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Effective Currency Transaction Taxes: The Need to Tax Derivatives

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In recent years, there has been considerable interest among economists, political leaders and non-governmental organizations in instituting a set of currency transactions taxes (CTT) or Tobin taxes. The motivation has been two-fold:

- to raise money for important social purposes, such as reducing poverty in developing, combating global warming, or providing basic health care in developing nations; and

- reducing instability in currency markets by reducing the volume of trading.

It is plausible that a well-designed CTT could serve both ends. Simple arithmetic shows that a CTT set at even a very modest rate (e.g. 0.1 percent), could raise an enormous amount of revenue. With daily trading volume now exceeding $1 trillion, a 0.1 percent tax could raise over $100 billion annually, even with very large decline in trading volume. Similarly, by reducing the volume of trading, it is possible that a CTT will increase the stability of currency markets. This could be the case if the traders who are discouraged by the tax are destabilizing speculators, or noise traders, rather than arbitrage traders. Also, reduced trading volume should facilitate effective intervention by central banks seeking to maintain stability in currency markets.

However, a CTT that applies to the spot market for currency cannot possibly achieve these objectives. This paper shows that:

- that such a tax will be readily evaded by speculators acting in secondary markets, and

- that trading in secondary markets can easily move the spot market.

It argues that to be effective, any CTT will have to be applied to a wide range of financial instruments. Furthermore, a broadly based financial transactions tax is socially desirable, for all the reasons that a CTT is desirable in currency markets.

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The first section of this paper describes ways in which a CTT that is applied only to the clearinghouse for exchanges of currency can be evaded through the use of derivative financial instruments. It also explains the links between derivative markets and the primary market, showing how movements in derivative markets can determine currency values in the spot market. The second section lays out an argument for a broader based financial transactions tax, as a policy which is both feasible and desirable. The conclusion summarizes the main points of the paper.

TABLE1
Trading in the Spot and Options Market[1]

	Spot Market No Tax		Tax	Net Profit
Trade 1	Buy – 1.11 million euros	Sell – 1 million dollars	--	
Trade 2	Buy – 1.05 million dollars	Sell – 1.11 million euros	--	
Total				**$50, 000.00**
	Spot Market with 0.1 Percent Tax			
Trade 1	Buy – 1.11 million euros	Sell – 1 million dollars	$1,000	
Trade 2	Buy – 1.05 million dollars	Sell 1.11 million euros	$1,050	
Total			**$2,050**	**$47,950.00**
	Options Market No Tax[2]		Tax	Net Profit
Trade 1	Buy 30-day option 1.11 million euros (@$13, 592.40)		--	
Trade 2	Sell 30-day option 1.11 million euros (@50,476.70)		--	
Total				**$36,884.30**
	Options Market with 0.1 Percent			
Trade 1	Buy 30-day option 1.11 million euros (@$13,112.40)		--	
Trade 2	Sell option 1.11 million euros (@ $49,575.10)		--	
Total				**$36, 462.70**

Source: Author's calculations, see text.

Evading CTTs Through Derivative Trading

In two recent papers, Rodney Schmidt (1999, 2000) has argued that it would be possible to implement an effective tax on currency trades by targeting only the clearinghouse for foreign exchange transactions. These papers examine the mechanics of the foreign exchange market and note that the vast majority of trades are processed through a netting system run by major money center banks. This netting system allows for trades to be netted against each other over a period of time, so that payments are only made to offset the net purchases or sales passing through a bank (e.g. the netting system balances an individual bank's sales of a particular currency against its purchases, so that payment is only made for the net change). Schmidt argues that trades can be taxed at the point where they are recorded in this netting process. The papers note that the centralization of the netting process is the result of real economies of scale in the settlement process. These economies make it unlikely that traders would seek to go outside the system to evade a modest transactions tax. The costs and risks associated with carrying through trades outside the system would almost certainly exceed the size of the tax.[3]

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[1] For simplicity, these calculations assume that all non-tax transactions costs are zero.

[2] These options prices were obtained from the OZFOREX options price calculator (www.oxforex.com.au/cgi-bin/optioncalcinput.asp). The calculations assume volatility of 12.5 percent and an interest rate of 6.15 percent.

[3] The claim that leaving the system to evade the tax would not prove profitable depends on the tax being relatively small. The 0.1 percentage point tax rate often suggested by proponents of currency transactions taxes is probably too small to encourage traders to move outside the existing netting and settlement system. Higher tax rates, such as the 1.0 percentage point tax proposed in Spahn (1996), which kicks in when currencies begin to trade outside of a pre-determined range, may be large enough to prompt traders to move outside the system. If the current institutional structure is inadequate to support large scale

While this argument concerning efforts to evade a tax by carrying through trades outside of the system is plausible, the papers' claims concerning derivative markets is less plausible. The papers argue that trades in derivative instruments such as forwards, futures, swaps, and options will also be subject to the tax, since these instruments ultimately will force traders to enter the spot market, where their transactions will be subject to the tax. In fact, these derivative instruments allow traders to take or hedge positions that are far larger than the implied trades in spot markets. In other words, while trading in derivatives may generally be associated with trades in spot markets, traders can speculate on far greater volumes of currency in derivative markets than they need ever exchange in spot markets. Therefore a tax that only applied to the netting system would simply shift most currency speculation to derivative markets.

The most obvious way that this sort of switch to derivative markets could occur is with currency options.[4] An option contract gives the owner the right to buy or sell a specific amount of a currency at a set price, at some point in the future, typically 30, 60, or 90 days from the date when the option is issued. A call option gives the owner the right to buy currency at a specified date, whereas a put option gives the owner the right to sell currency. These options allow individuals to speculate on the value of currencies without directly entering the spot market.

For example, suppose the current exchange rate is 120 yen to the dollar. A trader who expected the yen to rise in value against the dollar could buy a call option which will allow her to buy 1 million yen in 30 days, at a price of 120 yen to the dollar. If the yen appreciates in value before the expiration date of the option, then the price of this option will rise, providing the trader with a profit. Similarly, a trader who expected the yen to lose value relative to the dollar could purchase a put option, which would give her the right to sell 1 million yen in 30 days, at a price of 120 yen to the dollar. In this situation, the option will rise in value if the yen falls in price relative to the dollar. In this way, options allow traders a mechanism for speculating on currencies without directly entering the spot currency market.

It is also possible to speculate in currencies by selling options. For example, a trader who expected the yen to fall in price could sell call options. If the yen subsequently falls in price, then the option will expire without ever being exercised, and the seller would have profited by the sale price of the option. Similarly, a

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trading outside of the existing system, a large enough tax would provide sufficient incentive to establish alternative institutional structures.

[4] Currency swaps would also provide an easy method for evading a currency tax only imposed through the netting system. Currency swaps are typically carried through as large volume contracts between major banks. Generally they involve exchanging principle payments and subsequent interest payments between two currencies, which can provide an investor with a mechanism for hedging currency risk over the life of an investment. This sort of swap arrangement would require the parties to enter the spot market repeatedly, and would not allow them to avoid a currency tax. However, the contracts can be written in virtually any manner, so it would extremely simple just to specify a set of future payments that effectively allowed the parties to bet on currency movements without entering the spot market. According the Bank of International Settlements (BIS), the daily volume of trading in currency swaps was over $10 billion in 1998 (BIS 1998). While this is far smaller than the foreign exchange market, it is still a constitutes a sizable market, which can presumably easily expanded, if there were a reason, such as the imposition of a tax in the spot foreign exchange market. Another possible way to avoid taxes through derivative instruments would be to establish funds that hold currency, where the shares of the fund could be sold. Such funds would be analogous to closed end mutual funds. These funds hold a fixed amount of assets such as stocks and bonds, with the shares being bought and sold on established exchanges. The shares of the mutual fund gain or lose value as the underlying assets gain or loss value. A currency fund on this model could simple hold a large volume of a specific currency (e.g. 5 billion euros). This would allow traders to speculate in the currency without ever going directly into the spot currency market. (The value of such currency funds would presumably track the value of the underlying currencies in the same way that the value of closed end mutual funds track the value of the underlying assets. The fact that the fund could in principle be dissolved and the assets sold, ensures that there will never be any large and lasting divergence.) At present, the transactions costs associated with trading in such funds would almost certainly exceed the costs of trading in the spot currency market, but this may not be the case after the imposition of a 0.1 percentage point tax, and almost certainly would not be the case if the tax reached 1.0 percentage points.

trader who anticipates that the yen will rise in price can sell a put option. The put option will never be exercised if the yen rises above the strike price specified in the option.

While both the buy and sell sides of the option market can be used to speculate on currencies, it is worth noting an important difference. The risk on the buy side is limited to the money paid for the option itself, since in the worst case scenario the option expires worthless. However, the risk on the sell side is far greater, since currencies can rise or fall considerably over the life of the option. The seller of the option has to be prepared to honor their commitment regardless of the fluctuations in the currency price. For this reason, options exchanges require sellers to hold assets as collateral to ensure that they will be able to honor their commitments.

In fact, selling options can be seen as providing a form of insurance against excessive fluctuations in currency prices. Firms engaged in international trade often buy currency options to protect themselves against the possibility that an adverse currency movement can wipe out their profits on a particular transaction. The purchase of an option transfers this risk to the seller of the option. The bet on the part of the seller of the option is essentially that large fluctuations will not lead to a loss. It is common for traders to sell both put and call options simultaneously, betting in effect that currency prices remain sufficiently stable so that neither option becomes profitable to exercise.

There are two important points to recognize about options trades. First, they allow traders to highly leverage their transactions. Through the use of options, it is possible to bet on an amount of currency that is far larger greater than the purchase price of the option. This is especially true if a trader buys an option that is currently "out of money" with a strike price for a call option that is above the current spot price, or in the case of a put option, below the current spot price. For example, the cost of buying an option to purchase $100,000 worth of yen in 90 days, at strike price that is 2.5 percent above the yen's current value is $3,908.[5] The second important point is that options are rarely exercised. The vast majority of options are either sold back to the exchanges before their expiration date, or expire worthless. Only a small fraction of options are ever exercised. These two points about options are important to keep in mind, when assessing the extent to which a tax on spot currency transactions will affect trading in currency options.

The Impact of a Spot Transactions Tax on Currency Options

Schmidt (2000) identifies three ways in which a tax in the spot currency market will be passed on to traders in options. First, if the option is issued in a different currency than the one held by the trader, the trader will pay the tax on the currency needed to initially buy the option. Second, option traders often engage in collateral transactions in the spot market to hedge their positions. Such trades would be subject to the tax. Third, at the point when an option is exercised, the currency involved in thetransaction will be taxed in the spot market. Each of these points will be considered in turn.

The fact that currency traders may occasionally need to change currencies in order to buy options is true, but sufficiently trivial to be virtually irrelevant. It is only necessary that one well developed exchange exist in order for traders to be able to trade options in a wide variety of currencies. For example, at present the New York Board of Trade trades in contracts for 11 different currencies.[6] This means that any trader who holds dollars can buy options in all of these currencies without buying currency in the spot market. If a

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[5] This price was calculated using the options calculator at OZFOREX (www.oxforex.com.au/cgi-bin/optioncalcinput.asp). The calculation assumes volatility of 12.5 percent and an interest rate of 6.15 percent. It assumes that the yen is currently valued at the rate of 120 to the dollar.

[6] The number of currencies with active options markets would increase sharply if there were an incentive, such as a currency transactions tax, to shift trading to derivative markets.

trader held an insufficient amount of dollars to carry through their desired trades, it would be necessary for them to make a one-time purchase of dollars in order to have access to this market. However, once this purchase of dollars had been made, a trader could literally make thousands of options purchases and sales without ever being subject to the tax again. In short, the spot tax that would be applied to the initial transaction enabling the trader to have access to the options market would be sufficiently trivial to someone engaged in frequent trades, that it is likely to have virtually no effect whatsoever on their behavior and to raise very little revenue. (There are also active options markets in Japan and Europe, which means that holders of yen or euros would not find it necessary to even make this one-time transaction.)

On the second point, Schmidt is correct to note that some options traders do engage in collateral transactions in the spot market, and that such transactions would be subject to the tax. However, it is not clear that this will be of much consequence for those seeking to speculate in currency options for two reasons. First, in many cases the hedging accomplished through transactions in the spot market could be replicated with hedging through the derivative market. If the tax were large enough, most of the hedging transactions would simply be moved into the options, futures, or swap market, where the tax liability would be substantially lower. The second reason that the taxes on collateral transactions may not accomplish much is that the traders who are engaged in pure speculation are the ones least likely to make such collateral transactions. Typically, traders who are selling options to provide insurance to the market are the ones most likely to hedge their positions with these sorts of collateral transactions. Insofar as these traders are unable to evade a transaction tax with trades in derivative markets, a transactions tax that only applies to the spot market will be increasing the cost of hedging, while leaving the cost of speculating largely unaffected.

While the tax will be applied to the spot trades that result from options actually being held to their expiration date and being exercised, as noted before, this will be a small fraction of all option purchases. Furthermore, since options allow traders to engage in highly leveraged transactions, in most instances, traders will be able to buy and sell claims to large amounts of currency without paying any tax at all.

This can be seen by examining a simple example of a speculative options trade. Suppose that a trader wishes to speculate that euro will rise against the dollar. If a currency transactions tax of 0.1 percent on each side of a spot transactions was in place, then a trader would have to pay a tax equal to $1,000 if they bought one million dollars worth of euros, as shown on the table below.

If the trader guessed correctly, and the euro rose by 5 percent against the dollar, and then exchanged the euros for dollars to collect the profit, they would again pay the tax on this second transaction. This time the tax would be equal to $1,050, since the trader would also be paying tax on the profit. The total tax paid on this set of transactions would then be $2,050. This leaves a net of profit of $47,950, as compared to the profit of $50,000 shown in the first set of transactions where no taxes were paid.

Now suppose that the trader chose to speculate in a similar manner through the use of currency options. The calculations in the table assume that the trader purchases a 30 day call option on 1 million dollars worth of euros, at a strike price that is equal to the current market price. The first set of transactions assumes that the euro rises in price by 5.0 percent, as was the case in the spot market. For simplicity this calculation effectively assumes that the rise in price occurs instantaneously, so that there are the same number of days until expiration after the euro has risen against the dollar. In this case, the profit on the sale of the options would be $36,884.30.

The currency tax does not appear as a direct cost to an options trader, except in the rare event that the option is actually executed. However, it does impose an indirect cost, since it means that the currency will

have to rise by a larger amount before the option would prove profitable. In effect, it raises the strike price by an amount equal to the tax. If the actual strike price is 0.9 dollars to a euro, with a 0.1 percent tax, the option would effectively priced as though the strike price were 0.9009 dollars to a euro. This has the effect of lowering the option price by approximately $480 as shown in the table. The tax also has the effect of lowering the option price after the rise in the euro's value, in this case by approximately $900. The net effect of these changes is to reduce the option trader's profit by approximately $420 or 1.1 percent of the profits in this situation.

Contrasting the impact of the tax in the spot and options market, in this example it is clear that its impact is far greater in the spot market. The trader's profit in the spot market is reduced by over $2,000, or more than 4 percent of their profit when the trades go untaxed. By contrast, the loss to the trader engaged in approximately equivalent options trades is $420, or just 1.1 percent of profits. In short, the disincentive to options traders in this situation is far smaller than the disincentive to traders in the spot market.

While this set of trades is highly stylized, the same would hold true under any other scenario. Table 2 shows the profits in the spot and options market that a trader would receive without and with the tax in a case where the price of the euro rises by 1 percent and 10 percent, respectively. As can be seen the losses due to the tax in both cases are far larger in the spot market than in the options market. This would be true in any situation where the euro actually gained in value as trader had expected.

TABLE 2
Profits in the Spot and Options Market

1 Percent Gain in the Euro	Net Gain	Tax
Spot Market – no tax	$10,000	--
Spot Market – 0.1 percent tax	$7,990	$2,010
Loss Due to Tax	**$2,010**	
Options Market – no tax	$4,204.80	
Options Market – 0.1 percent tax	$4,140.70	
Loss Due to Tax	**$64.10**	
10 Percent Gain in the Euro	**Net Gain**	**Tax**
Spot Market – no tax	$100,000	--
Spot Market – 0.1 percent tax	$7,990	$20,100
Loss Due to Tax	**$20,100**	
Options Market – no tax	$83,541.20	
Options Market – 0.1 percent tax	$83,087.40	
Loss Due to Tax	**$453.80**	

Source: Author's calculations, see text.

The relative benefits of trading in the options market are even clearer in the cases where the trader bets wrong and the euro falls in value. The spot trader would still have to pay the currency tax on both ends of their transaction, for a cost of 0.2 percent of the average value of the transaction. However, the option trader is not affected at all by the tax in this case, since the option would have expired worthless in any case. In fact, an option trader would actually experience a somewhat smaller loss as a result of the tax, since the price of an option with the same expiration date and strike price would be slightly lower with the tax than without it. (The price of a 30 day option on $1 million worth of euros with a strike price of .90 euros to the dollar was 13,592.4, but just $13,112.4 with the tax. This is the amount of money that the investor stands to lose if the option expires out of the money. In this case, a speculator in currency options would have lost $480 less as a result of the tax, if the currency price fell before the option expired.)

This stylized situation can be altered along one other dimension to examine the full range of possibilities. Suppose that the gain on the currency occurs while the option is being held, instead of instantaneously, as in the calculations above. This also does not change the situation significantly as shown in Table 3.

TABLE 3
Trading in the Options Market with Gains Accruing Through Times

	Options Market No Tax	Tax	Net Profit
Trade 1	Buy 30-day option 1.11 million euros (@$13,592.40)	--	
Trade 2	Sell 30-day option 1.11 million euros (@$50,612.50)	--	
	(10 days prior to expiration)		
Total		--	**$37,020.10**
	Options Market with 0.1 Percent Tax	**Tax**	**Net Profit**
Trade 1	Buy 30-day option 1.11 million euros (@$13,112.40)	--	
Trade 2	Sell 30-day option 1.11 million euros (@$49,708.40)	--	
	(10 days prior to expiration)		
Total		--	**$36,596.00**

Source: Author's calculations, see text.

In this case the cost to trader as result of the tax is $424, slightly less than in the case where the gain occurred immediately, and far less than the tax of more than $2000 that this trade would imply in the spot market.

In short, in virtually every imaginable scenario the impact of a currency tax imposed on the spot market is far less on traders in options market than on traders in the spot market. As a result of this fact, the primary effect of a currency tax which is imposed exclusively on trades in the spot market will be to switch trading into the options market, as well as other secondary markets. Therefore, the tax is likely to raise far less revenue than has generally been assumed and is likely to have relatively little impact on the volume of short-term trading.

Options Trading and Market Volatility

If a tax has the effect of moving most currency speculation from the spot market to the options market and/or other secondary markets, it will do nothing to reduce volatility in currency markets. Primary and secondary markets equilibrate quickly, as any movement in one market is quickly transferred to the other. The reason is simple, insofar as prices are significantly out of line, it is possible to earn a sure, or nearly sure, profit through arbitraging the difference. For example, if options prices for euros were driven sharply lower relative to the dollar as a result of a wave speculative selling in the options market, traders in the spot market would opt to buy euros through call options with expiration dates in the near future, instead of purchasing them directly in the spot market. This shift of the buy end of the spot market to the options market would depress the demand and the price of euros in the spot market, until it had fallen enough to eliminate the incentive for this sort of arbitrage. The imposition of the currency tax will act to discourage this sort of trading, but it will still not allow large differences to persist between prices in the spot and the options markets. It will simply raise the margin slightly before arbitrage between markets becomes profitable. For example, if the markets would tolerate gaps between risk adjusted options prices and spot prices of 0.2 percentage points before the imposition of a 0.1 percentage points, then the higher transactions costs could be expected to raise the threshold to 0.3 percentage points.

It is also important to remember that the relative size of the two markets is likely to change significantly as a result of a currency tax in the spot market. While the spot market is currently far larger than the options market, if the tax provides a serious disincentive to trade in the spot market, it is likely that the options

market, or other secondary markets, will quickly outgrow the spot market. In this case, it would take a relatively small volume of trades to transmit price movements in the secondary markets to the spot market.

In short, if the main impact of a transactions tax imposed in the spot currency market is to shift trading to secondary markets, it will not raise a significant amount of revenue, nor will it do much to reduce the volume of trading, and the resulting volatility in currency markets. The tax will simply shift the focus of traders attention to secondary markets.

A Broad-based Financial Transactions Tax -- The Alternative to a Tax in the Spot Market

The fact that a tax in the spot currency market alone is not likely to be effective is not a reason to abandon currency taxes. It simply means that these taxes will have to be more broadly based, applying to a wide range of financial instruments. While this may mean that the tax collection process will be somewhat more complicated, it vastly increases the amount of revenue that can be raised. The additional revenue could be used for a wide range of socially productive purposes, both domestically and internationally, including the reduction of other more regressive taxes.

In addition, taxes on the trading of other financial instruments, such as stocks, bonds, commodity futures, and various derivative instruments would serve the same purpose as a tax on currency trading -- it would lower volume and possibly reduce volatility. It is also possible that by reducing the focus on short-term market movements, a financial transactions tax could encourage more long-term planning among corporate managers (Stiglitz 1989, Summers and Summers 1989). Furthermore, by reducing trading, and therefore the resources (capital, labor, and materials) used up by the financial sector, financial transactions taxes will be eliminating a source of waste in the economy. If there is no reason to believe that the allocation of capital by financial markets will be less effective with a smaller volume trading, then reducing the resources used in this sector will be eliminating waste from the economy in the same way that eliminating a pointless government bureaucracy eliminates waste from the economy. In both cases, resources will be freed for more productive purposes.

Baker (2000) estimated that a domestic financial transactions tax applied in the United States could have raised close to $90 billion based on 1999 trading volumes, not including revenue raised through the taxation of currency transactions. This is almost 10 percent of the revenue raised through the individual income tax in that year and more than 20 percent of the revenue raised through Social Security taxes. While the financial markets in the United States are larger relative to the size of its economy than is the case in most other countries, the revenue raised through a financial transaction tax is likely to be considerable under almost any circumstances.

In addition, the amount of resources freed up in the financial sector as a result of fewer transactions is likely to be quite substantial relative to the impact of almost of any other economic policy. A back of the envelop calculation can provide a quick estimate of the magnitude of the resource savings. The volume of trading on U.S. stock exchanges exceeded $10 trillion in 1999. If the average transaction cost of a trade averaged 0.5 percent (0.25 percent on each side) then over $50 billion was spent to execute these trades. If a transactions tax reduces the volume of trading by one third, then this would free up nearly $17 billion that had been spent on this market alone. With the tax applied to all other financial markets as well (corporate bonds, government bonds and bills, options, futures, swaps, etc.) the total resource savings would probably be at least 50 percent larger, or more than $25 billion annually. This savings amounts to an average of more than $250 a year for every household in the country. The efficiency gain generated by eliminating excessive trading in financial markets vastly exceeds standard estimates of the efficiency gains associated with standard trade agreements.

It is also worth noting that there are ample precedents for financial transactions throughout the world. Every industrialized nation imposed taxes on trades in its stock markets until recently, and several still do. For example, until 1989 Japan had a tax of 0.3 percent on stock trades, which raised 4.1 percent of government revenue at its peak (Japan Securities Research 1992, p 244). Until 1966 the United States placed a tax of 0.1 percent on shares of stock when they were first issued, and a tax of 0.04 percent when they were traded. It still imposes a tax of 0.003 percent on stock trades to finance the operation of the Securities and Exchange Commission. New York State even imposed a state tax on the stock trades until recently. This tax was estimated at 0.19 percent in 1968 (Epps 1976, p 177).

While most developed nations have reduced or eliminated their taxes on financial transactions in recent years some developing countries have gone in the opposite direction, most notably Brazil and Argentina. In 1998 Brazil imposed a broad based financial transactions tax which applies to a wide range of assets from stocks to checks. Argentina has imposed a financial transactions tax in 2001. In both cases, the main purpose of these taxes was to raise revenue. It is too early to determine the extent to which these taxes have had an effect on the stability of these markets.

The fact that financial transactions taxes have been implemented and often raised substantial amounts of revenue should refute claims that such taxes are unenforceable. Clearly there will be a significant amount of evasion, as is the case with any tax. However, there is little reason to believe that the amount of evasion will be so large as to render the tax pointless.[7] It may not be possible to collect broadly based financial transactions taxes through a single source, like the netting system for foreign exchange transactions, but other taxes, such as income and sales taxes are collected through a large number of sources as well. As a first approximation, it is probably reasonable to assume that the degree of evasion of financial transactions taxes will be comparable to the evasion of income and sales taxes. While minor acts of evasion can generally pass undetected, it is unlikely that evasion could persist by large actors without being detected.

Conclusion

A currency transactions tax could prove desirable for several reasons, most importantly as a source of revenue, but possibly also as a stabilizing factor in international currency markets. However, a tax that is imposed exclusively in spot currency markets is likely to prove ineffective, since traders should find it relatively easy to shift their speculation into derivative markets, where it would largely escape the effects of taxation. Such a shift would sharply reduce the revenue generated by such a tax and would limit the extent to which the tax could have any positive effect on volatility.

Broadly based financial transaction taxes which apply to the whole universe of financial assets would be far more effective, since they eliminate the possibility of shifting between assets to evade the tax. Such taxes could also raise far more revenue than a currency tax alone. This revenue could be used for a wide variety of domestic and international purposes, including a reduction in less progressive forms of taxation. By reducing the volume of trading in financial markets, a broadly based financial transactions tax would also be freeing up large amounts of resources, which had been wasted in carrying through financial trades.

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[7] It is worth comparing the incentive for evading a financial transactions tax with the incentive for evading copyright protections. The incentive will obviously depend on the size of the tax, but its is unlikely to ever be more than 0.5 percent of the value of the transaction to each of the parties involved. By contrast, the incentive to evade copyrights, on items like video disks or software, is 100 percent of the purchase price. Yet, few policy analysts argue that copyrights should be discarded because they are unenforceable. Given the relative size of the incentives involved, it can be safely asserted that financial transactions taxes will in general be more enforceable than copyrights.

Finally, it is important to note that such taxes are not merely hypothetical. All industrialized nations have imposed taxes on trades in their financial markets through much of their past. While these taxes have generally been reduced or eliminated in recent years, they had been a significant source of revenue in prior years. In addition, Brazil and Argentina have both recently implemented financial transactions taxes as a way to get revenue. If these nations can effectively implement financial transactions taxes, then presumably the industrialized nations have the ability to successfully implement such taxes as well.

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