The Internationalization of Equity Markets

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6   International Experiences with Securities Transaction Taxes

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6.1   Introduction

During the past few years securities transaction taxes (STTs) have been debated in a number of countries. In some places, the debate has focused on the effects of changing technology and deregulation for sustaining or removing transaction taxes. In others, shortages of revenues and a change in atmosphere from the 1980s have led to talk of instituting taxes anew. The U.S. government, for example, reviewed a proposal during the 1990 budget negotiations for a broad-based 0.5 percent tax on transactions in stocks, bonds, and exchange-traded derivatives. The Congressional Research Service estimated at the time that such a tax might raise $10 billion in revenue, and this figure has been widely cited in subsequent discussions of STTs. Moreover, in 1993 the Clinton administration proposed a fixed fourteen-cent tax on transactions in futures contracts and options on futures.

Based on this, it seems safe to conclude that STTs are important because of their clear and current policy relevance. However, there is at least one other reason that recent international experiences with transaction taxes are of interest: STTs reveal the nature and scope of powerful underlying changes in international capital markets, and offer a glimpse into a future in which government policy not so much disciplines, but is instead disciplined by, competition in modern capital markets.

In this paper we consider the international experience with STTs. We argue that this experience is in many ways quite varied. There is, for example, an almost bewildering variety of details in their nature, size, and implementation.

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Transaction tax rates may vary with the type of financial instrument (equities typically being taxed at higher rates than debt instruments or derivatives), with the location of trade (on or off an exchange, at home or abroad), and with the identity of the buyer or seller (domestic or foreign resident, market maker, or general trader). But we also point out a number of similarities across countries. For example, as table 6.1 shows, while many countries currently impose STTs of varying sizes, there is a marked recent trend toward lower taxes.[1] To emphasize the differences and underlying similarities in some detail, we begin by describing the apparently dissimilar experiences of two countries, Sweden and the United Kingdom.

Next we try to provide an overall framework for understanding STTs. We propose two principles that might be used to rationalize transaction tax rates across securities. The first principle is that transactions which give rise to the same pattern of payoffs should pay the same tax. Although this seems appealing on prior grounds, we show that it is conceptually impossible to apply this principle consistently. Accordingly, most actual tax systems rely on a second principle, that transactions which use the same resources should pay the same tax. Different countries tax different types of resources: Sweden, for example, taxes domestic brokerage services (the Swedish resources used in matching buyers and sellers), whereas the United Kingdom taxes registration (the legal transfer of ownership of U.K. equities).

Any tax gives people an incentive to change their behavior to reduce their tax liability. We argue that in the case of STTs, several changes in behavior are relevant. First, investors can change the location of trade, moving transactions off-exchange or abroad. Second, investors can trade substitute securities which generate payoffs similar to those whose transactions are taxed. Third, investors can choose not to trade, accepting a change in the payoffs they receive in order to reduce their STT liability. We discuss the importance of each of these behavioral changes for different STT systems, in particular the Swedish and British systems. We show that offshore trading has been a particularly important response to the Swedish equity STT, while investors have responded to the Swedish fixed-income STT by trading untaxed local substitutes. The British STT cannot be avoided by trading abroad, but it does stimulate trading in untaxed substitute assets and also seems to reduce total trading volume to some degree.

In addition to examining the Swedish and British cases, we look at the econometric evidence on the elasticity of trading volume with respect to changes in transaction taxes. There are a number of estimates of this elasticity in the literature; however, few take into account the margins of substitution that we describe.

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1. Sweden, Finland, and Taiwan have recently cut or removed altogether their turnover taxes. Several other countries, such as Australia, Japan, and the United Kingdom have recently considered reductions in existing tax rates.

Table 6.1   Transactions Taxes around the World (through 1993)

Country	Tax Size 1991	Description	Notes; Changes since 1991
Australia	0.3%	Transaction tax	Additional stamp tax removed in 1991
Austria	0.15%	Transfer tax	May be avoided by trading off exchange
	0.06%	Arrangement fee	May be avoided by trading off exchange
	0.04% - 0.09%	Courtage fee	
Belgium	0.17%	Stamp tax on buys and sells	No tax ex country; maximum of 10,000 Belgian francs
	0.025%	Stock market fee	No tax ex country; maximum of 2,500 Belgian francs
Canada		No taxes	
Denmark		No taxes for nonresidents	
Finland	0.5%	Transaction tax	Waived if both parties foreign, eliminated in 1992
France	0.15%	Trading tax	Tax on trades > 1 million francs, rate is doubled on smaller transactions, may be avoided by trading ex country
Germany	0.125%	Boersmumsatz Steuer	Residents only
	0.06%	Courtage tax (official broker fee)	Tax may be avoided by trading ex country
Hong Kong	0.25%	Stamp duty	
	0.006%	Special levy	May be avoided by trading off market
	0.050%	Exchange levy	May be avoided by trading off market
Italy	0.05%	Stamp duty tax	Tax may be avoided by trading ex country
Japan	0.30%	Sales tax	May be avoided by trading ex country
Malaysia	0.05%	Clearing fee	Maximum $100; may be avoided by trading off exchange
	0.3%	Transfer stamp duty on purchases and sales	Eliminated in 1992
Netherlands		No taxes	
New Zealand	0.0057% plus per trade fee	Transaction levy	May be avoided by trading off exchange; eliminated in 1992
Norway		No taxes	
Singapore	0.1%	Contract stamp duty	May be avoided by trading off exchange
	0.05%	Clearing fee	Maximum S$100, may be avoided by trading off exchange
	0.2%	Transfer stamp duty	Purchases only; eliminated in 1992
Sweden	0.5%	Turnover tax	Tax may be avoided by trading ex country; eliminated in 1991
Switzerland	0.0005%	Exchange fee	Tax may be avoided by trading ex country
	0.01%	State tax	Tax may be avoided by trading ex country
	0.075%	Stamp tax	Tax may be avoided by trading ex country
United States	0.0033%	SEC fee	
United Kingdom	2 pounds	Levy	On trades over £5,000
	0.5%	Stamp duty tax	On purchases only

Source: UBS Phillips and Drew.

We conclude by drawing some lessons for the U.S. debate. Some proponents of an STT favor it on the grounds that it would reduce trading volume, while others seem more interested in the revenue that might be raised by the tax. An STT will disappoint both types of proponent if it causes investors to move trading into offshore markets or untaxed assets. Accordingly we argue that an STT along British lines would be far more workable than a Swedish-style STT. Even a British-style STT, however, would likely lead to major behavioral changes and we argue that the widely cited figure of $10 billion in revenue for a 0.5 percent STT is too optimistic.

6.2   Case Studies

6.2.1   Transaction Taxes in Sweden

Summary of the Swedish Transaction Tax Regime

Sweden's recent experiment with transaction taxes began in January 1984 with a levy of fifty basis points on both the purchase and sale of equities.[2] Support for the tax came from the Labour Party—the tax was approved by Parliament over the objections of the Finance Ministry and business sectors. Labour did not view trading in itself as undesirable; however, it objected to the idea that bright young people were being paid so much for performing what seemed to them essentially unproductive tasks.

Partly as a result of this sentiment, the tax was levied directly on registered Swedish brokerage services. Such services (plus those of a registered Swedish exchange bank) were required for local stock transactions of meaningful size between domestic residents as well as those between domestic and foreign residents. Trades between two foreign principals were taxed only if they involved a security registered in Sweden. No tax was levied on transfers of stock ownership unless a broker was involved. For example, no tax was levied on gifts or inheritances of stock. In addition, private trades involving domestic entities were free of taxation, provided that the trades were small enough and the entity did not trade too frequently.

The initial legislation also included a tax on stock options. The tax was for two hundred basis points (for round-trip transactions), calculated as a percentage of the option premium. In addition, exercise of the option was treated like a transaction in the underlying stock, thereby resulting in an additional levy of one hundred basis points (based upon the exercise price).[3] As the tax was in-

2. The tax was announced on October 24, 1983; that day the Swedish All-Share equity index fell 2.2 percent. See Umlauf (1993).

3. Unlike options, warrants were taxed on the amount of stock they (potentially) represented, and at the same rate as stocks. Conversions from warrants into stock were not taxed. Futures transactions in equity-linked instruments were taxed at the same rate as stock transactions, with the tax applying to the underlying notional amount.

tended to resemble a kind of sales tax, that is, a tax on final consumption of local brokerage services, interdealer trades, which were viewed as "intermediate" and not final trades, were exempted.

Over the following two years, the government came under pressure to raise more revenue from the tax. In July 1986, Parliament acceded, doubling the rates on equity and equity-derivative transactions.[4] Moreover, in early 1987, Parliament broadened the scope of the tax to include interdealer equity trades (at one hundred basis points per round trip, half the rate of the brokerage tax).

Also in early 1987, several large losses in interest-rate futures and options were announced. The largest and most highly criticized of these were the city of Stockholm (which lost SEK [Swedish kronor] 450 million) and the insurance company Folksam (which lost SEK 300 million). Soon thereafter Stig Malm, chairman both of the Swedish Trade Union Council and of Folksam, attacked the money markets "for creating economic instability and excessive wage differentials" (see Lybeck 1991, 162). In September 1987, through the trade union council, Malm proposed a turnover tax to "reduce the overly large and socially worthless activities on the money market" (Lybeck 1991, 156). The government followed up on Malm's initiative, although its official reasoning for a turnover tax on money-market instruments was to create "neutrality" with the stock market's tax. While the government actually worked out a legislative prototype almost immediately, the fixed-income turnover tax did not actually take effect until January 1, 1989.

The tax applied to fixed-income securities, including government debt and associated derivatives, such as interest-rate futures and options. The rates on these instruments varied, but were considerably lower than those on equity, reaching a maximum of only fifteen basis points of the underlying notional or cash amount. For example, the tax rate on a round-trip transaction was three basis points for bonds with maturities exceeding five years, one basis point for one-year bonds, and 0.2 basis points for maturities of less than ninety days.[5]

Beginning in 1989, the political climate began to change. Disappointment with the revenues raised, and concerns that taxes on the money market merely raised the costs of government borrowing, led to an erosion in political support for turnover taxes. The taxes on fixed-income securities were abolished as of April 15, 1990. On January 1, 1991, tax rates on the remaining instruments were cut by one-half. Then on December 1, 1991, all remaining security transaction taxes were completely removed.

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4. The tax increase was announced on March 11, 1986; that day the Swedish All-Share index declined by 0.8 percent.

5. Intermediate maturities received intermediate rates: four-, three-, and two-year bonds were taxed at 2.6, 2.0, and 1.5 basis points, respectively. For securities with maturities of less than one year, the tax levy increased linearly with the investor's holding period. The tax on fixed-income futures contracts was levied on the notional amount, at a rate equivalent to that on the underlying instrument.

Effects on Volume and Location of Equity Transactions

Several studies have argued that the stock transaction tax had a negative effect on local Swedish trading (see, for example, Umlauf 1993 and Ericsson and Lindgren 1992). Table 6.2 reviews the evidence, showing the location of trading in stocks of about a dozen large Swedish companies.[6] Unfortunately, data prior to 1988 are not available. The data include volume in Stockholm, London, and the United States,[7] and trading in both restricted and unrestricted shares.[8]

Table 6.2 clearly shows a high level of offshore trading in 1988 and 1989, when the stock turnover tax was at its maximum level. For example, only 27 and 23 percent of trading in Ericsson, Sweden's most actively traded company, took place in Stockholm in 1988 and 1989, respectively. Comparable average fractions across all stocks in table 6.2 were 61 and 57 percent of total volume. The fraction of trade in Stockholm continued to decline through 1991, when it reached a low of 52 percent. By 1992 (after taxes had been completely removed), trade in Sweden had increased to 41 percent for Ericsson and to 56 percent for the average stock in table 6.2.[9]

The effect of the tax on local trading volume does not appear to be instantaneous. For example, even though the tax was instituted prior to 1988, the fraction of trading taking place in Stockholm declined from 1988 through 1991, when tax rates were cut. Such lagged trading volume responses are not too surprising in practice, as it is likely that shifts in institutional capacity and expertise—needed inputs in the production of brokerage services—take time.

The tax on equity transactions was avoided in different ways and to different extents by different types of traders. Foreign investors were most able to use non-Swedish brokers for transactions in Swedish stocks. One way to see this behavior in the data is to compare the degree of trading migration in unrestricted versus restricted shares. This sheds some light on the relative behavior of foreign and domestic clienteles since unrestricted shares are disproportionately owned by foreigners and restricted shares are owned exclusively by domestics.

6. We thank Lief Vindevag of the Stockholm Stock Exchange for supplying us with the data used in tables 6.2 and 6.3.

7. Trading in the United States is small, and is predominantly on the NASDAQ (an over-the-counter electronic exchange). This probably reflects liquidity considerations (London and Stockholm are open during the same hours, and therefore help provide liquidity for one another) more than it does the profile of shareholder domiciles.

8. Some Swedish shares carry ownership restrictions, while others do not. Restricted shares can only be owned and voted by Swedish nationals. Transactions taxes apply to trades in both types of shares, as long as a registered Swedish brokerage house is involved.

9. Other authors have found responses of local trading volume to transactions costs, including taxes, at least as large as this. Lindgren and Westlund (1990), for example, estimate the long-run elasticity of trading volume on the Stockholm market with respect to transactions costs to be approximately −1. Jackson and O'Donnell (1985) estimate elasticities in the range of −1 to −1.7 in their study of U.K. stocks.

Table 6.2		Trading of Swedish Stocks inside Sweden (percentage of turnover in London, New York, and Stockholm taking place in Stockholm)				
		1988	1989	1990	1991	1992
Aga		59%	64%	63%	47%	53%
Alfa Laval			71%	41%		
ASEA		50%	39%	36%	34%	56%
Astra		88%	59%	44%	34%	36%
Atlas Copco		51%	40%	26%	44%	44%
Electrolux		43%	32%	46%	41%	45%
Ericsson		27%	23%	26%	28%	41%
Gambro		97%	92%	31%	35%	58%
Pharmacia		39%	33%			
Procordia				78%	68%	55%
Incentive					75%	79%
Saab-Scania		80%	77%	70%		
Sandvik		80%	51%	56%	56%	55%
SCA		84%	84%	88%	76%	73%
SKF		43%	50%	59%	45%	39%
Skandia				75%	57%	72%
Stora			78%	77%	76%	72%
Trelleberg			73%	73%	69%	81%
Volvo		55%	38%	54%	50%	50%
Average		61%	57%	56%	52%	56%

Source: Central Bank of Sweden.

Table 6.3 provides this breakdown, taking those companies from table 6.2 for which there is liquid trade in restricted shares. The table reports the fraction of trade in *unrestricted* shares that took place in Stockholm relative to total trade in New York, London, and Stockholm. The first point to note is that, during the 1988–91 period when the tax was in place, the fraction of trading taking place in Stockholm was much lower for unrestricted shares. For example, during 1988, only 47 percent of trade in unrestricted shares took place in Stockholm (versus 61 percent for all shares—see table 6.2). After the tax was removed, however, trading of unrestricted shares in Stockholm rebounded considerably, rising from 40 percent in 1991 to 50 percent in 1992. This evidence suggests that foreign investors tended to substitute more toward trading abroad than did domestic investors, who substituted more toward not trading at all.

Naturally, domestic investors also had an incentive to evade the tax when they did trade. However, for them it was harder. Domestic investors had to establish an offshore domicile or company if they were to avoid using a Swedish broker for transactions. And they were taxed in the process: a tax equal to three times the round-trip tax on equity applied to funds moved offshore.

Perhaps the clearest way to measure foreign investors' response to the tax is to use data on the trading patterns of specific foreign investors. One such data

Table 6.3   Trading of Swedish Unrestricted Shares inside Sweden (percentage of turnover in London, New York, and Stockholm taking place in Stockholm)

	1988	1989	1990	1991	1992
Aga	30%	34%	46%	34%	42%
Alfa Laval		67%	24%		
ASEA	35%	15%	32%	26%	49%
Astra	77%	33%	24%	18%	30%
Atlas Copco	49%	40%	26%	44%	44%
Electrolux	43%	32%	46%	41%	45%
Ericsson	27%	23%	26%	28%	41%
Gambro	95%	85%	23%	27%	48%
Pharmacia	11%	19%			
Procordia			55%	43%	45%
Incentive				61%	75%
Investor					76%
Saab-Scania	58%	50%	50%		
Sandvik	60%	34%	24%	39%	48%
SCA	71%	65%	73%	61%	68%
SKF	34%	34%	53%	39%	36%
Securitas					16%
Skandia			75%	57%	72%
Stora		68%	66%	61%	68%
Trelleberg		40%	34%	36%	70%
Volvo	25%	27%	34%	26%	31%
Average	47%	42%	42%	40%	50%

Source: Central Bank of Sweden.

base is maintained by Frank Russell Securities, Inc. Russell monitors the transactions costs paid by a group of large U.S. institutional clients.[10] These clients traded large amounts of international equities. It is worth noting that these U.S. institutions found trading in the United States considerably cheaper than in other countries. Figure 6.1 reports average taxes, fees, and agency commissions paid by these institutions when trading in securities from the world's ten largest equity markets. Average direct costs total about thirty basis points in the United States, compared with about seventy-six basis points in Japan and ninety-six basis points in the United Kingdom.

Figure 6.2 depicts average round-trip trading costs paid by large U.S. institutions when trading Swedish equities. The figure shows that during the 1987–92 sample period, commissions remained roughly constant, while taxes paid fell

10. The data base, assembled by Richard Kos and Thomas Morton, analyzes the trades of U.S. institutional clients that are members of Russell's portfolio verification service. Altogether the data include well over two-million transactions, recorded over six years (1987–92), from approximately five thousand actively managed portfolios. Equity securities from over thirty-five counties are represented in the data.
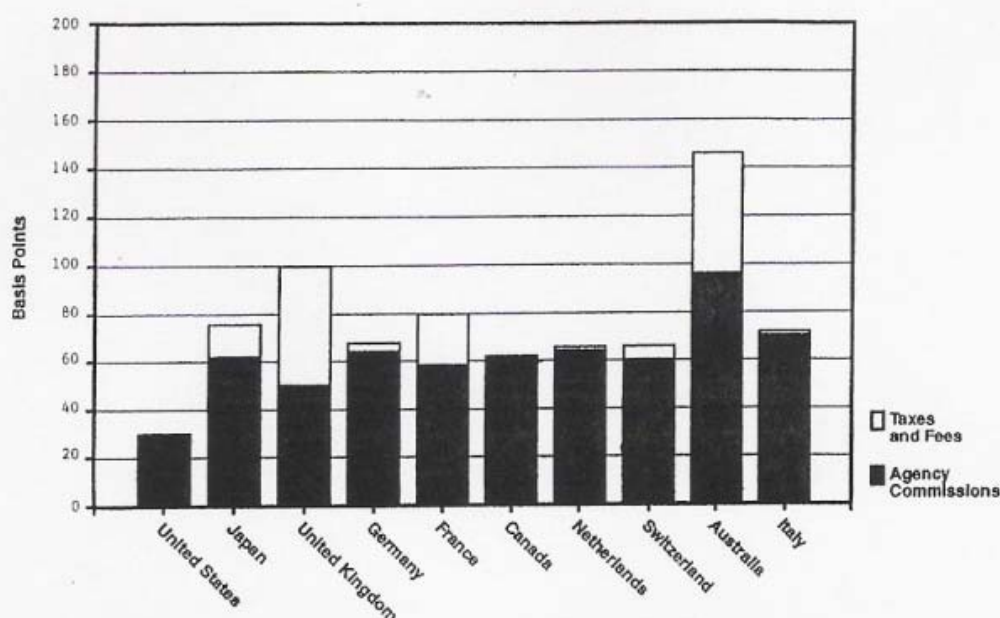
Fig. 6.1   1992 global trading costs, ten largest markets
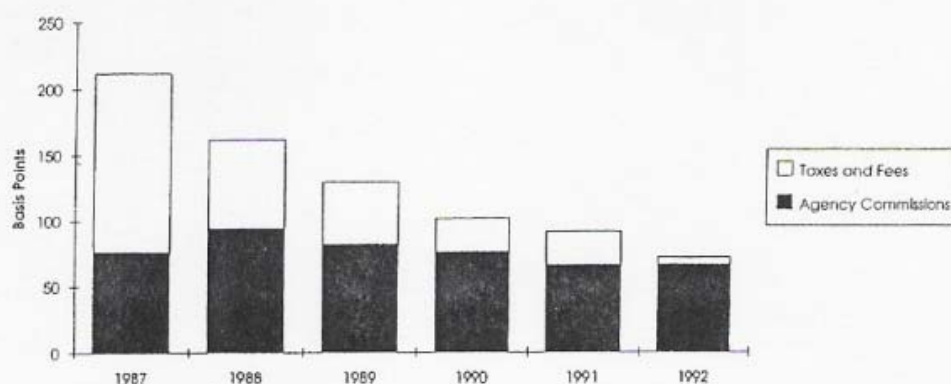*Source:* Frank Russell Securities, Inc.

Fig. 6.2   Round-trip trading costs in Swedish Equities for U.S. institutional investors
Source: Frank Russell Securities, Inc.

from 136 basis points in 1987 to only 6 basis points in 1992. During the 1987–90 period there was no change in the statutory tax rate, yet the average round-trip tax payment fell by over 100 basis points. Thus, whereas these U.S. institutions paid 68 percent (136 basis points relative to the statutory rate of 200) of the statutory tax in 1987, they were paying only 13 percent (26/200) of the statutory rate by 1990. U.S. institutions (and their brokers) were increasingly able to evade the tax by eliminating the use of Swedish brokers when trading in Sweden or by exchanging Swedish securities in London or New York.

It appears also that the Swedish tax had only a marginal effect on the volume of trade in Swedish equities by foreign institutions. Figures 6.3A and 6.3B
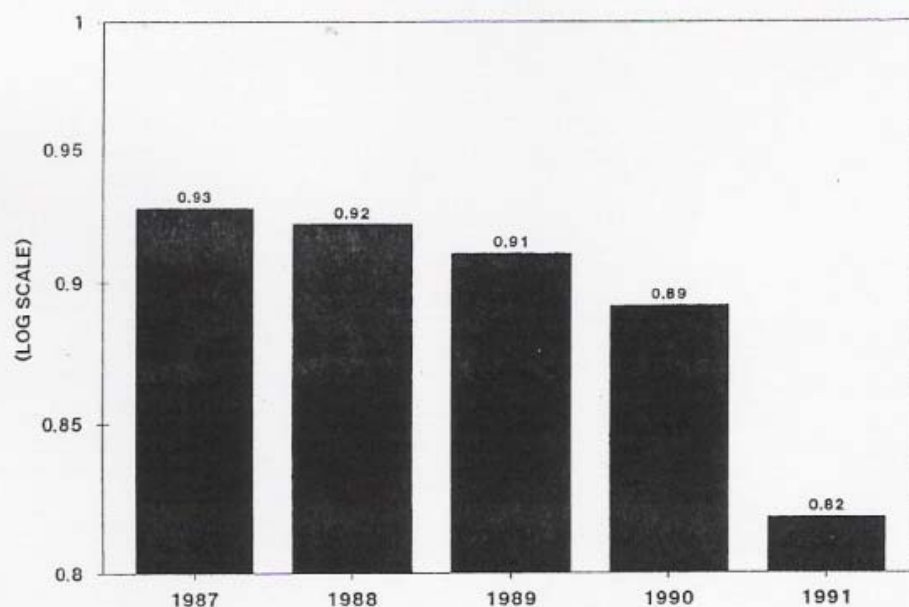
Fig. 6.3A   Ratio of median equity turnover ratios, Stockholm versus the United States
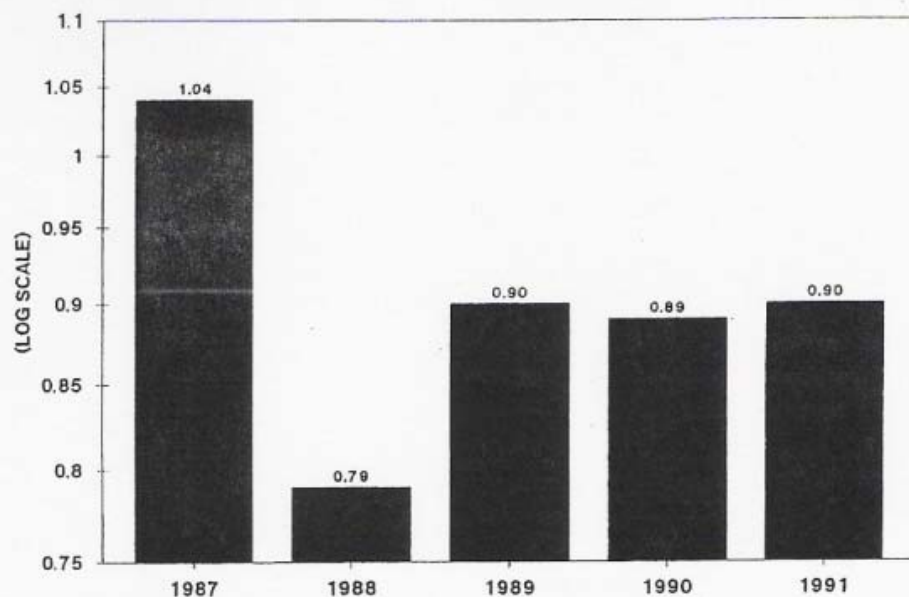

Fig. 6.3B   Ratio of median turnover ratios, average of Stockholm versus that of sixteen other markets

show the Swedish-share turnover rates for Russell's investors relative to U.S.-share turnover and to average total turnover. There is little evidence that total trading volume in Swedish stocks responded strongly to changes in taxation of trades in Stockholm. This lends additional support to the view that international investors easily evaded Swedish turnover taxes.
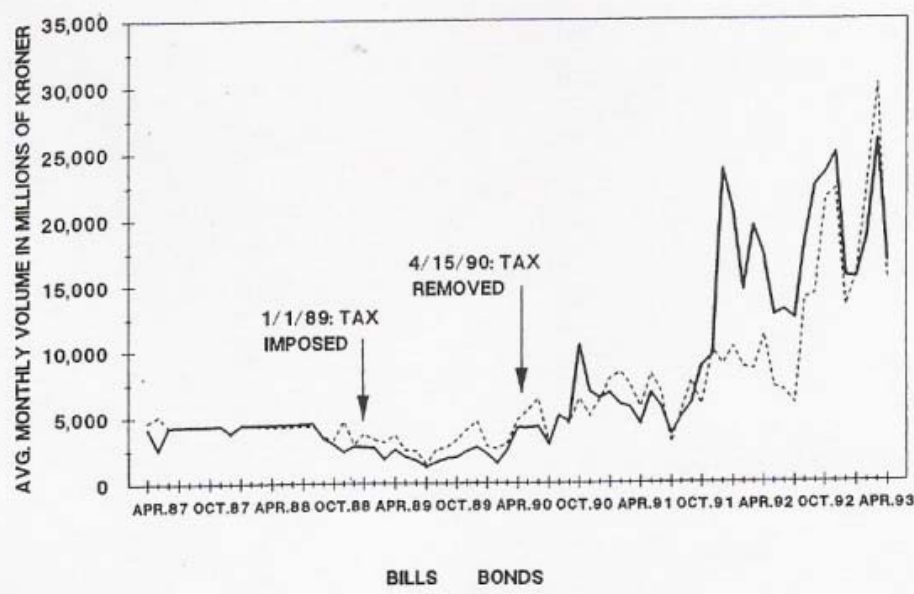
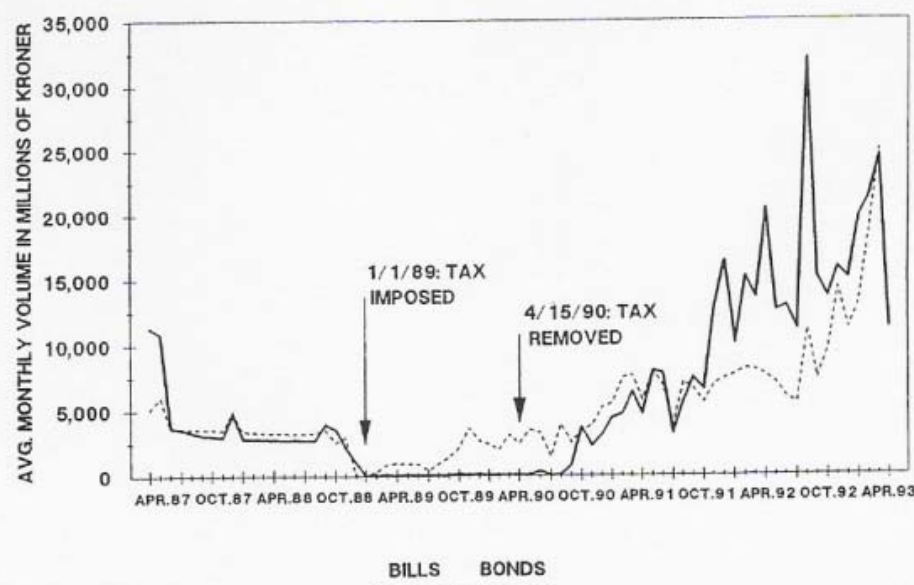Fig. 6.4   Volume of trade in Swedish money markets, spot market

Fig. 6.5   Volume of trade in Swedish money markets, futures market

Effects on Volume and Location of Fixed-Income Transactions

The transaction tax on fixed-income securities had a larger impact on local trading volume than did the tax on stocks. Figures 6.4 and 6.5 show the trading volume in Swedish government bills and bonds and in futures on bills and bonds, respectively.[11]

11. We thank Pehr Wissen and the Bank of Sweden for providing the data in figures 6.4 and 6.5.

There are several noteworthy aspects to these data. First, the effect of the tax (proposed in late 1987 and implemented in early 1989) seems to be quite large. During the first week of the tax, bond trading volume fell by about 85 percent from its average during the summer of 1987.[12] Trading in futures on bonds and bills (in figure 6.5) fell by about 98 percent over the same period. Trade in options essentially disappeared. The effects were less dramatic for bills, whose trading fell by only about 20 percent.

Second, much of the volume decline in futures occurred in anticipation of the tax. However, there was also a large decline in volume in January 1989, the month when the tax was instituted. One possible explanation for the anticipatory decline is that low levels of future liquidity raise the current risk of illiquidity. If the risk of low liquidity is high, investors who value liquidity most will prefer to trade securities with lower liquidity risk, thereby reducing current liquidity in futures.

Third, these effects ran in reverse once the tax was removed in April 1990. Trading volume subsequently increased, in both bonds and bills, spot and futures. At the same time, the yield on bonds relative to that on bills fell. This could be explained by the liquidity arguments above and by the high tax rate on bonds relative to bills.

Why does fixed-income volume appear more sensitive than stock-market volume, even with much smaller taxes, and with no viable offshore replacements? The answer would appear to lie in the relative ease with which substitutes for bonds can be created—substitutes which avoid the tax even if they are local. For example, the market for Swedish debentures (which were not subject to the tax) became more active when the tax was imposed. The market for VRNs (variable-rate notes) also grew rapidly.[13] VRNs avoid taxation because they are traded by counterparties, without a broker. Finally, FRAs (forward-rate agreements) quickly took the place of futures markets in bills and bonds.[14] By moving from futures to forwards, transaction taxes could easily be avoided with little change in payoff patterns.[15] Swaps performed a similar service for longer-maturity instruments, serving as a close substitute for futures on bonds.

Because trade in fixed-income securities can move so easily into debentures and forward contracts, the turnover tax raised little revenue, and a good deal less than the authorities expected. Whereas the Finance Ministry initially estimated tax revenues from fixed-income transactions at SEK 1500 million per

12. Lybeck (1991) estimates the elasticity of Swedish money-market trading with respect to the turnover tax to be 3.0.

13. VRNs carry longer maturities, but are priced more like short-maturity bills because their value is reset every three months at par.

14. See Lybeck (1991).

15. Indeed, the substitutability between futures and forwards became quite close; beginning in mid-1989, the FRA market was standardized to the futures-contract expiration dates.

year, the realized revenue averaged only about 50 million per year, reaching only 80 million in 1989.

The fixed-income tax created considerable substitution toward other Swedish instruments, with little migration offshore. If the tax had remained in place, however, offshore migration might also have occurred. There were no barriers to trading SEK-denominated bonds, bills, and associated derivatives in foreign markets. Presumably, offshore migration did not occur because foreign investors are not so active in Swedish money markets, and because it is so easy to create forward contracts for fixed-income instruments. Thus, the reason for the lack of migration in fixed-income trade was not that offshore trading was relatively more costly than it was for stocks, but that there were even less costly local alternatives available.

6.2.2 Transaction Taxes in the United Kingdom

Summary of the U.K. Transaction Tax Regime

The securities transaction tax in the United Kingdom is known as "stamp duty." As the name suggests, stamp duty began as a tax on the transfer of a financial instrument from one owner to another, a transfer which could only be made legally effective by an official stamp applied to the instrument. Thus stamp duty is a tax on the registration of ownership of a financial asset. In 1986 the U.K. government closed certain loopholes in the application of stamp duty by introducing a "stamp duty reserve tax" (SDRT) which substitutes for stamp duty itself and is paid at the same rate.[16] In what follows we use the term "stamp duty" to refer to both stamp duty proper and the SDRT, and we use "taxable" to mean subject to stamp duty (as opposed to other U.K. taxes that are outside the scope of this paper).

Stamp duty applies to transactions in ordinary shares (common stock, in U.S. terminology), and in assets convertible to shares such as convertible unsecured loan stock (convertible bonds, in U.S. terminology) while the conversion option is still exercisable. Futures and options transactions are not taxable, but the exercise of an option is treated as a purchase of ordinary shares at the exercise price and is therefore taxable. Transactions in the shares of investment trusts (closed-end funds, in U.S. terminology) are taxable in the ordinary way, as are the transactions carried out by the managers of investment trusts. Purchases and redemptions of units in unit trusts (open-end funds, in U.S. terminology) are taxed as if they were transactions in the underlying shares held

16. For example, the SDRT is payable when investors buy shares and then resell them within the same two-week London Stock Exchange account period, thereby avoiding the need for a transfer of registered ownership. The SDRT is also payable on transactions in "renounceable letters of allotment or acceptance," which are traded in place of shares themselves during the six months after shares are first issued to the public.

by the trust. Transactions in fixed-income securities, such as corporate and government bonds, are not taxable.

Stamp duty applies to both primary and secondary market transactions. When new shares are issued the issuer pays the tax, whereas in secondary market transactions the purchaser pays the tax. Corporate repurchases of shares are also taxable.

There are a few exemptions from stamp duty. Registered charities are exempt, as are market makers registered by the London Stock Exchange when they trade in the securities for which they make a market, and member firms of the London International Futures and Options Exchange (LIFFE) when they trade to hedge equity options positions or to meet delivery obligations following the exercise of equity options.

The rate of stamp duty has varied over the years. In August 1963 the rate was lowered from 2 percent to 1 percent, increasing to 2 percent in May 1974, falling again to 1 percent in April 1984 and to 0.5 percent in October 1986. In its 1990 budget the British government announced its intention to abolish stamp duty altogether when the London Stock Exchange's Taurus system for electronic settlement came on-line. With the collapse of the Taurus development project in the spring of 1993, the future of stamp duty is uncertain.

Effects on Market Institutions and Trading Strategies

To understand the effects of stamp duty, it is important to realize that stamp duty is not a tax on the domestic consumption of transactions services. Accordingly the British system does not make any distinction between domestic and foreign investors.[17] Nor is stamp duty a tax on the domestic production of brokerage services. Indeed, the City of London thrives by providing brokerage services for trading in foreign shares, and these transactions are not subject to stamp duty. Instead, stamp duty is effectively a tax on registration, the transfer of legal ownership of U.K. shares.[18]

Since stamp duty is a tax on registration, investors have an incentive to reduce their consumption of this service by using nominees to hold assets in their name ("street name," in U.S. terminology). An investor could receive assets from the account of another investor using the same nominee without incurring a tax liability.[19] Recognizing the potential for tax avoidance of this type, the British tax authorities distinguish between "custodial nominees," who perform regular custodial functions, and "active nominees," who in addition may trans-

17. An exception is that for practical reasons the U.K. tax authorities do not try to collect the SDRT on transactions between foreign investors.

18. Transactions in some non-U.K. shares, mainly South African, Australian, and Irish shares, are settled in the United Kingdom using the London Stock Exchange's Talisman system. Stamp duty is payable at the South African and Australian rates for South African and Australian shares, while the U.K. and Irish tax authorities share stamp duty revenues for purchases of Irish shares through U.K. brokers.

19. Conversely, stamp duty is payable if an investor does not sell shares but simply changes nominees.

fer assets between the accounts of their clients. A typical custodial nominee is a large U.K. clearing bank (commercial bank, in U.S. terminology). Active nominees include domestic clearance services, and depositories that allow claims on assets held in their name to be traded in U.S. stock markets (these claims are known as American depository receipts, or ADRs). Transfers of shares into the name of an active nominee are taxable at three times the ordinary rate, compensating to some extent for the free trading which is possible once the shares are held by the active nominee.

More generally, stamp duty generates an incentive for the creation of bearer instruments, which can be traded without using registration services. To offset this incentive, stamp duty applies at the triple rate on any such creation of bearer instruments. For example, shares in Eurotunnel (the company operating the channel tunnel) were issued in both the United Kingdom and France. In the United Kingdom the shares were registered in the usual way, but in France the shares are bearer instruments. Triple stamp duty is payable when a holder of U.K. registered Eurotunnel shares converts them to French bearer shares.

Of these various devices for economizing on registration services, ADRs are the most commonly used. In the last six months of 1992, total trading volume in U.K. equities and ADRs on the London Stock Exchange amounted to 136.1 billion pounds, of which 10.5 billion pounds were U.K. ADR trading. In addition, there were 13.8 billion pounds of U.K. ADR trading in U.S. markets.[20] Thus trading in U.K. ADRs accounted for 16 percent of the total (U.K. ADR plus U.K. equity) trading in this period.

There are two other important means by which investors can reduce their liability to U.K. stamp duty. First, investors can switch from trading U.K. equities directly to trading U.K. equity derivatives. Futures transactions incur no stamp duty, and options transactions incur duty only when the options are exercised. Furthermore, LIFFE member firms can hedge equity options transactions without paying stamp duty. This gives derivatives a substantial tax advantage for many transactions. The LIFFE reports considerable trading volume in futures on the FTSE 100 index of U.K. equities (2.6 million contracts were traded in 1992, up 52 percent from 1991), in FTSE 100 options (3.1 million options in 1992, up 37 percent from 1991), and in options on individual U.K. equities (4.6 million options in 1992, down 4 percent from 1991).[21]

Second, investors can reduce stamp duty liability by trading less frequently. The magnitude of this effect is hard to estimate. Jackson and O'Donnell (1985) and Ericsson and Lindgren (1992), in econometric studies of U.K. and international equity turnover, respectively, find that the long-run elasticity of turnover with respect to overall transactions costs is in the range of −1 to −1.7. That

20. The U.S. figures are calculated as follows. In the last six months of 1992 there were $20.4 billion of trading in U.K. ADRs listed on the New York Stock Exchange, and $3.0 billion of trading in U.K. ADRs listed on the NASDAQ. Converting to sterling at an exchange rate of $1.70 per pound gives 13.8 billion pounds of U.K. ADR trading in U.S. markets.

21. Before March 1992 the equity options were traded on the London Traded Options Market, which has now merged with LIFFE.

is, a 10 percent increase in transactions costs reduces turnover by 10 to 17 percent in the long run. Since U.K. stamp duty appears to account for about half of the total trading costs in U.K. equities, these estimates imply that turnover is less than half of what it might be in the absence of stamp duty. Alternatively, without relying on econometric studies, one might note that in 1992 the ratio of trading volume to market value of domestic equities on the London Stock Exchange was only 62 percent of the corresponding ratio for the New York Stock Exchange (NYSE) and NASDAQ (National Association of Securities Dealers Automated Quotations) combined.[22]

Despite the availability of various means by which investors can substitute away from taxable trading, the stamp duty still has a considerable tax base. Trading volume in U.K. equities on the London Stock Exchange was 216.9 billion pounds during calendar 1992, and stamp duty on U.K. equities raised 830 million pounds in revenue in the fiscal year 1992–93. The revenue raised is somewhat less than the statutory 0.5 percent of trading volume because of the various exemptions. These exemptions do not reduce the liability of foreign investors, and figure 6.6 shows that the investors whose U.K. equity transactions are recorded in the Frank Russell data base pay close to the statutory fifty basis points per round-trip transaction. This is in marked contrast to the Swedish evidence reported earlier.[23]

6.3 Securities Transaction Taxes and Market Responses

By taxing an activity, the government creates an incentive to replace it with a nontaxed substitute. In the case of securities transaction taxes, the availability of alternative securities or trading methods creates many possible means of tax avoidance. Investors, intermediaries, and securities issuers can all attempt to pursue lower-cost trades through a variety of alternatives. Trading may migrate into substitute securities or it may move out of the government's physical tax jurisdiction, or both.

In this section, we examine different means of taxing transactions and the resulting tax incentives for migration and financial innovation. We first look at two rules that countries seem to apply in choosing which transactions to tax and how much to tax them. We argue that regardless of which rule is used, its application will create incentives for participants to avoid the taxes. We then turn to describe various ways in which taxes might change behavior (other than simply inducing investors not to trade): moving transactions to offshore or off-market locations; changing the nature of securities that investors and intermediaries trade; and changing the kinds of securities that issuers are likely to provide.

22. These figures come from the 1993 edition of the *London Stock Exchange Fact Book.*
23. Note, however, that the Frank Russell data base does not include transactions in U.K. ADRs or U.K. equity derivatives.
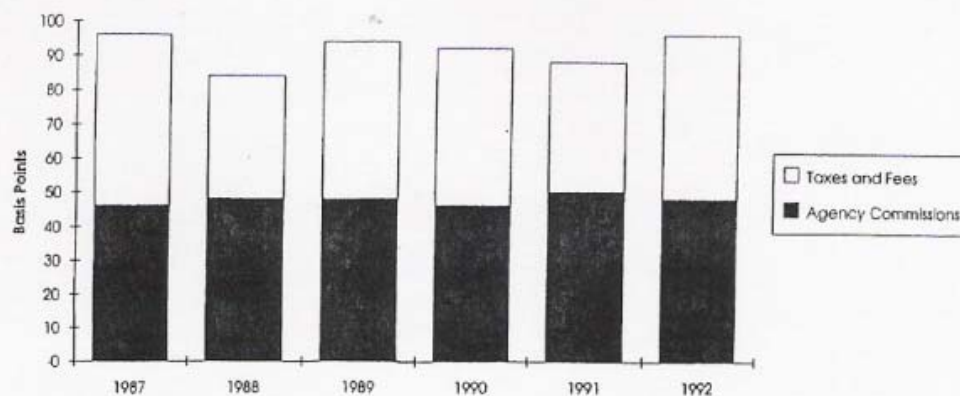
Fig. 6.6   Round-trip trading costs in U.K. equities for U.S. institutional investors
Source: Frank Russell Securities, Inc.

6.3.1   What to Tax and How Much to Tax It?

Any attempt to tax transactions must face questions of what constitutes a transaction and how much to tax different transaction types. While it seems simple enough to define a transaction as the transfer of legal ownership of a financial security, that definition does not go very far toward building a transfer tax program. No actual systems equally tax *all* financial ownership transfers; all exempt (partially or completely) certain types of securities or transfers between certain parties.

The main consequence of such selective taxation is a high degree of complexity in rates and scope. In the British system, for example, transfers of domestic equities and convertible bonds are taxable but transfers of straight bonds are not. In the Japanese system, straight bond transfers are taxable but at a lower rate than convertible bond transfers, which in turn are taxed at a lower rate than equity transfers. In the Swedish system, the statutory tax rate depended on who was trading as well as what was traded; for example, the taxes could be avoided by using offshore brokers for trades in Swedish equities. Moreover, derivative securities are taxed in many different ways: in the British system, futures transactions are untaxed, while options are taxed only upon exercise. In the Japanese and Swedish systems, futures and options are taxed, but at a much lower rate than either bonds or stocks.

One is naturally led to ask whether there are any underlying principles that can be used to determine which asset transfers are taxable and at what rate. Two principles are appealing on a priori grounds, and these seem to underlie at least some features of the systems we see in different countries. A first principle is that *transactions that generate the same payoffs should pay the same tax.* A second principle is that *transactions that use the same resources should pay the same tax.* The first principle emphasizes the outcome from a transaction, while the second emphasizes the resource cost of the transaction.

6.3.2   Taxing Transactions According to Their Payoff Patterns

Despite the a priori appeal of taxing transactions according to the payoffs they generate, this approach rapidly runs into difficulties. The problem arises from what we saw in the examples above—that for any *given* tax regime, behavioral responses will occur to undermine it. The effect of a turnover tax is rarely just to discourage trade. It also encourages a move in the location of taxed services, or a switch to an instrument which is a close, but more lightly taxed, substitute. These problems make it difficult or impossible to implement a system which taxes a transaction according to the payoffs it generates.

To take an example, consider what the presence of derivative securities does to a system that tries to tax payoff patterns. As is well-known, derivatives deliver payoffs which can be replicated through trading the underlying assets (along with short-term borrowing and lending).[24] For example, the payoff pattern obtained by purchasing and holding an option can be replicated by undertaking a dynamic trading strategy in the underlying asset, and, reciprocally, the payoff pattern from buying and holding the underlying asset can be replicated through a dynamic trading strategy in the option. Only the *intensity* of trading separates the two strategies for any given return pattern. Once a transaction tax is imposed, some payoff patterns will likely be cheaper to achieve with derivatives, and others will be cheaper to achieve with the underlying asset. Transaction taxes will generally not be able to equate the tax burdens from trading the two instruments.[25]

To see this, suppose that the system taxes the purchase of shares at rate τ. What should the tax rate on options be? A tax rate of zero would clearly encourage investors to substitute away from trade in the stock. Most investors would prefer to adjust their exposures to the stock through trade in the option.[26]

Alternatively, suppose a positive tax rate is levied on the option's market price. If an investor uses the option to duplicate the return from buying and holding the stock for, say, a year, a larger number of options transactions will be required. For this investor, the option can turn out to be more expensive than the stock for all but the lowest option tax rates. However, for another investor, one who wants the downside protection that options offer, the option will need to be purchased only once; a low option tax rate will make the option less expensive than the stock for this latter investor. A tax on option prices will therefore not satisfy the principle of taxing payoff patterns.

More generally, taxing the market price of a derivative is, in any case, a problematic proposition. After all, it is always possible to redesign a derivative

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24. The replication is precise under simplifying assumptions such as those made by the Black-Scholes option-pricing model, and approximate otherwise.

25. The presence of a transaction tax can also make the derivative an imperfect substitute for the underlying asset. In such cases, the replication described above will not be exact.

26. Of course, even in the absence of taxes, transactions have costs (brokerage fees plus the difference between execution price and the middle of the bid/ask spread). Thus there will be some trade in the stock even if options are completely untaxed.

to include more leverage. For example, futures contracts cannot be taxed according to their market price, as they have a price of zero when written.

The last possibility might be to tax options' "deltas"—that is, the notional amount of the stock an investor would currently need to buy to perform the stock-option replication discussed above. This method of taxation would also fail to tax transactions according to payoff patterns. First of all, implementation would be a nightmare: option deltas vary with both the market price and the strike price of the stock, so that tax rates across options would have to differ, and would have to vary over time. Second of all, the previous argument still applies: investors who want the return from buying and holding the stock will need to buy and sell options frequently if they are to achieve the return through options, and will therefore avoid using options; alternatively, those who prefer the payoff pattern of the option will find that the necessary frequent trading in the stock will make options the cheaper alternative for all but the highest option tax rates.

Thus it seems clear that no system of tax rates will enable a government to tax transactions according to their payoff patterns. Such a system does not in any case correspond exactly to any country's system. However, it does appear to have been part of the motivation in Sweden for extending the tax on underlying stocks and government bonds to futures and options.

6.3.3   Taxing Transactions according to Their Resource Costs

An alternative principle of transactions taxation is to equate the transactions tax burden across assets as a fraction of total transactions costs. On this principle, transactions with the same resource costs should be taxed equally.

For example, by some measures derivatives represent low-cost means of purchasing exposure to an underlying asset. Accordingly, this principle would suggest that transactions in derivatives should be lightly taxed compared to "expensive" transactions in cash markets.

This principle can be implemented in several ways. One possibility is to tax transactions costs directly; for example, Japanese brokers' commissions are subject to a 3 percent sales tax. Another approach is to tax the notional amounts invested, but at lower rates for assets with low transactions costs. This might help explain, for example, what was done in Sweden, with different rates on a wide range of instruments handled by Swedish brokers. Also, in Japan futures transactions are taxed at 0.001 percent, while cash transactions are taxed at 0.3 percent for general investors.

The third interpretation of this principle stresses that "resource costs" refers to indirect as well as direct costs. A number of arguments have been made that higher trading volumes stimulate negative externalities. These externalities typically fall into one of two groups: (a) excessive volatility of asset prices, higher risk premia, and, therefore, lower levels of investment;[27] and (b) excess

27. See, for example, Summers and Summers (1989).

or misallocated investment in speculative activities.[28] Either way, one might imagine a tax system which attempts to tax transactions as a way of compensating for the externality and reducing its size.

Such externalities provide a kind of economic rationale for transactions taxes as "sin" taxes. Such arguments were used by the Swedish Trade Union Council in initiating Sweden's discussion of transaction taxes. The tax rates that follow from this application of the resource-cost principle depend on the magnitude of the negative externalities. In Sweden, for example, where the sentiment focused on the negative consequences of excessive speculation, it is perhaps not surprising that tax rates on derivatives were set so high as to practically eliminate trade.

Can governments expect to accomplish their objectives when taxing transactions according to their "costs"? By taxing transaction inputs, such as brokerage or local trading services, taxes can indeed discourage local production of those inputs. That is because, in practice, these inputs are relatively inelastically supplied. In Sweden, for example, there is little question that the equity turnover tax succeeded in hurting local equity brokers and floor traders, at least to the extent that they could not costlessly move their services to offshore markets. However, no one has claimed that Sweden's tax should therefore be judged a success. This suggests that the tax's true objective had never actually been to discourage the allocation of local inputs into trading.

Suppose, instead, that the objective of the tax is to reduce negative externalities (allegedly) associated with trading "too much." In this case it is clearly not enough simply to discourage local investment in inputs. Externalities due to excess volatility or short-termism will not be reduced if total trading remains as its original level merely by moving abroad or into local close substitutes. Thus, a necessary condition for meeting this objective is for the tax to discourage *total* trading volume.[29] In terms of reducing total volume, the U.K. tax might be considered a success relative to the Swedish taxes.

6.3.4 Econometric Evidence on Market Responses to Transactions Taxes

Our case studies have shown that investors respond to transactions taxes by reducing the volume of taxable transactions. There is also some econometric evidence for this behavior.

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28. Stiglitz (1989) argues that profit-maximizing investors overinvest in information gathering relative to the social optimum. Froot, Scharfstein, and Stein (1992) show that short-horizon trading can lead researchers to "herd" on some sources of information and to ignore others. Presumably, the costly externalities here are not the misallocation of investor resources, but the potential for corporate resource allocation to be affected by inefficient investment in information. See Froot, Perold, and Stein (1992) for an analytic review of these issues and that of excessive volatility. Schwert and Seguin (1993) provide a broad overview of the literature.

29. It is important to emphasize that reducing total volume is by no means sufficient to ensure the tax's success. For example, lowering total volume does not ensure that excess volatility is reduced (even if it is present to begin with). If the demands of "stabilizing" traders are reduced along with the demands of "destabilizing" or noise traders, then the overall effect on excess volatility of reduction in volume will be ambiguous. See Froot, Perold, and Stein (1992) for an elaboration of and evidence on this argument.

The original work on this topic was done by Jackson and O'Donnell (1985), who studied U.K. trading volume over the period 1964–84. Jackson and O'Donnell estimated an equation of the form

$$v_t = \alpha_0 + \alpha_1 v_{t-1} + X_t \beta + e_t,$$

where v is the log of trading volume and X_t is a vector of explanatory variables including some contemporaneous and some lagged variables. One of the explanatory variables, say, X_{1t}, is a measure of log transactions costs; Jackson and O'Donnell call the coefficient on this variable β_1, the short-run elasticity of trading volume with respect to transactions costs, and they call $\beta_1/(1 - \alpha_1)$ the long-run elasticity of trading volume with respect to transactions costs since this is the effect of a one-time permanent change in transactions costs after trading volume has fully adjusted to its new level.

Jackson and O'Donnell measure trading volume in a rather unusual way. They divide the value of shares traded by the level of the *Financial Times* (FT) all-share stock price index, instead of dividing by the total value of shares outstanding. The latter procedure would give a measure of turnover; Jackson and O'Donnell's procedure approximates turnover only if the number of shares outstanding is fairly constant and if the FT stock price index adequately proxies the price behavior of the market as a whole.

To measure transactions costs, Jackson and O'Donnell assume that other costs equal 0.75 percent for a one-way transaction. They add the one-way stamp duty rate to this to get a total transactions cost, and then take logs.

Jackson and O'Donnell also include a large number of other variables in their X_t vector. They use the log of the total value of shares outstanding, deflated by the consumer price index; the log of expenditure on mergers and acquisitions, deflated by the FT stock price index; the log of net inflows to life assurance and pension funds (the leading institutional investors in the U.K.), again deflated by the FT price index; the change in the log stock price index and the absolute value of this change; and seasonal dummies for the third quarter of every year (to capture low trading volume in the summer) and for the first quarter of 1981 and every subsequent year (to capture capital gains tax effects).

In their preferred specification, Jackson and O'Donnell estimate the coefficient on lagged log trading volume to be 0.55, and the coefficient on log transactions costs to be −0.48. This implies a long-run elasticity of trading volume with respect to transactions costs of −1.65. Starting from an initial transactions tax rate of 2 percent, a reduction to 1 percent is a 0.45 reduction in total log transactions costs, which is estimated to increase trading volume by about 70 percent. Starting from an initial transactions tax rate of 0.5 percent, abolition of the tax is a comparable reduction in total transactions costs with a similar estimated effect on trading volume.

Jackson and O'Donnell also experiment with other specifications and find that the estimated long-run elasticity of trading volume with respect to transactions costs varies from −0.9 to −1.7. In very similar work with Swedish data

over the period 1970–88, Lindgren and Westlund (1990) estimate the long-run elasticity to be in the range of -0.85 to -1.35. Ericsson and Lindgren (1992) extend the approach to international panel data. They estimate the long-run elasticity to be in the range of -1.2 to -1.5. Thus all these studies give fairly similar results.

There are some small differences in specification between the Lindgren-Westlund and Ericsson-Lindgren papers and the original Jackson-O'Donnell paper. Lindgren and Westlund use $\log(1 + z)$ in place of $\log(z)$, where z is the merger activity variable and the net inflow to institutions variable. This is to avoid the implication of the Jackson-O'Donnell specification that stock market trading volume would fall to zero if merger activity or net inflow to institutions ceased. Ericsson and Lindgren use a standard measure of turnover as the dependent variable, they drop the merger activity and institutional inflow variables, and they include both market size and interest-rate movements in the vector of regressors. More importantly, they include time and country dummies to pick up fixed country effects and common movements in trading volume across countries.

Although these studies are suggestive, there are several reasons why their results should be treated with some caution. First, the time-series studies tend to begin with equations that include long lags and hence a very large number of regressors, testing down to a more parsimonious final specification. Jackson and O'Donnell, for example, begin by estimating thirty-seven coefficients when they have eighty-three observations! Even their final equation includes nineteen explanatory variables. In this situation it is easy to overfit the data and end up with spuriously significant coefficients.

Second, it is not easy to measure total transactions costs accurately. Transactions costs include not only bid-ask spreads and brokerage commissions, but also the price impact of trading and the effects of capital gains taxes. It is not at all clear that these factors can be proxied adequately by any fixed number.

Third, the effect of transactions costs on trading volume depends on the other margins of substitution that investors have available. This is a point that we have emphasized elsewhere in this paper. If investors can easily switch from taxed and measured trading volume to untaxed, unmeasured trading in offshore markets or substitute assets, then transactions costs should have a large effect on measured trading volume. If investors can only choose between taxed trading on the exchange and holding their assets, then transactions costs should have a much smaller effect. None of the econometric studies adequately capture the variation over time and countries in the alternatives available to investors.

Fourth, many of the other variables included by Jackson and O'Donnell and the other authors are arguably endogenous. The growth rate of stock prices and the absolute value of this growth rate (a measure of volatility) may well respond to changes in transactions costs. The same can be said of merger and acquisition activity. Some of the effects attributed to these variables in the regressions may in fact be due to changing transactions costs.

Last but not least, transactions costs themselves may be endogenous. Our analysis of Sweden shows that the authorities reduced transactions tax rates in response to declining trading volume and disappointing revenue. It is possible that the secular decline in U.K. stamp duty rates from 2 percent in the late 1970s to 0.5 percent today has also occurred because the authorities perceive that investors are increasingly able to substitute away from taxable trading.

For all these reasons we believe that the elasticity of trading volume with respect to exogenous changes in transactions taxes remains uncertain. The estimates of Jackson and O'Donnell and others are plausible values to use in rough calculations, but not more than that.

6.4 Conclusion

Any analysis of a proposed tax change must take account of the behavioral responses that may result from it. The main lesson from the international experience with securities transaction taxes is that these behavioral responses can be quite large, and that they are sensitive to the way an STT is implemented. The important responses seem to be:

1. A reduction in overall trading. The response here was greater for the United Kingdom than for Sweden's equity or fixed-income taxes. While volume in Swedish money markets fell most dramatically, this was not true for total volume in money market securities and their substitutes. The effects on total trading are often difficult to measure because trade moves off the market where it is taxed.

2. A migration of trading into offshore markets for the same securities. Here the response was greater for Swedish equities than it was for U.K. equities or Swedish fixed-incomes. There is no perfect substitute for a share of Volvo, but there are nearly perfect substitutes for Swedish brokerage services to trade Volvo. The result was a steady movement away from the use of local brokerage services to consummate trades. Similar experiences abound: taxes on futures transactions in Tokyo led to the migration of trade to Osaka and Singapore; taxes on stock transactions in Finland (removed as of May 1992) caused a large fraction of local trading to migrate to London; and so on.

3. A migration of trading into local substitute securities. In the United Kingdom local trading of ADRs and in Sweden the trading of forward contracts (versus taxed trade in futures) demonstrate that markets can and will shift toward existing substitutes or create new ones when taxes are imposed. Substitution by the original issuer may also take place. For example, taxation of corporate equity but not debt (as in the United Kingdom) may lead companies to lower capital costs by issuing more debt and less equity, all else equal.

4. A combination of (2) and (3): A migration of trading into offshore markets for substitute securities. ADRs traded in the United States permit untaxed trading of a security closely related to the U.K. ordinary stock.

The importance of these behavioral responses for any specific tax proposal

will depend on the available alternatives as well as on the specific tax design.[30] Indeed, alternatives that do not yet exist can be important. The establishment of new instruments or trading environments is particularly likely when the tax base is large in an absolute sense, since then the fixed costs of establishment can be spread over a large number of trades.

All these responses tend to shrink the tax base as tax rates increase, reducing the revenue that might otherwise be expected. A basic principle of public finance is that the shrinkage of the tax base is more severe when a tax is levied on a good or service that is supplied and demanded elastically. In such circumstances sellers greatly reduce supply rather than accept lower prices, and buyers greatly reduce demand rather than pay higher prices; the tax wedge between the seller's price and the buyer's price then greatly reduces the quantity of the good traded and the revenue that can be raised by the tax. This principle can be applied to STTs once one thinks of them as taxes on one or more of the resources that are used as inputs to a transaction. Different countries tax different resources. As we have seen, the Swedish system taxes domestic brokerage (the domestic resources used in matching buyers and sellers), whereas the U.K. system taxes registration (the resources used to make a transfer of ownership legally binding).

The demand for domestic equity brokerage is highly elastic because investors can easily trade abroad and use foreign brokers instead of domestic brokers. Similarly, the demand for domestic fixed-income brokerage is highly elastic because it is easy to create local untaxed substitute assets. Accordingly, the Swedish STTs on equities and particularly fixed-income securities produced disappointingly little revenue for the Swedish government.

The demand for registration appears to be less elastic, at least in the short run.[31] Trading offshore does not by itself remove the need to make a transfer of ownership legally binding, and hence does not shrink the tax base for the U.K. securities transaction tax. To reduce their tax liability, investors in U.K. equities must trade in closely related but not identical securities (ADRs or UK equity derivatives), or must reduce their volume of trading. These alternatives are certainly important, but the U.K. securities transaction tax base remains large enough for the U.K. government to raise about 800 million pounds a year from a 0.5 percent STT on equity transactions.

What are the lessons from international experience for the U.S. debate on securities transaction taxes? Proponents of an STT argue that it would reduce trading volume (and negative externalities that are alleged to be associated with volume), while raising much-needed revenue for the U.S. Treasury. The "externality" argument for an STT requires that investors act to reduce their tax lia-

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30. Any impact of a tax on parts of the domestic securities industry is likely to be similarly sensitive to the specifics of the tax and feasible responses to it.

31. Long-run elasticities may be a good deal higher. Evidence for this comes from the secular downward trend in U.K. stamp duty rates, which may be attributable to the growing availability of untaxed substitutes.

bility, but specifically by reducing trading volume rather than by moving trading to untaxed assets or jurisdictions.[32] If an STT is to raise much revenue, however, investors must not reduce their tax liability too far. Thus there is some conflict between these two arguments for an STT, but both arguments clearly fail if investors find it easy to trade in untaxed assets or foreign markets.

The first lesson from international experience is therefore that an STT fails when it taxes a transaction input that has close untaxed substitutes. The Swedish equity transaction tax applied only to transactions using Swedish brokerage services, which are highly substitutable with foreign brokerage services. The tax has some effect on domestic trading volume (as measured by transactions in restricted Swedish shares), but did not reduce the volume of trade in London and may even have increased this volume as investors moved trading offshore. The Swedish fixed-income transaction tax was a more dramatic failure; investors did not even have to move offshore because they were able to find untaxed domestic assets that were close substitutes for the taxed assets.

The British stamp duty has clearly been more successful than the Swedish STT, because it taxes registration. This is a necessary input no matter where a transaction is carried out, and so the British tax does not give investors incentives to move trading offshore. In the long run, however, even the British tax is vulnerable to innovation as investors discover that they can avoid stamp duty by trading ADRs or equity derivatives. This is an example of the point emphasized by Kane (1987), that long-run elasticities of substitution tend to be much larger than short-run elasticities. Governments must continually update their tax systems if they are to avoid erosion of the tax base through financial innovation.

How much revenue might the U.S. government raise if it imposed a securities transaction tax of the British type, at the British rate? The U.S. Congressional Budget Office (1990) estimate of $10 billion in annual revenue has been widely cited. One way to get a number of this magnitude is to scale up the U.K. annual revenue by the trading volume in U.S. equities relative to the trading volume in U.K. equities. First, we convert the U.K. annual revenue of 800 million pounds to dollars; using an exchange rate of $1.7 per pound, this is about $1.4 billion. Then we note that U.S. equity trading volume on the NYSE, AMEX (American Stock Exchange), and NASDAQ is almost eight times the U.K. equity trading volume on the London Stock Exchange, implying revenue of about $11 billion. One could get an even higher revenue estimate if one assumed that the U.S. STT would be applied to fixed-income securities, which are not taxed under the British system.

But this revenue estimate ignores the behavioral responses that would surely follow the imposition of a U.S. securities transaction tax. Once an STT is in

32. Note again that a reduction in trading volume is necessary but not sufficient for the externality argument to be valid. Even if an STT reduces trading volume, it might reduce positive-externality transactions more than negative-externality transactions.

place, investors have the incentive to replace taxed transactions with innovative untaxed transactions or simply to reduce the volume of trade. The Swedish experience with a fixed-income STT suggests that substitution makes it hard to raise much revenue in the fixed-income markets. In the equity markets, the econometric studies of Jackson and O'Donnell (1985) and Ericsson and Lindgren (1992) imply that the long-run elasticity of taxable trading volume with respect to transactions costs is in the range of -1 to -1.7; that is, a 10 percent increase in transactions costs reduces taxable trading volume by 10 to 17 percent in the long run. The large U.S. investors whose trades are recorded in the Frank Russell data base pay about thirty basis points for an average U.S. equity trade. A 0.5 percent STT would add fifty basis points to this, reducing taxable trading volume by 62 percent if the elasticity is -1 and by 81 percent if the elasticity is -1.7. The implied tax revenue falls proportionally to $4 billion if the elasticity is -1 and to $2 billion if the elasticity is -1.7.

It is important to note that an STT of given size has a particularly large impact on U.S. markets because U.S. trading costs are presently so low. The investors recorded in the Frank Russell data base pay about fifty basis points, excluding taxes, when they trade U.K. equities; trading costs in other national equity markets are typically even larger. An STT has a much larger proportional impact when other trading costs are thirty basis points (as in the United States) than when other trading costs are fifty basis points or more. The calculations above take account of this effect.

Of course, one may not want to rely too heavily on the econometric methods of Jackson and O'Donnell (1985) and Ericsson and Lindgren (1992). An alternative, simple way to estimate the revenue that could be raised by a U.S. STT is to scale up the revenue raised by the U.K. securities transaction tax by the total capitalization of the U.S. market relative to the U.K. market. U.S. equities listed on the NYSE, NASDAQ, and AMEX together have a total capitalization almost five times bigger than the U.K. equities listed on the London Stock Exchange. This scale factor of five is smaller than the trading volume scale factor of eight because U.S. equities trade more actively, just as one would expect given the low transaction costs in U.S. markets. Scaling up the U.K. transaction tax revenue by a factor of five gives a revenue estimate of only $7 billion.

One other consideration suggests that investors' behavioral responses would severely limit the revenue of a U.S. STT. The sheer size of U.S. financial markets makes it worthwhile for institutions to pay the fixed costs of developing and marketing tax-driven financial innovations. From this perspective it is not surprising that U.S. markets have been particularly innovative in the past, and one should expect similar levels of innovation in the face of new taxes. It is striking that in no country have the investors in the Frank Russell data base paid securities transaction taxes that exceed the other transaction costs in that country's market. Given the low general level of U.S. transaction costs, this leads to a pessimistic assessment of the revenue potential of a U.S. securities transaction tax.

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Introduction

The paper by Campbell and Froot provides an extremely careful analysis of the impact of security transaction taxes (STTs) on security markets. They show that these taxes have three effects on the trading of securities: (a) they decrease trading in taxed securities; (b) they increase trading in nontaxed substitutes; (c) they increase foreign trading of domestic shares at the expense of domestic

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trading. An important implication of these three effects for the use of STTs as a source of tax revenue is that they raise less funds than one would expect based on the transaction volume before their imposition. I fully agree with the message of the Campbell and Froot paper. In my discussion, I want to point out some additional implications of STTs which are outside the focus of their paper. In turn, I discuss the implications of STTs for share ownership, stock return volatility, the cost of capital, and the geography of trading. Finally, I talk briefly about the political economy of globalization.

Transaction Taxes and Share Ownership

If trading is cheap, investors can follow the Wall Street Rule—sell when dissatisfied with management—at little cost.[1] This means that they have little incentive to invest resources to monitor management. As trading becomes more expensive, investors become locked into their holdings and can increase the performance of their portfolios through actions designed to improve the performance of management. Since STTs increase the cost of trading, this reasoning implies that they increase the monitoring of management and hence improve corporate performance.

As Campbell and Froot point out, STTs can be avoided by trades in untaxed securities which have highly correlated payoffs with the taxed securities. For instance, a shareholder who wishes to sell his holding of shares of firm X can avoid the transaction tax by engaging in an asset swap whereby he swaps his shares of firm X for shares of some other firm. With such a swap, ownership of the shares is not affected and no explicit security is exchanged, hence no transaction tax is paid. Yet, the investor ends up with a portfolio whose payoffs do not depend on the performance of firm X shares because he pays to the counterparty all the payoffs from his shares of firm X. Hence, for investors who can find ways to alter the return distribution of their portfolios without paying the tax, the tax affects how these investors trade but not how they monitor management.

It is reasonable to think that most of the cost of drawing up a contract to sell a payoff pattern is represented by a fixed cost which does not depend on the magnitude of the payoffs sold. A swap involving ten times more shares of company X for ten times more shares of another firm is not ten times more expensive to set up. Consequently, one would expect that large investors would find it beneficial to use derivatives to alter the return distribution of their portfolios, whereas small investors would not. This is because for a small investor the fixed cost of the derivative transaction would most likely be greater than the tax payment. Hence, for small investors, STTs have a lock-in effect, but it is doubtful that they have as much of a lock-in effect for large investors. This suggests that STTs penalize small investors relative to large investors. Further, if use of the Wall Street Rule by shareholders leads management to pay excess

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1. See Bhide (1993) for the argument that a low cost of trading increases corporate control costs.

attention to short-run performance measures at the expense of long-run performance, STTs reduce the use of the rule mostly by small shareholders. Typically, those who are concerned about short-termism tend to blame fund managers rather than small shareholders,[2] so it is difficult to believe that STTs do much about short-termism.

One might argue that a well-designed tax would be such that it could not be avoided through sales of payoffs through derivative transactions. This view overlooks the fact that, whereas share transfers are easy to tax, transactions which take place outside of organized exchanges are not. Even if the intent is to tax trades of payoffs instead of trades of securities, it is unclear how well this can be done. Many derivatives have no value when the contract is opened. For example, forward contracts have no value when the parties agree to the forward transaction. Consider an investor who sells the security forward with a contract which has a long maturity. Eventually, the security will be sold as the forward contract is executed. At that time, the transaction tax will have to be paid. The present value of the tax payment is small, though. To make it uneconomical for investors to substitute forward sales for cash market sales, forward contracts will have to be taxed. Effectively, though, the tax authority would have to devise a formula that states that a forward sale is equivalent to some fraction of a cash sale.

Forward contracts are just one example of derivative assets. These contracts are the easiest to analyze. To avoid providing incentives to investors to substitute derivative trades for cash transactions, the tax authority will have to provide complicated formulas that require precise valuation of the derivative trades. There are an infinite number of ways through which payoffs can be sold. This means that markets will always be one step ahead of the tax authorities. In addition though, it seems unlikely that the tax authorities would know how to evaluate each derivative transaction without making valuation mistakes. After all, for most derivative securities, there is no unanimously agreed upon valuation approach.

Security Transaction Taxes and Volatility

It is sometimes suggested that security transaction taxes reduce volatility by decreasing trading. It is true that there is substantial empirical evidence which shows a positive relation between trading and volatility,[3] so that a mechanical application of this relation suggests that a decrease in trading will indeed reduce volatility. The problem is that the behavior modifications induced by the transaction tax themselves change the relation between trading and volatility. The argument I want to make is that STTs may increase volatility for a given volume of trading, so despite their negative effect on trading volume, they may increase volatility.

2. See, for instance, Jacobs (1991).
3. See Karpoff (1987) for a review of the evidence.

Note that STTs reduce liquidity. To see this, suppose that unexpectedly a block of shares for firm X is offered for sale on the exchange. To absorb this block, investors want a price concession, so that the price of the share drops slightly. Investors who are willing to make these trades possible provide liquidity to the markets.[4] They probably do not intend to hold on to these shares for very long, but they are providing an important service. With an STT, investors who provide liquidity want the stock price to fall more than in the absence of an STT before they buy shares, since their profit from doing so is decreased by the STT. Hence, an STT is likely to increase the short-run volatility of share prices.

If the concern is that there is excessive volatility because large groups of investors may trade without regard for fundamentals but simply to anticipate or react to trades by other large groups of investors, the effect of an STT on this excessive volatility is ambiguous.[5] This is because the STT affects the incentives of investors who trade on fundamentals as well as the incentives of those who do not. Short of carefully modeling the behavior of both classes of investors, it is unclear which category reduces its trading the most as the STT is introduced. If investors who trade on fundamentals reduce their trading the most, it is possible for excessive volatility to increase following the imposition of the STT.

The effect of an STT on information acquisition is also ambiguous. The reward for trading on a given piece of information falls with the STT because the cost of trading increases. Hence, one would expect investors to invest less in information collection. At the same time, though, the gain from collecting information to monitor management increases. Because small investors do not monitor management, the STT is likely to decrease information acquisition if it ends up favoring large investors over small investors.

STTs and the Cost of Capital

Suppose now that the STT cannot be avoided through trades in untaxed substitutes. When investors purchase securities, they do so based on their expectation of the return net of trading costs. Consider the case of a tax of 0.5 percent which is expected to be maintained forever. In this case, if investors have a discount rate of 8 percent and expect to hold securities for two years, the unexpected imposition of an STT should decrease stock prices by 3.5 percent and increase the before-tax expected return required by investors to hold shares by 0.25 percent.[6] Hence, the imposition of an STT decreases shareholder wealth and increases the cost of capital of firms. This means that one would

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4. See Grossman and Miller (1988).
5. See, for instance, Froot, Scharfstein, and Stein (1992) for a model where some investors behave this way.
6. This number equals

$$0.005 + 0.005/(1.08)^2 + 0.005/(1.08)^4 + \ldots = 0.035.$$

expect an STT to decrease investment within a country and hence to have a negative impact on growth.

STTs and the Geography of Trading

Governments can tax and regulate within their borders. In the absence of cross-border restrictions on capital flows, one expects security markets to grow where taxes and regulations are the least onerous. Hence, governments that tax securities trades take the risk of driving away from their countries security markets altogether. Taxes and regulations imposed in the 1960s in the United States played a major role in the creation of the Euromarkets. Taxes and regulations within European countries have played a major role in the growth of trading of European stocks in London. In particular, the Swedish STT shifted trading of Swedish shares to London as discussed by Campbell and Froot.

In the presence of cross-border restrictions on capital flows, there is a role for national stock markets. This is because residents within a country can share risks among themselves more efficiently than they can with outside investors. In addition, when information flows slowly from one place to another, it makes sense for shares to trade where information is generated. Over the past ten years, however, barriers to international investment have fallen dramatically and technological advances have eliminated the informational advantage of proximity. In this setting, it is unclear what role there is for national stock markets.

One plausible scenario is that the Euromarkets will keep growing and will extend more to trading in shares. With this scenario, trading in shares would progressively be concentrated offshore and national markets would become less important, catering mostly to small investors. It is not clear how regulators can make the costs of trading offshore higher without imposing cross-border restrictions which would lead to renewed market segmentation. Hence, it would seem that offshore trading will keep creating pressures for deregulation as long as barriers to international investment keep falling.

STTs and the Political Economy of Globalization

Over the past ten years, markets have become more integrated mostly because of the decrease in barriers to international investment and, to a lesser extent, because of technological advances in communication. Although many seem to believe that globalization is irreversible, the experience of STTs should make us careful about drawing such a sweeping conclusion. In the absence of barriers to international investment, trade in securities takes place where it is most advantageous, which makes it difficult for countries to tax and regulate them. Hence, countries that wish to tax and regulate trade in securities may decide that they can only do so effectively if they limit cross-border flows. As countries place more restrictions on cross-border flows, offshore markets become less liquid and trading flows back to national markets, making it easier for governments to regulate and tax securities trading. This is not the first time in history that barriers to international investment are low.

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