of investment, as well as Binswanger's more recent model (1999), which also explicitly tests stock market movements as a determinant of investment.

It is true, of course, that the STET will increase the costs of nonfinancial firms constructing complex risk-management portfolios, i.e., themselves engaging in short-term financial asset trading on an ongoing basis.   However, again, these increased costs are countered by the benefits of the STET in creating a more stable financial environment, thereby reducing the need for such strategies. In addition, in considering non-financial firms' performance over time, it is not clear that active risk management strategies have made a significant positive contribution to firm performance, according to basic measures such as investment growth. This conclusion is certainly suggested by the figures in Table 2, which, on an annualized cycle-to-cycle basis, shows the patterns of real fixed investment growth for nonfinancial corporations and the ratio of financial asset acquisition to fixed investment since 1960. The ratio financial asset acquisition/fixed investment is a good indicator of the extent to which nonfinancial corporations have engaged in complex risk management strategies relative creating new assets through investment.

[TABLE 2 BELONGS HERE]

As the table shows, the full business cycle in which fixed investment grew fastest over the period covered was 1960-69, at an average annual rate of 8.1 percent, when financial asset acquisition was at its lowest relative fixed investment expenditures, at 36.6 percent. The financial asset acquisition/fixed investment ratio then rises dramatically to 55.2 percent over the two cycles in the 1970s, during which fixed investment growth fell to a 4.0 average annual rate. The financial asset acquisition/fixed investment ratio then falls, but only slightly, over the 1980s and 1990s cycles, without any apparent gains in terms of fixed investment growth—i.e. investment falls further in the 1980s then picks up in the 1990s. Of course, one would need to study this relationship far more carefully before reaching any definitive conclusion. But, at the least, it is not obvious that more risk management activities by nonfinancial firms has contributed to a higher rate of real investment growth.

Distortionary Effects of STET

Probably the most common critique of a STET is that it creates distortions between market segments, inviting migration and other tax-avoidance strategies. One widely-cited example of such effects was the STET imposed in Sweden in 1984, that was subsequently lifted in 1990. As Campbell and Froot (1994) discuss, this Swedish tax was narrowly targeted, applying only to trades executed through Swedish brokerage firms. It did not apply to foreign trades of domestic taxpayers, even if they were of Swedish financial instruments. It also did not apply to domestic trades conducted through foreign brokerage firms. It was initially limited to equity and equity-derivative trades, and only later was it extended to bond markets and bond derivatives. Given the narrowness of this STET, it is not surprising that it created strong incentives for market participants to migrate to untaxed market segments, both within Sweden and elsewhere.

At the same time, Campbell and Froot also describe the UK "stamp tax", which, as its name suggests, is a tax on the registration of ownership of a financial asset. As such, the UK tax does not discriminate among market-makers. But the UK tax was not uniform across all financial markets. It did not apply to futures markets, and applied to options only when those options were exercised. This created incentives for investors to migrate from the spot to the derivative markets.

But even if the tax were applied across markets, another consideration is establishing an appropriate *tax rate*. Hubbard (1993, 1997), for example, has argued that if a uniform rate, such as 0.5 percent, were applied across markets, it was have widely varying impacts, given differences in existing transaction costs in different markets. In particular, Hubbard says that a tax at this level would be devastating for derivative markets, in which existing transaction taxes are far below those for equity markets. Avoiding distortionary impacts of the tax therefore entails consideration of existing differences in transaction costs across markets.

Campbell and Froot have suggested as a first principle on which to rationalize taxes across securities that transactions which give rise the same pattern of payoffs should pay the same

tax. However, they themselves conclude that this approach is unworkable. Among other factors, just among equity instruments, payoff patterns can differ widely at the discretion of the firms' managers. We therefore propose a variation on this principle. Rather than comparing transactions according to the payoff patterns of the assets being traded, we suggest, to the extent possible, that securities be taxed at equal rates relative to the value of the asset being traded. Within this basic framework, we then also incorporate Campbell and Froot's second strategy for designing a neutral tax across markets, which is that the tax be assessed equivalently relative to total existing transaction costs. While this is a valuable principle, it also faces a problem. As we show below, transaction costs vary widely not only across markets, but also between segments of a given market.

These are the considerations that we need to keep in mind as we turn to designing a STET that, to the extent possible, is neutral in its impact across markets.

5. Design of a Market-Neutral STET

We propose that the U.S. STET be applied following the British model, as a "stamp duty"--i.e. as a tax on the transfer of a financial instrument from one owner to another. Asset transfers would not be legally effective until they had been officially stamped. Assuming market participants place a high value on establishing legal status for their asset acquisitions and sales, the stamp requirement creates a strong disincentive against efforts to circumvent the STET.

The tax should apply to all trades and transfers. This would include trades by specialty brokers and market makers. This eliminates the ambiguity involved in determining who exactly is a market-maker (in an over-the-counter market) and in distinguishing between trades that are carried through to take a position as opposed to trades for the purpose of maintaining liquidity in the market.

In considering the UK experience with a stamp duty STET, Campbell and Froot (1994) discuss various ways through which efforts were still made to avoid the tax. The first is for investors to use "nominees" to hold assets in their names. However, the effectiveness of such an

avoidance strategy can be minimized, as Campbell and Froot describe, as long as someone in the trading chain--either the nominee or the final asset owners themselves--at some point must pay the STET in order for the trade to attain legal standing. In the British case, the STET applied at penalty rates at three times the ordinary rate on trades initially acquired by trading nominees.

Campbell and Froot discuss only two other ways that British market participants avoided the stamp tax STET. One was simply to trade less, which, along with raising revenue, is the aim of imposing the tax in the first place. The other strategy is to move trading into untaxed market segments, which in the British case included the derivative markets. But this approach would not apply to the tax we propose, which would cover derivative markets as well as swaps, bonds and equities.

To maintain the principle of broadest possible applicability, we propose that the U.S. STET apply to all traders in U.S. financial markets of both domestic and foreign residents. This would also be another difference from the British tax, which did not apply to foreigners trading in the UK market. Further, the tax would apply equally to foreign transactions of U.S. nationals and corporations, as was the case with Denmark's STET (Shin 1989). Finally, the U.S. STET would apply to trades of U.S. securities by foreigners in non U.S. markets. Even though such trades take place outside U.S. jurisdiction, holding a legal claim on the asset and income stream generated by it would still require legal endorsement within the U.S. Thus again, the stamp tax approach would create strong disincentives against noncompliance even for trades in foreign markets.

Tax Rates

We begin with a benchmark that the two-sided tax rate on trading equities will be 0.5 percent, so that each party to the trade pays 0.25 percent. This is the amount proposed by former House Speaker Jim Wright in his 1987 proposal. This was also the level proposed by Summers and Summers (1989) and Stiglitz (1989), and has been the benchmark figure for other studies as well (e.g Hakkio 1994). It is also in line with rates on equities that have been applied elsewhere in the world.

Working from this benchmark, we would then scale the two-sided tax rate on other

financial instruments as follows:

Bonds--0.01 percent per each year until bond's maturity

Futures--0.02 percent of the notional value of underlying asset

Options--0.5 percent of the premium paid for the option

Interest Rate Swaps--0.02 percent per each year until maturity of swap agreement.

Determining the impact of STETs at these proposed levels of course depends, to a

significant degree, on the existing, market-determined levels of existing transaction costs.

In reviewing the literature on transaction costs, two basic conclusions stand out:

1) Transaction costs vary widely, both across markets and within markets, according to

the size and other specific characteristics of orders; and 2) As expected, there is an inverse

relationship between transaction costs and trading volume. But we cannot be confident as to the

size of the inverse elasticity. The uncertainty as to the elasticity, of course, is due in part to the

fact that transaction costs themselves vary widely by instrument and market. In addition, there is

also much evidence to suggest that transaction costs have fallen sharply over the past 20 years.

But even here, because of the wide range of estimates, we cannot establish this conclusion on a

definitive basis. Part of the problem is that research on transaction costs and elasticiticies remains

uneven.

Equity Markets

Table 3 presents evidence on transaction costs in equity markets. The first set of

estimates are from Stoll (1993), who estimates what he terms "trading costs in the large". These

are derived from aggregate revenues of securities firms. By contrast, with what Stoll terms

"trading costs in the small", one tries to examine the impact of individual trades from the

perspective of either the investor or the short-run behavior of individual security prices. Stoll's

estimates find that average one-sided trading costs have varied quite substantially both over time

and by market. As we see in the top panel of Table 3, average costs were substantially lower for

exchange-traded equities relative to OTC trades, and that for both exchange-traded and OTC trades, transaction costs fell significantly between 1980-1990. As we see, exchange-traded transaction costs fell from 0.689 to 0.285 between these years, while OTC equity transaction costs fell from 1.528 to 0.761 percent of the value of trades. Based on Stoll's 1990 figures, a 0.5 percent two-sided STET on equity trades--meaning a 0.25 percent one-sided cost--would raise transaction costs on exchange-based trades to an average of .535 percent, which is still more than 30 percent below the average figure for 1980.   With OTC trades, transaction costs in 1990 would still be 34 percent below the 1980 figure, even after imposing the 0.5 percent two-sided STET. And as we consider further below, overall transaction costs have fallen still further since 1990.

[TABLE 3 BELONGS HERE]

Keim and Madhaven (1998) develop one version of a "trading costs in the small" transaction cost estimate, for both the exchanges and Nasdaq. These estimates are based on estimating, on a per trade basis, both "implicit" and "explicit" trade costs for institutional equity trades. The main explicit trade cost is the commission paid to the broker for execution. The more difficult to measure implicit trading costs include three components: 1) bid-ask spreads; 2) the price impacts of large trades on markets; and 3) the opportunity costs associated with missed trading opportunities

From this approach, Keim and Madhavan find that, in the institutional market, trading costs vary substantially according to the size of trade, size of firm being traded and market. We report some of these figures in Table 3. For one thing, they find that buyer-initiated one-sided exchange trading costs range between 0.31 for large firms and 1.78 for the smallest firms. Measured according to size and therefore difficulty of trades, one-sided buyer initiated transaction costs range between .31- .90 percent for exchange-based trades, and between .76 - 1.80 percent for Nasdaq trades.

From these figures, we get a sense of the widely divergent impact the STET will have on transaction costs, by size of firms and by size of trades.   When small firms are involved and

when trades are relatively large, a two-sided 0.5 percent STET will not add significantly to trading costs. For example, the two-sided costs of making a large trade of a small firm on Nasdaq will average 4.65 percent; a STET will add only 10.8 percent to total transaction costs. The STET's impact will clearly be much larger when the firm being traded is larger and when the amount of the trade is smaller. Considering a second extreme case, an exchange-based trade of the largest market cap firm for the smallest trade amount will entail, on average, a .62 percent transaction cost. The 0.5 percent STET will add 81 percent to transaction costs. But even here, the STET is not out of the range of existing transaction costs. We can also be confident--though we are not providing additional direct data here--that, even with the STET, these transaction costs are still well below either the existing costs on individual trades or historical costs on institutional trades.

Finally, we report a summary of Reiss and Werner's (1996) findings, which utilized another methodology and studied another market, the London open electronic quotation system, SEAQ, the UK equivalent to Nasdaq. They develop a new measure of transaction costs, the "adjusted apparent spread" which enables them to track discounting patterns on larger trades relative to the touch spread on smaller trades. As we see in the bottom panel of Table 3, the adjusted apparent spread on SEAQ ranges between 0.71 of trading value with large firms to 2.28 of value with the smaller-sized firms.

Though Reiss and Werner are studying a different market and employing a different methodology than either Stoll or Keim and Madhavan, we nevertheless see again that the orders of magnitude on estimated transaction costs are similar across samples and methodologies. Taking these all into account, one can conclude that the 0.5 percent two-sided tax is not outside the range of what the equity markets can absorb, after of course recognizing that the STET is in fact intended to reduce speculative short-term trading to some significant degree.

Bonds

We have proposed a two-sided tax rate of 0.01 percent per each year to maturity for debt issues, to maintain the neutrality of the STET's impact between stock and bond markets. With this rate on bonds, the trading of a 50-year bond would incur the same tax liability as an equity trade. Under such a formula, the STET should not create significant incentives for traders to favor either equity or debt instruments.   In addition, maintaining a sliding rate of 0.01 percent per years until maturity would avoid discontinuities in the tax burden among bonds of differing maturities.

Our proposed STET would tax all government debt--federal, state, municipal and other-- at a rate identical to that of private debt. This is a departure from the practice in many countries, which have explicitly exempted the transfer of government debt from taxation. It would also be a departure from the current preferential tax treatment for municipal bonds and the debt of various other state and local public agencies in the United States. However, independent of the merits in general of providing tax-exempt government bonds, it does not follow that these benefits should necessarily be compounded through additional preferential treatment in the second-hand trading of these assets. At the same time, the argument in behalf of extending the tax to the government bond market at all its levels is straightforward. It is needed to maintain the neutrality of the tax across markets.

Far less research has been conducted estimating transaction costs for bond markets relative to those for equity markets. But a sufficient body of work does now exist to enable us to broadly evaluate the size of our proposed tax relative to existing transaction costs.

Hong and Warga (1998) estimate transaction costs on bonds traded both at the NYSE Automated Bond System and the over-the-counter dealer market between March 1995 and February 1997.   Their data sample includes government securities as well as corporate bonds that span the range of quality grades, i.e. from Aaa to Caa. Though their research examines these alternative market settings and bond instruments in considerable detail, their conclusion is robust across these variables. They summarize their findings as follows:

We find that estimates of the effective bid/ask spread in the dealer and exchange-markets are quite similar. Per 100 dollar par value, investment grade bonds have average spreads of about 13 cents in the dealer market and 20 cents in the ABS. High yield bonds (below Baa) have spreads of about 19 cents (per 100 dollar par value) in both the dealer and ABS markets. We also find that transaction-based prices from ABS and the dealer market are broadly in agreement with each other and bid quotations from dealers at Lehman Brothers (p. 19).

Restating their results in percentage terms, Hong and Warga find that transaction costs average between 0.13 and 0.2 percent of par values. Based on these results, the sliding-scale tax that we propose of 0.01 percent for each year to maturity would mean that a one-year bond would face a tax obligation that would be between 5 – 8 percent of total transaction costs. If we assume that transaction costs were invariant relative to a bond's time-to-maturity, that would also suggest that that the tax obligation would be equal to total transaction costs for 13-20 year bonds, and that the tax would exceed total transaction costs for bonds with time-to-maturity greater than 20 years.

However, the evidence is strong, if not conclusive, that bond transaction costs are not invariant relative to time-to-maturity but rather, as with our proposed STET, rise as time-to-maturity lengthens. Hong and Warga do not themselves present evidence on this. However, another recent paper by Driessen, Melenberg, and Nijman (1999) finds that transaction costs do vary positively with time-to-maturity. Driessen et al. present their results on total costs in terms of basis points rather than relative to par values, so we cannot directly compare their results on overall levels of transaction costs with those of Hong and Warga. But we can make use of their evidence on *changes* in transaction costs according to time-to-maturity. They present direct evidence on this for Treasury bills only, ranging between 1- and 9-month bills. For their 1987-97 data sample, they find that transaction costs increase fourfold—from an average of 0.4 to 1.6 basis points—between one- and nine-month bills. Thus, if the pattern of transaction cost increases throughout the full span of bond maturities bears any resemblance to the increases reported by Driessen et al., it will surely be the case that a STET on bonds based on the sliding

scale we propose will remain substantially below existing transaction costs even up to 50-year bonds.

Driessen et al also provide evidence on changes in transaction costs over time. They have grouped their data on Treasury bills into two time periods, 1972-97 and 1987-97. By removing 1972-86 from the data sample, they find that transaction costs fell by between 70-76 percent, varing by the maturity of the instrument in their sample. Assuming this finding is broadly consistent with other bond instruments, it suggests that considerable range exists to implement a STET without creating a level of overall transaction costs that is even close to that which prevailed as recently as the 1970s to mid 1980s.

Options

Through the options market, investors can create synthetic positions for themselves through which, if the market were not taxed, they could still speculate on underlying equities and bonds without paying a STET for such activities. Thus, the principle of taxing neutrally across all markets applies with additional force in the case of options.

How should the options market be taxed in order to maintain neutrality among the markets? Stiglitz (1989) has argued for taxing the strike price of the option, specifically, taxing options at half the rate of equities in order that the tax paid by buying a call and selling a put is equal to the tax paid for buying the stock itself. However, basing the tax on the strike price would be inconsistent with the incentive and pricing structure of the market. Options with strike prices that are significantly higher than the current spot price--"deep-out-of-the-money" options-- do not involve a larger transfer of value, since the likelihood is lower that such options will get exercised.

To avoid distortions in taxing options, we propose instead that the options market STET be based on the premium paid for the option, i.e. the price paid for acquiring the option. By taxing the premium, we are targeting the tax on the asset actually being traded with an options contract, which is the right to acquire another asset. Moreover, unlike the strike price, the

premium incorporates the market's evaluation of the option itself, including the time limits for exercising the option and the difference between the strike price, the market price of the underlying asset at the time of purchase, and the price history of the underlying asset.

As an initial working figure, and in an effort to maintain neutrality with the stock and bond markets, we propose that options be taxed at 0.5 percent of their premium. If anything, based on the careful research of Diltz and Swiden (1993), this figure may perhaps be too low for maintaining neutrality across markets. Diltz and Swinden estimated observed transaction costs for 10 actively traded Chicago Board Options Exchange (CBOE) call options for the calendar year 1988. The analysis was restricted to the nearest-to-the-money calls, in order to mitigate potential biases resulting from combining the near-to-the-money options with the distinct in- and out-of-the-money markets.

The results of their study are summarized in Table 4. As the table shows, their results are grouped according to whether the options are shorter-term ("nearby") or longer-term (distant). As we see, the shorter-term options consistently have higher transaction costs as a proportion of the option premium. For shorter-term options, transaction costs for the ten firms range between 4.9 and 21.2 percent of the option premium, with an average figure of 14.6 percent. With the longer-term options, transaction costs range between 3.1 and 12.8 percent of the premium call price, with an average figure of 8.2 percent.

[TABLE 4 BELONGS HERE]

Given this range for transaction costs, the imposition of a 0.5 percent tax would have a substantially smaller impact, on average, than would be true for equity markets. With the shorter-term options, the 0.5 percent tax would amount to about three percent of average transaction costs as measured by Diltz and Swidler, and would amount to about 6 percent of transaction costs for longer-term options. By contrast, we saw with equities that the range of transaction costs was large, but the tax would add somewhere between 10 – 81 percent to transaction costs, as derived from Kein and Madhaven's figures.

Of course, transaction costs on options markets are likely to have fallen significantly due to market innovations since the 1988 figures reported by Diltz and Swinden. But this doesn't necessarily imply that the transaction cost differential between the options market and other markets has changed, since costs have fallen in these other markets as well. For now, we can conclude that taxing options transactions at 0.5 percent of the option premium is within the range of a workable figure, and is, if anything, on the low side what would be needed to maintain neutrality across markets.

Futures Contracts

The taxing of futures contracts poses difficulties. There is no price of a futures contract comparable to the premium on an options contract. Both the initial and subsequent margin deposits that traders make with brokers are the only exchanges that take place at the initial closing of a contract and until the underlying asset is transferred. Margin deposits themselves represent only a partial source of protection to brokers against default risk by traders--the other form of protection being the practice of marking to market each traders' account. Nevertheless, as long as margins are adjusted through the daily marking to market, they most accurately represent the market's valuation of the right to own a futures' contract. One might therefore argue that taxing the margin deposits on future contracts is the most appropriate approach to a STET on futures contracts. There is, however, a significant problem with this logic: in taxing margins, we would be creating an incentive to minimize margins, which itself could contribute to market instability.

Other countries which have imposed STETs on futures markets have adopted three alternative strategies: Japan taxed the notional value of the underlying asset; France and Hong Kong imposed a flat fee on a per contract basis; and Finland taxed the gains or losses in trading value on the contract sold or bought. The Japanese approach is most consistent with our aim of maintaining neutrality both between different financial markets and within a given market. The French/Hong Kong flat fee approach would obviously entail a heavier proportional burden for smaller-sized contracts, thereby encouraging larger contracts. Taxing trading gains or losses

would be an ex-post tax, and would not be taxing the transaction itself but rather only the profit derived from the transaction.

Through the Japanese approach, we tax all transactions and the size of the tax burden varies in proportion to the size of the transaction.   However, relative to the tax on the margin deposit, it is less clear what the appropriate tax rate would be on the notional value of futures assets, while maintaining neutrality across markets. Before being lifted in April 1999, the tax in Japan had ranged between 0.002 and 0.005 percent of notional value. This level of taxation on futures was applied along with a range of between 0.3 and 1.0 percent on equities and 0.08 and 0.16 percent on corporate bonds. Working from this Japanese model, we propose to operate from an initial rate of 0. 002 percent of notional value. To determine the appropriateness of this rate, we can then invoke our second standard of tax neutrality, i.e. establishing tax rates relative to existing transaction costs. Fortunately, we do have adequate data on futures markets transaction costs to undertake this exercise.

Futures Market Transaction Costs

Though the literature in this area is far less developed than that for equity markets, the recent work of Locke and Venkatesh (1997; hereafter LV) and Wang, Yau and Baptiste (1998; hereafter WYB) does provide a substantial basis for formulating generalizations.

Table 5, derived from LV, shows a range of estimates of transaction costs in 11 different futures markets. LV themselves generated one set of estimates, based on measuring direct transfers of funds from customers to market-makers. They also report results derived from two separate techniques based on considering market-wide bid-ask spreads.

[TABLE 5 BELONGS HERE]

Without considering the relative merits of the alternative estimating techniques[8], we do see substantial variation in estimates according to the technique being used. Just considering mean values, the mean low figure, a one-way cost of 0.0184 of notional value, is more than three

times smaller than the mean one-way high of 0.0589. The full range between low and high

values is obviously larger still.

But for our purposes, the main finding is that our proposed two-way tax rate of 0.02

percent of notional value is well inside the existing transaction cost structure of the futures

market. Our proposed tax rate would amount to roughly 5 percent of the mean one-way low

estimate for these 11 markets, and 1.5 percent of the mean one-way high estimate. If anything, as

with options, the tax on futures might need to be somewhat higher to retain equivalence with

equity and bond markets relative to each market's private transaction costs.

Table 6 reports price elasticities of trading developed by WYB. To our knowledge, this

is the most recent research done on trading elasticities with respect to any financial markets. The

most recent work done on estimating equity market trading elasticities, again to our knowledge,

was that by Epps, which was published in 1976, relying on 1968 data. Epps found a trading

elasticity for equities of -0.26.

[TABLE 6 BELONGS HERE]

As we see, the futures markets trading elasticities vary tremendously across markets,

ranging from -2.72 for Deutsche mark futures to -0.116 for wheat futures (though the result for

wheat is not statistically significant). To explain their findings WYB argue that elasticities are

highly sensitive to whether there are close substitutes for the markets in which these commodities

are traded. The closest such substitute market would be overseas markets in which the same

commodities trade. This is why the elasticities of the financial and metals futures are higher than

those for agricultural futures

Interest Rate Swaps

Swap markets are far less standardized than options or futures markets, as there is no

clear market measure of the value of the swap transaction itself comparable to the premium on an

option. On the other hand, a swap transaction is, over the period specified for the exchange,

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[8] Though Locke and Venkatesh themselves consider this issue at length.

equivalent to the transfer of ownership of an asset. The primary difference is that instead of exchanging money now for the claim on the income from an asset, the counterparties exchange each other's income claims on two separate assets.

As such, the principle to follow for a STET on swaps would be the same as that for stocks and bonds. That is, the appropriate tax rate should be 0.01 percent of the value of the underlying assets per each year until the asset's maturity. In this case though, the duration of the swap agreement would be the measure of the years until maturity. Thus, if counterparties agreed on a "plain vanilla" swap over five years of a fixed and floating rate government bond, the tax would be 0.05 percent, regardless of the maturities of the two underlying bonds themselves.

6. Revenue Estimates from U.S. STET

Table 7 presents revenue estimates for the STET we have developed, based on levels of market activity for the full year 1997 for stock, bond and swap markets, and 3/99 data for futures and options markets.

[TABLE 7 BELONGS HERE]

Because of the uncertainties associated with transactions costs and elasticities, it is not possible to generate a reliable point estimate of the STET's revenue potential. We have therefore opted for a less exacting approach, which is to establish no more than correct orders of magnitude for our revenue estimates, using the tax rates we have discussed throughout the text (which are listed in the second column of the table).

As Table 7 shows, we provide three rough tax revenue estimates. Our first set of figures is based on the assumption that market values of securities and trading volume remain unchanged from the 1997 levels after the imposition of the STET.   Under this circumstance, the STET generates $132.1 billion.

But of course, in addition to raising revenue, the purpose of the STET is to discourage speculative market trading, so that it is unrealistic to assume that trading volume and prices will remain constant after the STET is implemented. The next column of figures assumes that trading

volume falls by 25 percent after the STET is implemented. This 25 percent figure for trading volume decline seems implausibly high, given the evidence we have on the magnitude of the tax we propose relative to actual transaction costs over the recent past.[9] Nevertheless, allowing for such a large decline in trading provides an informative benchmark. Based on this assumption, we see that our tax revenue estimate is still $99.2 billion. Now mainly to provide an outside estimate, in the rightward column of Table 7, we show revenue figures assuming trading volume falls by 50 percent after implementation of a STET. Even under this circumstance, we see that the U.S. STET generates $66.1 billion.

Of course, these revenue estimates would be higher for the full year 2000, given increases in both the value of the stock market and the volume of trading across all markets relative to 1997. We can obtain a sense of the revenue potential with the 2000 market through the actual revenue figures generated by the existing SEC tax of 0.0033 percent on stock transactions. This tax alone—as distinct from the 0.034 percent stock registration fee—generated $1.1 billion in 2000. As a hypothetical exercise, if we raise the stock transaction tax rate to 0.5 percent and assume no decline in trading volume, the 2000 revenue generated by the tax would be $184 billion, i.e. more than three times the $54.9 billion for revenue in equity trades we have estimated, based on 1997 stock market activity. As such, even allowing through 2003 for stock market declines on the order of the 15 percent drop that occurred over the year prior to June 2001 (according to the S&P 500 index), it would still follow that our revenue estimates based on the 1997 market would offer a broadly accurate order of magnitude estimate for the revenue potential of a STET designed along the lines we propose.

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[9] At the same time, there does not exist any significant body of evidence on how security prices might react to changes in either transaction costs or trading volume. From an efficient markets perspective, a small rise in transaction costs should have no effect on security price levels, if, indeed, security prices are determined by each firm's fundamentals. From a critical Keynesian or behavioral finance perspective, there is also no reason to expect that a small change in transaction costs would affect the mean level of security prices in any significant way, even while, by discouraging speculative trading, it should have some impact on the fluctuations around the mean prices.

7. Conclusion

The U.S. Congress has regularly considered proposals for a U.S. STET since 1987, when a bill was introduced by then House Speaker Jim Wright. Perhaps the steady stream of academic literature opposed to a STET has been a factor in preventing the measure from moving in Congress beyond the level of initial discussions. In this paper, we respond to the academic critics, and show that a STET can be designed in such a way that it is both desirable and workable in the U.S. context.

A STET is desirable along different dimensions. First, it is a measure that can contribute toward mitigating the "predominance of speculation over enterprise," as Keynes put it. Of course, critics are correct in arguing that, by itself, a STET will not be capable of preventing excessive financial trading, unless the tax is set at a level that would likely also inhibit "enterprise-driven," as well as "speculation-driven," forms of trading. But a STET can make a significant contribution toward dampening excessively speculative financial markets. It can do so first, in precisely the manner described by Tobin, by penalizing short-horizon round trips and thereby reducing the level of such short-term trading; while negligibly affecting those involved in long-term investment activity. But in addition, as speculative trading declines due to the STET, the capacity of policymakers to intervene as market makers increases, since the market they will be trying to influence will be smaller. This will also increase the effectiveness of monetary and fiscal policy interventions, since such interventions could be conducted with less concern about how speculative markets might respond.

As we have shown, the revenue potential of a STET is formidable. A US STET that raises $100 billion per year—which at the 2001 level of financial market trading would occur at lower tax rates than those we have proposed—would be sufficient to increase, for example, all federal spending on education, training, employment and social services by 154 percent over its 2001 level. This again highlights the "win-win" feature of a STET: if it fails to dampen

speculation, it will nevertheless be generating an even larger amount of revenue, taxing unproductive activity on a highly progressive basis. As policymakers gain experience in administering the STET, they could then also adjust the tax rates periodically, depending on whether their primary aim at a given time was to discourage speculative trading or raise revenue.

Finally, we have shown that a STET can be implemented in a way that will avoid serious distortions across financial market segments, and thereby the flourishing of tax sheltering strategies, as occurred with the narrowly targeted Swedish STET. We have designed a market-neutral STET by following two simple principles: first that securities be taxed at equivalent rates relative to the value of assets being traded; and second, that taxes be assessed equivalently relative to existing transaction costs in the various market segments. Incentives for tax avoidance will be weakened further through following the British Stamp Tax example—that is, granting legal status to ownership transfers only after the STET has been paid.

Given the fact that the U.S. government does at present impose a small STET to finance SEC operations—and raises over $1 billion/year in revenue through this tax—the overall evidence is strong that instituting a larger and broader STET would be a workable as well as desirable policy measure.

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TABLE 1. SECURITY TRANSACTION TAXES AROUND THE WORLD

COUNTRY	STOCKS	CORPORATE BONDS	GOVERNMENT BONDS	FUTURES	DETAIL
Argentina	0.60%	0.60%	0.60%	0.60%	tax of 0.6% on all financial transactions approved by legislature March 2000
Australia	0.30%	0.15%	--		Reduced twice in 1990s; currently 0.15 each on buyer and seller
Austria	0.15%	0.15%	--		Present
Belgium	0.17%	0.07%	0.07%		Present
Brazil	0.3% [0.38%]	0.3% [0.38%]	0.3% [0.38%]	--	Tax on foreign-exchange transactions reduced from 2% to 0.5% 1999. Tax on stocks increased and on bonds reduced June 1999
Chile	18% VAT on trade costs	18% VAT on trade costs	--	--	Present
China	0.5% or 0.8%	[0.1%]	0	--	Tax on bonds eliminated 2001, Higher rate on stock transactions applies to Shanghai exchange
Colombia	1.50%	1.5%	1.50%	-	Introduced June 2000
Denmark	[0.5%]	[0.5%]	--	--	Reduced in 1995, 1998, Abolished effective Oct. 1999
Ecuador	[0.1%]	1.0%	--	--	Tax on stocks introduced 1999, abolished 2001. tax on bonds introduced 1999
Finland	1.60%	--	--		Introduced January 1997; applies only to trades off HEX (main electronic exchange)
France	0.15%	See note		--	Present
Germany	[0.5%]	0.4%	0.2%	--	Removed 1991
Greece	0.60%	0.60%	--	--	Imposed 1998; doubled in 1999
Guatemala	3.00%	3.00%	See note	--	Present
Hong Kong	.3% + $5 stamp fee	[0.1%]	[0.1%]	--	tax on stock transactions reduced from 0.6% 1993; tax on bonds eliminated Feb. 1999
India	0.50%	0.5%	--	--	Present
Indonesia	0.14% + 10% VAT on commissions	0.03%	0.03%	--	Introduced 1995
Ireland	1.00%	--	--	--	Present
Italy	[1.12%]	--	--	--	Stamp duties eliminated 1998
Japan	[.1%], [0.3%]	[0.16%]	--	--	Removed April 1999
Korea	0.30%	--	--	--	Present
Malaysia	0.50%	0.5%	.015%[.03%]	0.0005%	Present
Morocco	0.14% + 7% VAT on trade costs	7% VAT on trade costs	7% VAT on trade costs		Present
Netherlands	[0.12%]	[0.12%]	0	--	1970-1990
Pakistan	0.15%	0.15%	--	--	Present
Panama	--	--	--	--	stamp duties eliminated Jan. 2000
Peru	18% VAT on trade costs	18% VAT on trade costs	--	--	Present
Philippines	[0.5%] + 10% VAT on trade costs	--	--	--	VAT present
Portugal	[0.08%]	[0.04%]	[0.008%]		Removed 1996
Russia	0.8% on secondary offerings + 20% VAT on trade costs				Present
Singapore	0.05% + 3% VAT on trade costs	--	--	--	Reduced 1994, eliminated 1998; VAT present
South Korea	.3%[.45%]	.3%[.45%]	--	--	Reduced 1996
Sweden	[1%]	--	--	--	Removed 1991
Switzerland	0.15%	0.15%	0.15%	--	Present; 0.3% on foreign securities, 1% on new issues
Taiwan	.3%[.6%]	0.1%	--	0.05%	Reduced 1993
United Kingdom	0.50%	--	--	--	Present
Venezuela	0.5% [1%]	-	-	-	Reduced May 2000
Zimbabwe	0.45% VAT on trade costs	-	-	-	Present

Notes: [...] indicates former tax rate. Sources ambiguous as to whether tax applies to bonds in France and government bonds in Guatamala.

Austria, Belgium, Finland, Germany, Italy, Japan, Mexico, Portugal and Spain also impose VAT-type taxes on commodity futures trades.

Sources: *The LGT Guide to World Equity Markets* (London: Euromoney Publications, 1997); *1994 Handbook*
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Table 2. Patterns Of Real Fixed Investment And Financial Asset Acquisition For U.S. Non-Financial Corporations

Data are grouped by NBER Business Cycle Averages
(figures are percentages)

	1960-69	1970-79	1980-90	1991-2000
Real growth of fixed investment	8.1	4.0	2.2	7.4
Financial asset acquisition relative to fixed investment	36.6	55.2	54.5	52.3

Note: NBER cycles are grouped on a peak-to-peak basis. For brevity, two sets of cycles—1970-74/1974-79 and 1980-81/1982-90—have been merged.

Source: Flow of Funds Accounts of Federal Reserve System, Table F.102. Nominal fixed investment figures deflated by Producer Price Index.

Table 3. Representative Estimates of Equity Market Transaction Costs

A) Average One-Sided Costs in US Markets
(Stoll 1993; percentage of trade value)

Exchanges		OTC	
1980	**1990**	**1980**	**1990**
0.689	0.285	1.528	0.761

B) One-Sided Costs on Buyer-Initiated Institutional Trades in US Markets
(Keim and Madhavan 1998; percentage of trade value)

	Exchanges	Nasdaq
Range from smallest to largest market caps	1.78 - 0.31	2.85 - 0.24
Range from smallest to largest trade size	0.31 - 0.90	0.76 - 1.80

C) Median One-Sided "Adjusted Apparent Spread" in UK SEAQ Market
(Reiss and Werner 1996; percentage of trade value)

FTSE-100 Size Class	Medium-Size Class	Smaller-Size Class
0.71	1.31	2.28

Table 4. Option Market Transaction Costs for 10 Actively Traded Firms
Transaction Costs as pct. of Call Option Premium

	Shorter-Term ("Nearby") Options	Longer-Term ("Distant") Options
Mean Value	14.6%	8.2%
Range for 10 firms	4.9 – 21.3%	3.1 – 12.7%

Note: Firms included are Bristol Myers, Dow Chemical, Eastman Kodak, Ford Motor, General Electric, General Motors, Hewlett Packard, IBM, Merck, and Exxon. Figures are for 1988

Source: Diltz and Swidler 1993

Table 5. Futures Market Transaction Cost Estimates

(Transaction costs as a percentage of notional value of contracts
derived from Locke and Venkatesh 1997)

Commodity	Range of Estimates		
Live Hogs	0.0337 - 0.0618		
Pork Bellies	0.0488 - 0.0958		
Live Cattle	0.0077 - 0.0397		
Lumber	0.0609 - 0.1480		
Feeder Cattle	0.0211 - 0.0519		
Canadian Dollar	0.0093 - 0.0187		
Swiss Franc	0.0038 - 0.0239		
Deutsche Mark	0.0058 - 0.0204		
Pound Sterling	0.0025 - 0.0173		
Japanese Yen	0.0053 - 0.162		
S&P 500 Index	0.0030 - 0.0089		
Summary Statistics			
Low Estimates			
Mean	0.0184		
Median	0.0077		
S.D.	0.0021		
High Estimates			
Mean	0.0589		
Median	0.0397		
S.D.	0.0538		

Table 6. Futures Market Trading Volume Elasticities as Function of Transaction Costs

(elasticity percentages; from Wang, Yau, and Baptiste 1997)

Financial Futures	
Treasury Bond	-1.169
S & P 500	-2.03
Deutsch Mark	-2.72
Agricultural Futures	
Wheat	-0.116
Soybeans	-0.165
Mineral Futures	
Copper	-2.29
Gold	-2.64

TABLE 7. REVENUE ESTIMATES FOR U.S. STET
(Estimates based on 1997 data except as noted)

	Tax Rate	*Revenue Estimates*		
		With no volume or price reduction (billions $)	25 percent volume reduction (billions $)	50 percent volume reduction (billions $)
Equities	0.5 percent of asset value	54.9	41.2	27.5
Government Bonds	0.01 percent of asset value, per number of years to maturity	41.6	31.2	20.8
Corporate Bonds		22.1	16.6	11.1
Futures (based on data from Wall Street Journal, 3/17/99)	0.002 percent of notional value of underlying asset	2.6	2.0	1.3
Options (based on data from Wall Street Journal, 3/17/99)	0.5 percent of option premium	6.5	4.9	3.3
Swaps	0.02 percent of asset value, per number of years to maturity	4.4	3.3	2.2
TOTALS		132.1	99.2	66.1