International Financial Flows and Transactions Taxes: Survey and Options [a]

by Paul Bernd Spahn [1]

Abstract

Tobin suggested that exchange-rate volatility be controlled through a tax on international financial transactions. The analysis shows that the Tobin tax as a pure transaction tax is not viable. The tax would impair financial operations and create international liquidity problems. It is also unlikely to deter speculation.

However, a possible alternative could be a two-tier rate structure consisting of a low-rate transaction tax, plus an exchange surcharge. The exchange rate could move freely within a "crawling" exchange-rate band, but overshooting the band would trigger a tax on an "externality" – which is the discrepancy between the market exchange rate and the closest margin of the band.

The scheme is inspired by the European Monetary System, a tax instrument would keep exchange rates within the target range, not interest policy or central bank sterilization and, eventually the depletion of international reserves.

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Summary

Analysis has shown that the Tobin tax as originally proposed is not viable and should be laid aside for good. This results from a number of basic problems associated with the proposal. First, it is virtually impossible to distinguish between normal liquidity trading and speculative "noise" trading. If the tax is generally applied at high rates, it will severely impair financial operations and create international liquidity problems, especially if derivatives are taxed as well. A lower tax rate would reduce the negative impact on financial markets, but not mitigate speculation where expectations of an exchange rate change exceed the tax margin. The assertion that reducing the level of trading would automatically reduce volatility can be contested. Second, because of the high substitutability of financial products, it would be vain to tax only spot transactions. This would create tax loopholes and reduce the effectiveness of the tax as an antispeculation device. However, the inclusion of derivatives, in particular of forward transactions, poses substantial conceptual problems as no fixed relationship between cash and derivative transactions can be established readily. Third, even with a very low rate, the tax would raise substantial revenue given the high and increasing volume of trading.[1] The high level of revenue generated eventually by a low-rate tax may constitute a considerable problem for tax assignment.

Most of the difficulties of the Tobin tax could eventually be resolved, however. A possible solution would be a two-tier rate structure consisting of a low-rate financial transactions tax, plus an exchange surcharge at prohibitive rates as a piggyback. The latter would be dormant in times of normal financial activities, and be activated only in the case of speculative attacks. The mechanism allowing the identification of abnormal trading in world financial markets would make reference to a "crawling peg" with an appropriate exchange rate band. The exchange rate would move freely within this band without transactions being taxed. Only transactions effected at exchange rates outside the permissible range would become subject to tax. This would automatically induce stabilizing behavior on the part of market participants. The effect should be strengthened through contingent claims to insure against eventual taxation, an exchange rate volatility is likely to occur only under market imperfections.

Tax administration seems to be the minor problem in this context, although it requires international cooperation. A remaining problem is related to political coordination and the assignment of the tax at the international level. Coordinating fundamental policy decisions at the international level will be of crucial importance and it will ultimately determine the feasibility of the tax in the longer run. However, the proposed policy seems to be feasible even on a unilateral basis.

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[1] For high rates, a revenue forecast is difficult because of the potentially severe impact on the volume of trading and, hence, an acute "Laffer effect."

I. Introduction

The liberalization of international capital markets and flexible exchange rates were once hailed by economists as a panacea to the ills of the Bretton Woods system with its intrinsic contradictions and inherent instability that Triffin had denounced so vociferously.[1] OECD countries have pursued the former goal persistently since 1961 (when they adopted the Liberalization of Capital Movements Code [2]; this objective is still cherished as promoting the efficiency of world capital markets. The goal was essentially achieved in the Western world by the beginning of the 1990s, yet progress is also visible in the developing and in the former communist countries. However, the flexible exchange rate regime that replaced the fixed-parity Bretton Woods system in the early 1970s has subsequently generated significant medium- and short-term price fluctuations that have refuted the extravagant claims of some advocates of floating rates that national monetary policies could proceed without external concerns, leaving the currency markets to reconcile the policies and macroeconomic performances of the several economies. On repeated occasions, international financial markets have encountered strong turbulence that has irritated market participants and policymakers and has instigated interventionist attitudes toward these markets. Exchange rate and interest rate volatilities have fostered fixed rate (and gold standard) nostalgia and aroused debates on the need for international policy coordination and supranational surveillance in order to control such fluctuations and to lessen market uncertainties.

One concept of stabilizing international flows of funds is macroeconomic policy coordination, which has proven extremely difficult to accomplish. The European Union (EU) is heading for the irrevocable fixing of member countries' currency rates (and ultimately a uniform currency) under a different approach that counts on macroeconomic policy convergence through statistical guidelines. In a similar vein, other countries, in particular the developing, have tried to discipline and coordinate their policies by aligning their exchanges rates to foreign "anchor" currencies either unilaterally (e.g., Mexico, Argentina) or backed by bilateral agreement (e.g., CFA countries). However, all forms of policy coordination have not fully achieved their objective of stabilizing exchange rates and it may weigh heavily in terms of lost national sovereignty in monetary and fiscal policies.

Recent turbulence in exchange markets has rekindled interest [3] in a proposal by Tobin, who suggests that speculative international capital movements and exchange rate fluctuations could be controlled by imposing a tax on international financial transactions (Tobin (1978, 1991); see also Eichengreen, Tobin and Wyplosz (1995)). The tax would reduce noise from market trading, but allow traders to react freely to changes in economic fundamentals and policy. It would constitute a "soft" approach to controlling foreign exchange markets in contrast to more radical interventions like capital controls and other protective devices. It would thus avoid the risks of political counteraction to "hard"

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[1] See, for instance, Triffin (1960)
[2] Published, in *The Organization for Economic Co-operation and Development*, (1963), Appendix IV.
[3] For an overview of such reaction, see Felix (1995).

protectionist measures that could set off self-defeating beggar-thy-neighbor reactions in the world economy. The tax would enhance market efficiency and be consistent with efforts to coordinate national policies at the international level. Furthermore, it could work under both flexible and fixed exchange rate regimes. Finally, the tax could serve as a policy instrument at the disposal of an international organization like the IMF and contribute to enhancing global financial stability.

II. The Nature of the Tobin Tax

The idea to contain speculation in financial markets by rendering access more expensive through a transactions tax goes back to Keynes (1936). Keynes compared speculative activities to casino operations and argued that "...casinos should, in the public interest, be inaccessible and expensive" (p. 159). Tobin translates this idea into foreign exchange markets [1] where he wants to throw "sand in the wheels" in the form of financial transactions taxes. More specifically, Tobin suggests "an internationally uniform tax on all spot conversions of one currency into another, proportional to the size of the transaction" (Tobin (1978), p. 490). He suggests that a 1 percent rate could be appropriate.[2]

The tax would be payable every time a currency is converted. This renders frequent short-run trading much more costly than long-term capital engagements, and this must reduce the volume of short-term flows of funds. Tobin asserts that it would thus contain erratic exchange rate volatility.[3] As the Tobin tax raises the costs of currency trading inversely to the maturity of the asset, it would "direct traders' attention to long-run fundamentals and away from transient contagious market sentiment." (Tobin (1991), p. 16). The idea is to check short-term capital movements, and *not* to impede commodity trade or longer-term international investment.

The main advantage of the Tobin tax is indeed that it can target short-term financial transactions very effectively. The differential impact of the Tobin tax on short-term and long-term trading is specified arithmetically in Appendix 1. The formula allows the calculation of annualized interest rates on foreign investments that are needed to match a target interest rate in domestic currency. If this target rate is 4 percent for a domestic asset and the Tobin tax is 0.5 percent (1 percent) of the foreign exchange transaction, the following foreign interest rates are required to fulfill the arbitrage condition between markets:

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[1] Tobin had already offered the idea in his 1972 Janeway Lectures at Princeton, published in 1974 as *The New Economics One Decade Older*, pp. 88-92. Modigliani also seems to favor such a tax when he says "...countries should rely on general fiscal policy as one of the possible devices for influencing incentive to capital movements. But they should also be allowed to opt, just as freely, for the alternative approach relying on specific tax and incentives which...is likely to be superior under most circumstances" (Modigliani (1973), p. 252; quoted in Dornbusch (1986a), p. 80).

[2] More recently, Tobin proposed a 0.5 percent rate (Eichengreen, Tobin, and Wyplosz (1995, p. 164).

[3] Exchange rate stability is, of course, not an end in itself. It reduces the scope for price "bubbles" and false signaling, and hence improves the allocation of international resources, foreign trade of goods and services, as well as factors of production. Furthermore, it reduces risk premia, in particular the risk of inflation, as exchange rate fluctuations represent important monetary shocks to an economy. It also restores some of the autonomy of governments and central banks that is lost under heavy speculation, and it avoids detrimental political reactions to misaligned exchange rates, like protectionist trade policies.

Table 1. Annualized Foreign Interest Rate Required Under a Tobin Tax to Match a 4 Percent Return in Home Currency

Maturity	Tax Rate	
	τ = 0.5 percent	τ = 1 percent
One day	551.3	4016.7
Three days	90.7	250.9
One week	35.6	77.2
One month	11.0	18.5
Three months	6.6	9.4
One year	5.0	6.1
Five years	4.6	5.3

Source: Staff calculations (see Appendix 1 for the methodology).

Table 1 demonstrates that a Tobin tax discriminates against *all* foreign assets, but long-term capital investment requires only a slightly higher rate of return than domestic assets. The discrepancy becomes smaller as the maturity of the foreign investment increases. Moreover, the additional cost of foreign investment may be outweighed by gains of exchange rate stability and certainty. Exchange rate adjustments responding to a medium-term change in market fundamentals would thus not be impeded by the tax to any significant degree. However, short-term trading bears high relative costs, and speculative round-trip excursions in other currencies are likely to be heavily discouraged by the Tobin tax. According to Tobin, this would remove excessive short-run volatility of exchange rates, and monetary policies would regain a degree of freedom that is lost under the pressure to counteract short-run fluctuations.

Ideally, Tobin wants to exclude from tax all foreign exchange transactions related to the *real* flow of goods and services as well as to *fixed capital formation*. He is skeptical, however, that this can be achieved technically, fearing that financial transactions could then be "disguised as trade" (Tobin (1978), p. 494). Therefore, all financial transactions should bear the tax without exception. The cost for direct investments would become smaller with the duration of the engagement anyway, and payments for goods and services would be partly relieved as the tax is levied only once (instead of twice, as in the case of financial round-trip transactions). One would want to add that firms, in particular international firms, could organize their payments in a way as to minimize the tax through the netting of credits and debits in one currency (which is market-neutral). [1]

The Tobin tax, contrary to other financial transaction taxes proposed in the literature or applied in practice, is a truly *international* tax. The world tax rate would have to be

[1] The recognition of legally enforceable bilateral netting arrangements subject to minimum standards is recommended for the banking industry in the Lamfalussy Report (Bank for International Settlement 1990). This is seen to improve the stability and efficiency of financial systems and to reduce liquidity risks and transaction costs. See also IMF (1994, p. 61).

uniform to avoid many of the locational distortions discussed in the context of *national* transactions taxes. However, the tax would be administered by national governments over their own jurisdictions even when domestic currencies are not involved (e.g., the British government for Eurodollar transactions in London). The proceeds of the tax could "appropriately be paid into the IMF or World Bank" (Tobin (1978), p. 494). The responsible organization would also coordinate policy regarding the Tobin tax at the international level.

III. The Tobin Tax in the Literature

1. General aspects

The Tobin tax--only outlined by Tobin himself--has received relatively little attention in the literature.[1] However, financial transactions taxes, in particular a securities transactions tax (STT), have been studied more intensively, notably in the context of proposals to introduce an STT in the United States under the Bush and Clinton administrations.[2] Moreover, where the Tobin tax *is* discussed in the literature, very different objectives come into play, and the term "Tobin tax" often stands for something quite distinct from the original proposal.

The following objectives of financial transactions taxes other than exchange rate stabilization can be distinguished.

Surrogate taxation of capital income. Since the transactions tax increases the cost of capital worldwide, it is tantamount to a surrogate tax on capital income. It could thus compensate for tax revenue lost through evasion as it becomes increasingly more difficult to tax capital under national personal and corporate income taxes (Grandcolas (1986)). The tax can also be seen as a tax on a specific type of financial services that is difficult to tax under a general turnover or value-added tax. Proponents of this view would, of course, extend the tax to all financial transactions, national and international. However, a tax on international capital transactions would also be borne, to some extent, by domestic investors as capital is diverted from international to national markets, forcing interest rates down within the domestic economy.

Taxation and quarantining of tax havens. A financial transactions tax could be used to impose a heavier burden (e.g., through a higher rate) on capital outflows and inflows to and from tax havens. This would not only work as a presumptive tax on "illegal" capital flows to offshore markets, it would also cut off financial markets that are unwilling to cooperate at the international level. It would not prevent circular flows of existing capital *within* offshore centers, nor would it be possible to tax offshore capital *ex post*. But, given the increase in the value of world financial transactions, the importance of offshore markets would decline in relative terms, which should bring them to the negotiating table in the longer run. Circular flows within insulated offshore markets would leave exchange rate developments unaffected anyway.

Increasing the efficiency of the financial sector. Many authors, including Tobin, affirm that "vast resources of intelligence and enterprise are wasted in financial speculation,

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[1] Tobin, referring to his proposition in the 1972 Janeway Lectures, remarks that the "idea fell like a stone in a deep well" (1978, p. 490).

[2] See, for instance, Summers and Summers (1989 and 1990), Stiglitz (1989), Roll (1989), Ross (1989), Kiefer (1990), Edwards (1992), Hubbard (1993), Kupiec, White, and Duffee (1993), Schwert and Seguin (1993), and Hakkio (1994). The most prominent advocates of an STT are Summers and Summers, and Stiglitz.

essentially in playing zero-sum games" (Tobin (1991), p. 18).[1] A financial transactions tax could eliminate "wasteful" trading and "excessive financial engineering" (Summers and Summers (1990), p. 881). This would contribute to a more efficient allocation of resources. If this is not the case, the Tobin tax could at least produce government revenue without critical negative side effects (Stiglitz (1989)).

*Elimination of the irreversibility distortion against fixed capital formation***.** Although economic fundamentals may be sound, investors often prefer to hold capital in liquid form. They refuse to engage in real projects although such projects are more profitable than financial assets, and investors willingly pay a significant premium in terms of opportunity costs. This paradox is explained by policy uncertainty, which is characteristic for many developing countries. In the presence of uncertainties, it may pay to remain liquid since real capital formation is irreversible and policy mistakes can quickly erode its economic returns. This short-term perspective of investors prevails even during episodes of reversed capital flight, and it encourages the inefficient round-tripping of capital. It is demonstrated that a sequence of taxes on international financial transactions could eliminate underinvestment by reducing the volatility of domestic interest rates (Tornell (1990); his arguments are sketched in Appendix 2). More generally, a transactions tax would cause investors to focus on longer-term prospects (Summers and Summers (1990),
p. 882).

2. Specific contributions

This section comments briefly on specific variants of the Tobin tax as found in the literature. The variants are described more fully in Appendix 2. Some of the most important characteristics of various variants of the Tobin tax are summarized in Table 2.

[1] The argument is more fully developed in Tobin (1984).

Table 2. Characteristics of Variants of the Tobin Tax

	Tobin 1978, 1991	Reinhart 1991	Tornell 1988, 1990	Eichengreen/ Wyplosz 1993
Tax base	All spot conversions of one currency into another	Domestic holdings of foreign assets	Variation of expected return of financial assets in home and foreign currencies	Non-interest-bearing deposits at central bank equivalent to transactions in foreign exchange
Exemptions	Transactions relating to real investment and trade (if feasible)	None	Repatriation of dividends from real capital	None
Tax rate	Proportional and uniform	Proportional	Proportional	Implicit, varies with interest rate
Scope of Application	International, multilateral	National, Unilateral	National, unilateral	National, unilateral
Wedge between domestic and foreign prices	Yes	Yes	No	Yes
Administration	National governments	National Government	National government	National central banks
Coordination	IMF/World Bank	No international coordination	Implicit through dual exchange rate regime	No international coordination
Appropriation of yield	IMF/World Bank	National government	(No fiscal revenue)	Central banks
Policy Objective	Remove short-term speculation and exchange rate volatility	No explicit policy objective	Eliminate the irreversibility distortion against real investment	Remove short-term speculation and exchange rate volatility

Source: Staff compilation.

Reinhart (1991) examines a Tobin tax in the context of a general equilibrium model of exchange rate determination for a small open economy under rational expectations. He applies the tax to the domestic stock of foreign assets, not the flows of foreign exchange

transacted, and argues that the tax increases the opportunity costs of holding foreign assets, causing investors to shift into home assets. The repatriation of capital entails a transitory appreciation of the exchange rate and a deterioration of the country's trade balance. This appreciation of the currency is followed by a real depreciation as the holdings of foreign assets approach their equilibrium value and the gap in the trade balance is closed. An implicit result of Reinhart's exercise is that a decumulation of foreign assets also affects the net real interest rate for holdings of domestic assets over time. Thus, the tax works as a surrogate capital income tax. Reinhart's variant of the Tobin tax bears resemblance to the real interest equalization tax (RIET) proposed, for instance, by Liviatan (1980) and Dornbusch (1986a and 1986b).

Tornell (1988 and 1990) demonstrates that a tax on international transactions can eliminate the expectation of short-run interest rate volatility, and hence uncertainty. This reduces shortsighted investment behavior, and fosters real over financial capital formation. Tornell's tax base is an expectational variable rather than a straightforward spot transaction. However, the author asserts that the tax "can be implemented through a dual exchange rate system" (Tornell (1988), p.13). Tornell's contribution draws attention to the fact that an *optimal* Tobin tax would either have to be applied to a varying tax base (like the one proposed by Tornell), or the tax rate on effective market transactions would have to change over time.

Eichengreen and Wyplosz (1993, p. 120) also discuss a Tobin tax on foreign exchange transactions that is, however, implicit rather than explicit. The "tax" would result from the requirement of banks to "deposit a *sum equivalent to the transaction* [in foreign exchange], interest free, with [the Central Bank] for one year" (emphasis added). Their proposal has been substantially refined in Eichengreen, Rose and Wyplosz (1994) and Eichengreen, Tobin and Wyplosz (1995). A similar alternative is mentioned in UNCTAD (1994, p. 112) where non-interest-bearing deposits corresponding to *increases in open positions* in foreign exchange are discussed. The implicit tax rate corresponds to the opportunity costs of holding these mandatory funds. The proposals are similar to the Tornell tax to the extent that variations of the expected return of financial assets in home and foreign currencies are reflected in an interest rate differential.

IV. Tax Policy Issues

1. Fiscal versus monetary policies

Examination of the literature on Tobin taxes illustrates a wide spectrum of reactions to the original proposition. It also bears testimony of the profession's predilection for monetary rather than fiscal solutions as proposed, for instance, by Tornell (1988 and 1990), Eichengreen and Wyplosz (1993), Eichengreen, Tobin and Wyplosz (1995), and, to the extent that a preference is detectable, in UNCTAD (1994). It is clear that there *is* an option between fiscal and monetary policy measures. Furthermore, there is the general belief in the market's ability to generate exchange rate stability *without* policy interference.

As to the latter view, Tornell remains in the tradition of the optimist monetarist literature that follows Friedman (1956) in maintaining that no professional case can be made to the effect that speculation is destabilizing, and which holds that the current equilibrium exchange rate correctly reflects the anticipated path of future (exogenous) money. This view supports a noninterventionist attitude *vis-à-vis* foreign exchange markets because flexible exchange rates would ultimately be self-stabilizing.

Experience has shown, however, that exchange rate volatility can be substantial under floating rate regimes, and Tobin himself (1978, pp. 155ff) reviews a number of reasons why market forces alone are unlikely to stabilize exchange rates even when flexible--at least in the short run. The main points can, perhaps, be summarized in a statement by Dornbusch who purports "that there is an exchange rate indeterminacy because financial policies, which supposedly anchor the system, are in fact endogenous and may be substantially *caused by movements in the exchange rate*" (Dornbusch (1986a), p. 32 (emphasis added)).

Nevertheless, Tornell seems to believe that the exchange rate mechanism provides an indicator for variations of the expected return of financial assets which is, however, biased through the transactions motivated by trade and the formation of real assets. For this reason, he champions the detachment of financial markets from market inertia resulting from commercial transactions:[1] "If the *financial* exchange rate is freely floating, [then expectations are correctly reflected in the financial exchange rate]. Therefore, a dual exchange rate system acts as a sequence of continuously adjusting Tobin taxes." (Tornell (1988), p. 24 (emphasis and text in brackets added)). His view is confirmed by Adams and

[1] Dual exchange rate regimes are typically discussed in the context of stabilizing the *commercial* exchange rate through its pegging across time, not so much with the aim of rendering the volatility of financial rates more distinct. Tornell puts on its head the common justification that aims at protecting real transactions from the vagaries of financial markets. However, there is a close relationship between the two rates of a dual regime as it "will be most effective if...maintained in a range close to the free rate. In this way, the system can buffer the economy from abrupt financial disturbances, but the rate must be allowed to shift in response to fundamental macroeconomic changes" (Dornbusch (1986b), p. 28). This argument very much resembles the means-reverting process emulated in Tornell's model.

Greenwood (1985), who prove that a dual exchange rate regime is indeed equivalent to levying a tariff on international financial transactions.

Dual exchange rate regimes have been tried by various Latin American countries (and by Belgium, until recently). They seem to require formidable institutional arrangements to keep markets segregated and to avoid financial arbitrage. Such arrangements foster the evolution of an ever-increasing web of "state interventionism." They are also susceptible to the creation of new distortions (e.g., through failure to fix the equilibrium exchange rate for commercial trade), and they spur the emergence of multiple exchange rate regimes and of "black markets." There are unlikely to be consistent with GATT rules or the Maastricht Treaty of the EU, and they are certainly at odds with the OECD Liberalization of Capital Movements Code. It can be demonstrated that there is an equivalence between dual exchange rates and capital controls (Adams and Greenwood (1985)). Dual exchange rates are, thus, a form of protectionism.

Although the volatility of financial exchange rates, combined with a more stable commercial rate, may convey more information to speculators than the effective exchange rate of unsegmented markets, it is doubtful whether this is sufficient to remove the indeterminacy problem invoked by Dornbusch (see quote on page 8). It is also arguable whether the "freed" financial exchange rate would differ much from the effective rate of dual exchange rate schemes given the fact that today's capital transactions dwarf the volume of commercially motivated transactions. Tobin remains skeptical in this regard: "Increasing exchange risks will help, but I do not think we should expect too much from it" (Tobin (1978), p. 158).

Eichengreen and Wyplosz (1993) consider a monetary policy action equivalent to the fiscal proposition of Tobin. The analytics of this "tax" are unclear, however, depending largely on the definition of the tax base and on the interactions of the implicit tax with related monetary policy measures. Obviously, there may be an equivalence between fiscal and monetary policy measures. For instance, a tax on foreign financial assets could have the same effect as an interest rate subsidy on domestic deposits.

The advantage of *monetary policy measures* seems to lie in the possibility to inflict costs (or, through subsidies, opportunity costs) on national and international investors *unilaterally,* without necessarily coordinating policies at the international level. This represents a considerable advantage during phases of great turbulence. On top of classical sterilization policies, countries have developed an arsenal of monetary defense instruments such as higher reserve requirements or negative interest rates on nonresidents' deposits (Chile, Malaysia, Spain, Switzerland) or, conversely, high overnight deposit rates (Sweden, Ireland). They have tried to limit banks' liabilities in foreign currencies (Mexico) or of portfolio investments by nonresidents (China, South Korea), and they tend to exclude nonresidents from certain markets and operations including outright bans on investment by foreigners (Swiss property market, parts of China's stock market). This has not prevented some of these countries' currencies to come under speculative attacks. It can even be

argued that such interventions, especially if *temporary*, could just as well encourage speculation to the extent that they send negative signals to financial markets, namely: distress and the lack of international coordination. This could provoke nervous reactions of market participants and drive even the sedate investor into speculation. Such measures also encourage "moral hazard" to the extent they raise expectations of a bailout by central banks. If unilateral monetary policy measures are more *permanent*, however, they tend to fend off international direct investors, with long-term implications for growth and the development of the economy.

Equally, some countries have employed *fiscal instruments* unilaterally.[1] Many have charged (or charge) financial transactions, generally or specifically, through stamp and coupon taxes (for example, Germany, Sweden, Switzerland, the United Kingdom), they taxed capital inflows (Israel), charged outward-bound capital transactions (*Interest Equalization Tax* in the United States), or tried to discriminate against foreign financial investments through taxes on bank assets and withholding taxes (Germany, Switzerland).[2] Many of these measures appear to hamper the natural development of financial markets, institutions, and operations; they encourage tax-evading detours through ancillary financial centers and tax havens; to the extent they are effective they invite retaliation, and they are unsuitable to cope with sudden transient monetary shocks, because, as a rule, tax policy seems to face much longer reaction and implementation lags than monetary policy. These may be reasons why they have been recently eliminated in many countries (e.g., Australia, Germany, Sweden).

Fiscal policy measures could, however, eventually become more propitious for market developments if adopted *multilaterally*. International coverage and enforcement are important aspects of the Tobin tax. It reduces the scope for evasion, it could be more abiding, and it could eventually avoid the *ad hoc* aspects of unilateral monetary defense schemes. Multilateral fiscal policy schemes, of course, need international agreements and cooperation. However, the prospects for multilateral fiscal consensus seem to be more propitious than for monetary policy actions because the latter are usually seen as an unwarranted bailout of weaker currencies, with severe moral hazards for general economic policies. This is not the case for coordinated international taxation.

2. Financial market efficiency and stability

A tax on financial transactions--whatever its objectives--is subject to one cardinal premise: it must preserve financial market efficiency and stability. It is thus essential to discuss how international financial markets would react to the impact of a possible Tobin tax.

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[1] For a survey of unilateral financial transaction taxes by countries, see Appendix 4.

[2] It is realized that income taxation, in particular withholding taxes on capital income, and double-taxation agreements can have an important impact on international capital flows. These are not considered in this paper, which places the emphasis on transactions taxes. See, for instance, Spahn and Kaiser (1991) for a discussion of problems relating to international income taxation.

3. Transaction costs

Financial markets--domestic and international--have undergone dramatic changes during the last two decades. These are attributable to the break-up of overly restrictive banking regulations (especially in the United States), to the need to cope with inflation and the increase in international liquidity (following the oil crises of the 1970s), to the necessity of financing larger government deficits (in the United States and, more recently, Germany), and to the need to hedge against new risks ascribed to higher interest and exchange rate volatility following the demise of the Bretton Woods system. These developments have been spurred by significant technological advances in computing and telecommunication technologies through the creation of new financial instruments and product innovation, the diversification and the deepening of markets spawned by large institutional investors, and greater competition at the world level.

Today the reallocation of funds is effected in a matter of minutes or seconds, developed forward and options markets allow to hedge financial risks, and information is disseminated to market participants through fast and extensive electronic telecommunication networks that cover all major financial centers of the world. These developments have significantly enhanced financial market efficiency and reduced the relative costs of financial transactions and of foreign exchange operations in particular. They have further stimulated market activity and increased the volume of trade which, for foreign exchange transactions, may now have passed the level of US$1 trillion per business day.[1]

Although it is difficult to estimate the effective decrease in transaction costs over the last two decades, [2] some authors contend that a transaction tax of 1 percent would still keep costs well below the levels that prevailed some 15 or 20 years ago (Hakkio (1994)). It is, however, misleading to compare the direct costs of foreign exchange transactions over the years as this is strongly dependent on the use of vehicle currencies. Originally, international traders and investors used the U.S. dollar almost exclusively as vehicle currency which avoided conversion costs altogether. Offshore dollar markets (like the unregulated Eurodollar market) were developed which became extremely liquid and cost effective. The U.S. dollar still dominates international transactions, although new vehicle currencies have emerged and regional currency markets have been developed with falling transaction costs. However, smaller currencies, if used at all at the international level, still have to "pass through" major currencies in the Eurodollar market, since bilateral exchange markets of nonvehicle currencies are too narrow and would entail higher transaction costs than a triangular arrangement using vehicle currencies as an intermediary. A Tobin tax thus

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[1] The Bank of International Settlements (BIS) estimated a daily global net turnover volume in the world's foreign exchange markets at some US$880 billion per business day in April 1992, which was a month of normal activities (BIS (1993)).

[2] The BIS (1994) provides a range for actual transaction costs, which are about 1/2 to 1/16 of a percent in terms of exchange commissions, 1 to 1/8 per thousand in terms of transfer commission, and 1 to 1/8 of a percent in terms of the bid-asked spread on a transaction according to its size.

discriminates against smaller currencies, because it penalizes triangular operations through double taxation. It would also promote the further use of vehicle currencies and restrengthen, in particular, the role of the U.S. dollar in world financial markets.[1]

Transaction costs have also been reduced by product innovation and by the creation of derivative financial instruments that allow individual investors to hedge against market risks while engaging only little capital (outright forward and futures transactions, swaps, and options). These instruments are of special importance for financial intermediaries, who have to protect themselves against interest rate risks, exchange rate risks, and credit risks, and who close open positions by buying or selling derivatives. Apart from rendering markets more liquid and reducing transaction costs, these instruments have become of utmost importance to the stability of the financial system as a whole.

a. Liquidity

Large institutional investors routinely engage in short-term arbitrage transactions for margins as little as 3 to 5 basis points on highly liquid transactions (like a US-dollar-DM swap).[2]
This is important for the efficient fixing of prices in financial markets, and for the securing of worldwide liquidity. This type of liquidity trading constitutes the overwhelming part of financial transactions on a recurrent basis and it is vital for well-functioning financial markets.

A Tobin tax has the enormous disadvantage that it cannot distinguish between liquidity trading and speculation. Sound interbank transactions would thus be affected indiscriminately by the tax although they are non-speculative in nature. This, according to some authors, must lead to thinner markets with less liquidity, which could even *increase* volatility.[3] The introduction of a Tobin tax could also cause a severe liquidity shock with large disturbances on a global scale. Moreover, the tax would lead to larger bid-asked spreads because market makers need to be compensated for higher risks and for the tying up of larger currency positions that are associated with reduced liquidity.[4] Finally, the taxation of derivatives could seriously distort markets and undermine the financial sector's ability to

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[1] Small currencies are, however, disadvantaged with or without a tax, because traders prefer to trade in high-liquidity financial instruments that entail lower costs and risks (Campbell and Froot (1993), p 9). This also explains the interest of smaller EU countries in joining a Monetary Union with its benefits of an important future vehicle currency.

[2] The margins for more "exotic" currencies (like the French franc) are, of course, higher (25 basis points and above).

[3] The argument is discussed in Section 3b. below.

[4] Market makers derive a substantial part of their profits from trading with liquidity traders who do not reveal new information to the exchange market. This allows them to cover losses when trading with those market participants who trade on information unavailable to the market maker. (If they traded exclusively with the latter group, they would make losses on average.) However, the lower the volume of liquidity, the higher must be the "bid-asked spread required to offset the 'lemons' problem in dealing with information traders" (Hubbard (1993), p. 989).

hedge against risks.

Some authors insist, however, that a small transactions tax would not reduce liquidity trading significantly, but eliminate destabilizing noise trading instead (Summers and Summers (1990)). This would reduce the discount rate for future transaction costs, due to the reduction of currency risks, and it would be beneficial for financial markets over the longer run.

The reference to noise traders reflects a "new strand of the finance literature" which "has developed the perspective that the financial markets may not be as efficient as previously thought" (Kiefer (1990), p. 889). Noise traders act, in contrast to informed "rational" traders, on misinformation like "technical investment analyses" or "rumors," a behavior that may drive prices away from their fundamental equilibrium value and render markets riskier and more volatile (Shliefer and Summers 1990). Informed traders cannot counterbalance these destabilizing tendencies because price discrepancies may in fact grow as a consequence of noise trading (DeLong, Shliefer, Summers, and Waldmann (1988), Summers and Summers (1989)). The Tobin tax would reduce this type of trading and thus improve market efficiency. Although the argument seems convincing, the market-inefficiency thesis is not yet the accepted paradigm in the finance literature, and it has to be considered with caution.

As to the liquidity-shock thesis, the outright closing of the market could be viewed as a severe disturbance or an extreme case of a prohibitive tax (Stiglitz (1989), p. 111). However, French and Roll (1986) provide evidence for the U.S. stock market that whenever markets were closed for a day for technical reasons, trading resumed normally, the liquidity of markets was not impaired, and price volatility was even greatly reduced--*not* increased.[1] This would make a case for a financial transactions tax.

As to the relationship between bid-asked spreads and liquidity, Black (1991, p. 514) demonstrates that the spread is indeed positively related to the ratio of price volatility to the volume of trade. However, Stiglitz (1989) argues that the tax could eventually lead to smaller spreads as holding periods of financial positions have nowadays become trifling, probably only minutes, and as volatility is being reduced through the tax.

With regard to the taxation of derivatives, however, the Tobin tax would positively face particular problems which, as above mentioned, could eventually entail the pure and simple elimination of such markets. Much depends on the level of the tax rate, however. The critical issues relating to the taxation of derivatives are more fully addressed in Section V.

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[1] During 1968, the U.S. market was occasionally closed on Wednesday because of heavy volume. French and Roll (1986) found that volatility between Tuesday and Thursday was roughly halved when markets were closed, compared to weeks when markets remained open.

b. Volatility

Excessive price volatility of financial markets is often ascribed to insufficient short-term speculation. In certain markets (real estate, art) significant mispricing can be identified, and significant price volatility is observed despite high transaction costs (Shiller (1990)). This can eventually be explained by these markets being rather illiquid (Summers and Summers (1989), p. 268), thus the lack of liquidity could be related to short-term price volatility. However, it does not follow that the increase of liquidity is always price stabilizing. Once a certain level of liquidity is attained, excessive liquidity could become destabilizing.

If there is a relationship between liquidity and price stability, this must emphasize the role of liquidity traders in the market. A Tobin tax would, however, discourage stabilizing arbitrageurs who will refrain from trading until the price varies from "true" value by more than the tax rate. "With the tax in place, arbitrage investors would wait for larger price discrepancies before entering the market" (Kiefer (1990), p. 891). If the tax reduces the volume of trading, markets become less liquid, and this could become the cause of greater volatility. Prices would move in jumps to close gaps that would not have emerged under normal trading operations--like intensifying geological tensions are relieved in an earthquake.[1] The opposite view is, again, taken by those who believe that the tax only reduces noise trading and hence volatility.

Empirical evidence on the issue is scarce: For securities trading, Roll (1989) finds no significant relationship between volatility and transactions taxes. Furthermore, Kiefer (1990) suggests that average transaction costs (commissions, etc.) have fallen significantly for large institutional investors in the U.S. stock market while they may have risen for smaller investors. Since institutional investors are the dominant traders in stock markets, volatility should have increased as a consequence of the cost reduction. But stock market volatility in the United States exhibits no trend over the last 15 years (Schwert (1990)). Furthermore, Roll (1989) observes that, during the stock market crash of 1987, stock prices declined by similar (or even greater) proportions in countries with a securities transactions tax. This would indicate greater volatility for markets where transactions taxes are present, yet the argument is not fully convincing because it neglects institutional aspects and spatial differences in the liquidity of markets.[2]

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[1] However, "dirty floating" or money market interventions by central banks to keep the exchange rate in line with official target (as under EMS) may indeed withhold information from markets, disguising changes in fundamentals or acting as an insurance against price changes. Also "wider spreads will be expected in low volume markets and narrower spreads in markets where the authorities enforce bands of short-term fluctuations, as in the EMS" (Black (1991), p. 514). This could explain the large fluctuations in situations of "crisis" whenever a government's commitment and implicit guarantees appear to be in doubt.

[2] The greater fall in stock prices at the Frankfurt market, for instance, is partly explained by market participants through the faster settlement system, which reduces the risk of failures to complete contracts.

A low tax rate would probably have little effect on volatility, given that large price fluctuations were observed in the early 1980s even though transaction costs of foreign exchange markets were much higher at the time than now. Under a low tax rate, liquidity could eventually be preserved, but the tax would miss its goal of removing short-term noise trading. The argument that "throwing in some sand" to reduce liquidity *and hence* volatility--the key argument on which proponents of the Tobin tax base their policy recommendations-- thus rests on shaky theoretical and empirical grounds.

c. Resource allocation and tax incidence

The effects of a Tobin tax on the real economy are essentially dealt with in Section 2 in connection with Reinhart's variant of the tax, which is more fully discussed in Appendix 2. Therefore, this section can be brief.

Positive economic effects of the tax are associated with its reducing "short-termism" (Reinhart 1991). The tax would lessen short-term trading (e.g., by institutional investors who face a higher relative increase in transaction costs) and markets would guide capital more reliably on the basis of fundamentals. The argument applies in particular to foreign exchange markets where significant risks of policy change may result from the behavior of myopic policymakers. The argument is not fully appropriate under all circumstances, however. Institutional investors (like Japanese insurance companies) are typically free from short-term considerations and usually invest with a longer-run perspective.[1] They also prefer liquidity-risk-free vehicle currencies, which constitutes a problem of access to international capital markets for the less developed countries and for smaller currency areas.

Also on the positive side, a Tobin tax could eventually reduce "waste" in the financial industry related to "financial engineering," and to unproductive rent-seeking activities (Tobin (1984), Stiglitz (1989), Summers and Summers (1989)).

A negative jolt of the tax could stem from its increasing the user costs of capital. While it could become a convenient form to tax capital income (respectively, turnover or value added of the financial sector) in view of certain shortcomings of the income and value-added taxes, it is also clear that such presumptive taxation could entail important deadweight costs. Most of this concern is, of course, related to the unilateral use of transactions taxes with its tendency to drive financial operations offshore.[2] Such arguments are disregarded here, because the Tobin tax is supposedly a truly international tax that cannot be avoided through the inefficient rerouting of capital.[3]

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[1] Despite such attitudes, large institutional investors were occasionally engaged in speculation on foreign exchange markets.

[2] For a discussion of the Tobin tax as a unilateral measure see, for instance, Garber and Taylor (1995).

[3] It is assumed that all major centers in OECD countries--plus a few other countries, like Singapore and Hong Kong--could eventually be coordinated at the international level. Offshore financial outlets are expected to accept the tax regime once coordinated financial centers impose a higher tax rate on transactions to and from

With reference to the U.S. securities markets, Hubbard (1993) believes that deadweight costs of a securities transactions tax (STT) would be important. He argues that these costs could be even greater than indicated by their impact on the information content of market prices. "An increase in transactions costs discourages the use of financial markets to smooth consumption in response to idiosyncratic income fluctuations, increasing the variability of consumption and reducing individual well being... Moreover, with aggregate uncertainty, the greater idiosyncratic volatility in consumption reduces individuals' willingness to bear aggregate uncertainty, increasing the required rate of return on equity relative to risk-free debt" (Hubbard (1993), p.995). [1]

Other authors are more impartial on the issue. They stress that the discounted value of the tax will fall with the holding period, and that risk premia will decline with reduced volatility. This would compensate for the higher liquidity risk. Also, risk-adjusted rates would move back to equilibrium over the longer run. Especially if the tax rate were small, the deadweight loss could be discarded, as it would be only proportional to the *square* of the tax rate. A tax at a rate of 1 percent would thus entail only negligible distortions (Stiglitz (1989), p. 104).

For the Tobin tax, the effect is tempered by the fact that only foreign exchange transactions are taxed, not financial transactions in general. Furthermore, the argument is based on the assumption that a fixed after-tax rate of return is demanded by the providers of international capital. This is not true where international investors can reap "excess profits" by going abroad. Excess profits can be taxed without causing deadweight loss. Also, the argument assumes that the supply of capital is infinitely elastic. This is typically not the case for international capital. Any realistic elasticity of savings would shift the burden of the tax partly onto savers. Finally, the argument does not take into account the use of the proceeds from tax by governments. If they are used to reduce public borrowing, this would increase capital market funds available to the private sector, and thus reduce capital costs.[2]

The distributional effects of a transactions tax are, of course, particularly difficult to assess. While the formal incidence seems to rest on financial traders and institutions, the effective incidence is typically on the real sector of the economy. However, it is nearly impossible to derive a precise incidence pattern for a financial transactions tax, which represents costs of financial intermediation that are ultimately borne by producers and consumers, with unknown supply and demand elasticities. Furthermore, short-term and long-term distributional effects would have to be distinguished. And the issue is further blurred by the international character of the Tobin tax.

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such tax havens.

[1] In these passages, Hubbard makes reference to Aiyagari and Gertler (1991), and Heaton and Lucas (1992a and 1992b).

[2] The tax also diminishes the tax base for income and capital gains taxes, which would partly relieve the taxation of capital.

However, the Reinhart model identifies an *initial* effect of the tax on prices of capital goods. Capital would be shifted into domestic assets, and prices of these assets would rise, which would render the holders of these assets wealthier. But, the small country is constrained by the level of world interest rates, thus net returns on foreign investments would fall and the repatriation of foreign capital would also lower the net rate of return on domestic investments. In the long run, the tax is spread on capital more generally. It would then become a surrogate capital income tax.

Also, the tax would probably discriminate against smaller capital-importing countries in the first instance. This would be true to the extent that their access to international capital markets was more difficult, which would facilitate the forward shifting of the tax onto issuer of debt from such countries.[1] The situation would become even worse if the government of such countries furnished a large share of securities to the market--because governments might feel less constrained by their budgets and would be willing to bear the tax more readily.[2] It would shift the international tax onto the taxpayers of smaller countries with external public debt.

The tax could also be inequitable between generations because pension funds--which represent a large share of the market--would probably bear an important share of tax. This would be true to the extent that they relied on financial institutions for their investment policies, and the need to diversify large blocks of capital bestowed financial intermediaries with a relatively strong position in the market, which would allow the backward shifting of the tax. Older and retired generations would then have to shoulder the tax. Since it is probable that foreign assets of institutional investors would be held predominantly on behalf of middle-income individuals and families, this could shift the burden of the tax primarily on these social groups (Hubbard (1993), p. 993). However, as the effective tax on long-term capital formation is smaller than on short-run transactions, the overall burden should be relatively small for such groups of investors. The incidence of taxes on short-term capital is, however, nearly impossible to assess.

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[1] A further disadvantage of small capital-importing countries would be their indirect access to international capital markets through vehicle currencies, which would lead to the double taxation of financial transfers under the

[2] It should be noted that the government that supplies debentures need not be the one that appropriates the proceeds from the tax. According to Tobin, the tax is collected by an international institution.

V. Issues of Tax Design: The Four Dilemmas of the Tobin Tax

This section looks into four design problems the Tobin tax might face at the implementation stage--defining the tax base, the rate, revenue, and tax assignment.

The first three problems could be solved by remodeling the Tobin tax into a two-tier structure, which is further explained in Section VII. The fourth, tax assignment, has important political implications and can only be solved through negotiation and policy coordination at the international level if the tax becomes a multilateral scheme. However, it is conceivable that the remodeled Tobin tax would also work as a unilateral device, thus avoiding the problems of international policy coordination.

1. The tax base

The tax base of an international financial transactions tax should be as broad as possible, to limit tax avoidance and financial market distortions. Moreover, no group of market participants should be excluded *a priori* from paying the tax. The possibilities for substituting financial products are unlimited, and financial markets are particularly innovative in exploiting tax loopholes by shifting operations to untaxed institutions or creating new financial instruments not subject to tax. Nevertheless, special considerations must be given to both taxable trades and taxable transactions under a Tobin tax.

a. Taxable traders

Obviously, all foreign currency transactions would be taxable irrespective of the type of operations the trader or a trading institution normally engages in. It would equally apply to transactions effected by financial institutions, government and international organizations, the producers of goods and services, commercial enterprises, and private households. There would be no room for personal exemptions, and the nationality of traders would be irrelevant.

There are, however, deviations from this rule. Exemptions should reasonably apply to market interventions by monetary authorities to the extent that their own currencies are involved. This would allow effective monetary policies for stabilizing exchange rates. The tax could also exempt conversions of a vehicle currency into national currencies issued by a currency board. The same could be true for currency conversions subject to bilateral currency support agreements (CFA franc) or--in the future--between currencies of the European Monetary Union as long as a single currency is not yet in place. Eventually, capital transactions between governments and international organizations as well as official government aid to less developed countries could also be exempt from tax, although the case is more difficult to make and rests presumably only on merit grounds. The risk that these channels of foreign exchange transactions will be abused by speculators is, however,

remote.

Although the tax base should be as broad as possible, political pressure will likely be exerted to exempt certain groups of traders from the tax. It could be argued, for instance, that market makers play an important public role in setting prices and stabilizing foreign exchange markets on a regular basis (especially for intra day trading), possibly even more so than central banks through their money market interventions. Indeed, market makers are typically *not* noise traders. It is therefore logical to ask for their dispensation from paying the tax. Likewise, it could be argued that most intermediary transactions involving financial institutions serve to secure the liquidity of the banking industry as a whole, and that the liquidity trading of banks should thus also be tax exempt. Another rationale would be that financial institutions also engage in normal nonspeculative business whenever they trade to hedge foreign exchange positions, or when they purchase currencies, for example, to meet delivery obligations following the exercise on a foreign exchange option. Most transactions between financial institutions are thus "intermediary" in a strict sense, and ideally should not bear the tax. This is particularly obvious for institutions with a pure "clearing" function. The case can therefore be made for exempting all financial intermediaries from the tax.

These arguments illustrate the first problem--defining the Tobin tax base. The dilemma stems from the impossibility to discriminate, on an institutional basis, between normal trading, which secures the efficiency and stability of financial markets, and noise trading, which is in fact destabilizing and should be the only target of the tax. To contain speculative trading, the tax has to be applied to *all* foreign exchange transactions, whether or not they implicate financial institutions and market makers. Exempting these institutions from tax would simply encourage tax-free transactions by and through intermediaries. Such institutions must therefore be taxed in defiance of their important role in market efficiency and stability, which would entail severe efficiency costs.

b. Taxable transactions

Tobin proposes a tax on all "spot transactions" involving foreign currencies. This is likely to be inadequate, as it would invite markets to avoid the tax by trading in financial derivatives.[1] Substitutability of financial instruments is thus a severe problem for the scheme. Moreover, it would be simplistic to require that both cash and derivative markets be taxed equally. The definition of taxable transactions and their delineation is much more complex than appears at first glance.

The first issue relates to foreign exchange transactions that involve basket currencies (like SDRs or ECUs) and currency indices. Taxing such tools could lead to double-taxation if transactions in underlying currencies are taxed as well. This would discourage the use of these market instruments. But SDRs and ECUs could eventually acquire characteristics of

[1] Garber and Taylor (1995) discuss possible strategies of banks to avoid the Tobin tax if financial derivatives were not subject to the tax.

"true" currencies and become important elements in defining world liquidity in the future, in which case they should also become subject to tax. Another issue relates to transactions involving gold as a counterpart. Despite its official demonetization, gold transactions should also be taxed as long as gold serves as a refuge for speculators in times of exchange rate turbulence.[1]

A third problem relates to markets being able to develop (and having developed) close substitutes to cash that eventually escape the tax. The use of short-term market instruments, similar to banker's acceptances and commercial papers, could become a response of the market if the Tobin tax were restricted to cash transactions only. Equally, foreign exchange market funds and repurchase agreements (against collateral, and not settled on central bank accounts) could emerge as a tax avoidance scheme. Such instruments could also contribute to increasing settlement risks and thus destabilize financial markets.

Money market instruments in foreign exchange should be subject to the tax as they develop. However, it is difficult to define such products in advance. The tax code must therefore establish a tax base in *comprehensive* terms, which should prevent the emergence of money market instruments as pure tax-avoidance schemes. Their use as genuine financial instruments should, of course, not be inhibited.

Finally, other derivatives such as outright forward transactions, futures, financial swaps, and options should also be taxed, as they permit the transformation of long trading into short trading (e.g., swaps) with important repercussions on spot markets. They allow, for instance, the leveraged mobilization of funds for speculative activities on cash markets. Nearly two thirds of all forward transactions have a very short maturity (seven days or less).[2] Such transactions have grown rapidly in number and now form an important segment of the foreign exchange market. The swap market is the second largest segment after the spot market, and one of the fastest growing (see Table 3).

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[1] Purchases of gold for industrial purposes could, however, be exempt although this would complicate the tax in practice. Also, major gold exporting countries are likely to object to a Tobin tax if gold is taxed.

[2] BIS (1993), p. 19.

Table 3. Net Foreign Exchange Turnover by Important Currency Pairs in April 1992
(In percent of daily average turnover)

Currency Pair	Market Segment					
	Spot	Outright Forward	Swaps	Futures	Options	Total
US$/DM	29.6	21.7	19.4	41.5	34.3	25.4
US$/¥	15.7	20.4	25.0	29.9	27.9	20.2
US$/£	8.5	9.4	11.5	11.1	4.1	9.5
DM/£	4.9	3.1	0.7	0.1	5.8	3.1
DM/¥	3.9	3.5	0.3	0.1	6.0	2.5
Intra-EMS currencies (exc. DM/£)	7.0	4.0	1.0	0.2	1.4	4.1
Other pairs	30.4	37.9	42.1	17.1	20.5	35.2
All currency pairs	100.0	100.0	100.0	100.0	100.0	100.0
(Weights, in terms of gross turnover)	*(49)*	*(6)*	*(40)*	*(1)*	*(4)*	*(100)*

Source: BIS (1993), pp. 10 and 17; and IMF staff calculations.

However, the problem is not simply resolved by imposing the tax on transactions in derivatives, because the transaction volume cannot be matched with an underlying long transaction in a straightforward manner. For instance, future contracts mobilize funds on a comparatively small capital base and thus operate with very low transaction costs. A Tobin tax on the transaction or on the contract value would grossly understate the value of funds that might be channeled to foreign exchange markets on the basis of such deals, but taxing the *notional value* of the contract would probably severely damage the market of such instruments and could even destroy them entirely.[1] Forward and futures markets play, however, an important role in hedging exchange rate risks and their devastation would represent a severe blow for the stability of foreign exchange markets. Similarly, a foreign exchange swap or a combined interest rate/currency swap would be difficult to relate to an underlying "long" financial instrument and to tax it in line with spot market transactions.

[1] This is because the same tax levied on a long spot-market transaction and a comparable notional value of a futures contract would increase transaction costs, disproportionally disfavoring the latter. For instance, Edwards (1992) estimates that a 0.5 percent transaction tax on the notional value of a stock index futures contract in the United States would increase transaction costs for a round-trip trade by 2,200 percent. In addition, a uniform tax rate applied to the notional value of futures entails varying proportional increases of transaction costs for various types of contracts according to the degree of leverage embedded.

The same could be said for foreign exchange options.[1]

Campbell and Froot (1993) discuss two principles for relating derivatives to cash market transactions for purposes of taxation:
(1) transactions generating the same payoffs (outcome) should pay the same tax; and (2) transactions that use the same resources (costs) should pay the same tax.

Despite its attraction, the *equal payoff* principle rapidly runs into difficulties. Consider, for instance, two financial products with the same payoff pattern (like a foreign exchange option, and the long-trading in underlying assets that exactly replicates the payoff of the option). The two instruments vary only in their *trading intensity*. This implies that a uniform tax on financial transactions must disfavor one instrument over the other to the effect that markets will use the more lightly taxed financial product. This is likely to distort the genuine function of such derivatives. Uniform transaction taxes are thus *generally* not able to equate the tax burdens from trading two instruments with the same payoff as they may differ in trading intensities. "(N)o system of tax rates will enable a government to tax transactions according to their payoff patterns" (Campbell and Froot (1993), p. 18).

The other principle, equality according to *resource costs*, also runs into problems. One approach would be to impose the tax on transaction costs directly.[2] The tax would then become a sales tax on financial services rather than a transactions tax as proposed by Tobin. But such an approach would be based on a narrow definition of resource costs, and it would exclude, in particular, externalities that relate to exchange rate volatility, to higher risk premia, to lower levels of investment and foreign trade, and to the misallocation of financial resources. Reduction of such externalities is, however, precisely the objective of the Tobin tax.

Another option would be to tax the notional amounts invested, but at lower rates for derivatives because of their lower costs. This would create a propensity toward a complex system of selective taxation with considerable implementation problems. It would be difficult to calibrate tax rates exactly to market conditions, because elasticities of trading with respect to transaction costs vary significantly among the instruments. They are substantially higher for forward than for spot transactions, but their empirical importance is totally unknown. There is thus no simple general solution that would avoid the discrimination of derivative markets against cash markets, and *vice versa*. But a system of selective tax rates should be avoided under all circumstances, because it is essentially

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[1] If the tax is applied to the premium for an option, it generates significantly lower revenue than a tax on a transaction of purchasing a call option and selling a put option with the same strike price. This would entail a tax-induced bias against long trading and in favor of derivatives. However, placing a tax on the strike price creates a disadvantage for options, because "the synthetic positions in options designed to replicate price performance in the cash market entail twice as many transactions" as the underlying long transactions (Hubbard (1993), p. 988).

[2] Transactions have costs even in the absence of transactions taxes (brokerage fees plus the difference between the

arbitrary and it involves formidable administrative complexities without ever being bias free.

Summarizing the problems relating to the Tobin tax base, the dilemma has a number of important dimensions. First, it is not possible to distinguish between normal trading and noise trading. Taxing both could harm financial markets without impeding speculation in periods of distress. Second, taxing equal payoffs on an equal footing is impossible with a transactions tax, given that trading intensities vary widely. A Tobin tax must discriminate against various types of financial instruments. Third, the multiplicity of instruments with varying costs would require a set of selective tax rates, which is irreconcilable with the idea of uniformity and universality, and it would constitute an administrative nightmare. Nevertheless, a partial solution could lie in designing a two-tier rate structure with an extremely low tax rate for normal operations, and a high rate on speculative "windfall profits" during periods of erratic trading as further described in Section VII.

2. The tax rate

The problem of setting the tax rate has already been noted in the context of Tornell's contribution to the Tobin tax. It is linked to the problem of defining the tax base. Tornell argues that an optimal Tobin tax would have to operate with a zero tax rate (or, equivalently, a zero base) when the exchange rate is in equilibrium, and it would increase in accordance with the degradation of equilibrium. The Tornell variant of the tax has either a fluctuating tax base, or variable rates. This is in sharp contrast to Tobin's original proposal of a uniform tax rate on international transactions. The dilemma of a fixed rate Tobin tax is that a low level of, say, 2 percent on a round-trip transactions is unlikely to deter investors who will expect a short-term devaluation of, say, 5 percent during periods of speculation. And a high rate would, of course, become a serious impediment to efficient financial intermediation.

The dilemma could, again, be resolved through a two-tier rate structure which taxes normal exchange operations only lightly while imposing a high rate on "windfall profits" in the case of speculative attacks. Such profits would become taxable at very high rates, perhaps in the range of 50 to 100 percent. Obviously, this would involve the need to design a tax base that allows discrimination between normal and speculative financial flows. Furthermore, windfall gains associated with speculative financial flows would have to be defined. The proposal is further elaborated in Section VII.

Another case for discriminatory taxation through differential rates results from the need to limit the possibility of funds moving to offshore financial markets not subject to the tax. Of course, bringing all world financial centers under the tax regime would be a matter of negotiation and policy coordination, yet as long as this is unlikely to be successful in the short run, tax discrimination could be used to bring offshore centers to the negotiating table. The history of national securities transactions taxes--where the risks posed by their narrow

coverage are even greater than under a Tobin tax which would eventually embrace all the major financial centers of OECD countries--provides examples in this respect. In Sweden, the securities transactions tax rate for funds moved offshore was three times the rate of the round-trip tax on registered equity (Campbell and Froot (1993), p. 7), and the U.K. stamp tax was three times the ordinary rate if shares were transferred to "active nominees" who are allowed to trade tax free on the U.S. stock markets.[1]

3. Tax revenue

The revenue of the Tobin tax would depend on a number of factors, the rate, the base, and exempt trades or institutions. Significant behavioral response to the tax by market participants would be expected, yet extremely difficult, if not impossible, to assess. The higher the tax rate, the lower the taxable base would become ("Laffer effect"). It would thus be adventurous to engage in forecasting the expected revenue of a Tobin tax, particularly because the Laffer effect is likely to be dramatic. Nevertheless, there could be important revenue implications of the tax, because of the sheer size of foreign exchange markets.

As above mentioned, global net turnover in the world's foreign exchange markets (spot, forward, and derivative contracts)[2] was estimated to have been some $880 billion per business day in April 1992 (BIS (1993)) and may have approached the level of $1 trillion a day by now. A static revenue estimate (excluding behavioral changes to the tax) for a 1 percent Tobin tax on global net turnover of all spot and derivative markets would thus amount to $10 billion a day or about $2.5 trillion a year (assuming 250 business days *per annum*). Of course, this figure is totally unrealistic. But even if foreign exchange markets would contract by 99 percent as a response to the new tax, it would still raise the sizable amount of $25 billion. Alternatively, a tax rate of 2 basis points (two hundredths of a percent) could raise the amount of $50 billion (which approximates the annual volume of official government aid to less developed countries). Such a small tax rate would probably entail only moderate behavioral

reactions of foreign exchange markets, and the static revenue estimate could be much more realistic.[3]

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[1] The U.K. stamp duty is a tax on registration services, not on transactions which explains this particular form of arrangement. The triple tax rate also applies to the conversion of registered to bearer instruments (possible in the United Kingdom only for foreigners) as a compensation for free trading that is possible after conversion (Campbell and Froot (1993), p. 13).

[2] Futures and options were reported in terms of notional principal values.

[3] Assuming an average margin of 4 basis points for a highly liquid transaction, a transaction tax of 2 basis points would correspond to a 50 percent tax on gross profits on the transaction. The implicit profits tax rate would be significantly lower for less liquid transaction (like those involving pound sterling, French francs or Spanish pesetas).

Nevertheless, market reactions to the tax cannot be disregarded, although it is extremely difficult to quantify them. More generally, behavioral response follows the reduction of the value of currencies by expected future transaction liabilities. These could be estimated on the basis of studies available for securities transactions taxes.[1] Such results have to be treated with caution, however, because transaction costs may be endogenous. Their measurement could be inaccurate to the extent that they include the price impact of trading and the effects of capital gains taxes which cannot be proxied by a fixed number (Campbell and Foot (1993), p. 22). However, the methodology for assessing behavioral response is, in principle, available.

One possibility for markets to react to the tax is related to its differential impact on vehicle and nonvehicle currencies. Since exclusive trading in vehicle currencies avoids the tax altogether, world financial markets could retract into vehicle currency (U.S. dollar) trading. The second possibility would be to trade less frequently through netting, which is possible with the aid of modern technologies. The third possibility would be to eschew the tax through the forming of monetary blocks like the European Monetary Union.[2] Some of these options are considered even without a Tobin tax, but the introduction of the tax could speed such processes.

Finally, the question as to who should be entitled to appropriate the proceeds may represent yet another difficulty with the Tobin tax. The potential for revenue raising could simply be too high to assign the tax exclusively to an international organization or to a specific supranational cause.

4. Tax assignment

Tax assignment is a highly controversial political question and cannot be dealt with extensively in this paper. It is clear that a Tobin tax requires international coordination, although it may be administered by national governments. Tobin designates the World Bank and the IMF as possible candidates for coordinating the tax at the international level.[3] However, it does not follow that the tax proceeds would also be appropriated by the

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[1] See, for instance, Jackson and O'Donnell (1985) for the United Kingdom, and Lindgren and Westlund (1990) for Sweden. Large reductions in trading volume are indeed observed as a reaction to securities transactions taxes. As an example, trading declined by 85 percent for fixed-income securities and by 98 percent for bond futures in Sweden after the tax was introduced (Campbell and Froot (1993), pp. 8-9). However, such results are inconclusive for a comprehensive international tax, because--under a unilateral scheme--national traders can always move to foreign markets or into alternative tax-exempt instruments (debentures, variable rate notes, and forward rate agreements, instead of futures and swaps in the Swedish case), which is more difficult under a comprehensive multilateral tax regime.

[2] In 1992, intra-EMS currency trading represented only 7.2 percent of total trading. The forming of a European Monetary Union would reduce the volume of trading only little.

[3] The latter organization is, perhaps, better prepared to assume responsibility for the tax because coordinating the international financial system (and exchange rates, in particular) belongs to its genuine statutory functions. More recently, Tobin has also proposed to charge the Bank for International Settlements (BIS) with the task

institution that orchestrates the tax.

There is, of course, a legion of alternatives to assigning the tax to the World Bank or the IMF. In particular, tax proceeds could be handed back to national governments.[1] One possibility would be to apply the derivation principle, which would redistribute the tax proceeds to the countries of origin. This would favor countries with important financial centers, and it is likely to be resented by the rest of the world. It would also lead to an extremely inequitable distribution of revenue, and is likely to deviate from the regional incidence of the tax. Such distribution formulas would be arbitrary in economic terms, and be determined exclusively by historical fortune.[2] However, tax proceeds could also be redistributed to national governments on the basis of various other distribution schemes like, for instance, the quota ascribed to an international organization.[3]

The basic philosophy behind Tobin's idea on tax assignment is economically sound, however. Since the regional incidence pattern is difficult to determine, the proceeds should ideally be assigned to a supranational body where they can be used to provide public goods on a global scale. Instead of assigning the tax to an existing institution, it could also be used to serve specific purposes of worldwide importance such as basic research in health, the protection of the environment and habitat, or similar global objectives.[4]

Obviously, solving the tax assignment problem would entail significant international coordination costs of establishing a worldwide consensus. This may become the ultimate pungent question for tax implementation, even if all technical and policy issues are resolved. This is because assigning revenue from the Tobin tax to a supranational body is tantamount to conveying significant power to that institution, which is likely to be resented by some member countries.

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of administering the tax (Eichengreen, Tobin, Wyplosz 1995, p. 165).

[1] The handing back of tax proceeds to national governments would probably be mandatory if the Tobin tax were expanded to all financial transactions, international and domestic; this could also become an option for counterbalancing the advantage of trading in vehicle currencies.

[2] The problem reminds us of the "Rotterdam" phenomenon for customs duties. Rotterdam, the main harbor of the EU, would unduly benefit from an arrangement that would leave it with the proceeds from customs duties on imports destined to the regions of the EU. For this reason, customs duties were assigned to the supranational budget of the European Commission.

[3] The use of the IMF quota, for instance, is likely to involve a redistribution of funds in favor of smaller and less developed countries whose foreign exchange markets are not yet fully developed. At the same time, this would probably raise objections from those countries whose quotas are small and financial operations substantial (e.g., Singapore). A possible solution might be the use of a mixed redistribution formula by which a part is redistributed on the basis of local turnover, and another part on the basis of some fixed indicator like quotas. Felix (1995) proposes tax sharing between national governments, the IMF, the United Nations, and the World Bank.

[4] Felix (1995) proposes a Tobin tax for the funding of social objectives, which "would give the Tobin tax proposal a clearer moral dimension to reinforce its materialistic economic rationale."

VI. Administrative and Operational Issues

Once the tax policy questions have been resolved, in particular the definition of the tax base, the Tobin tax is comparatively easy to administer. This is because its base is a straightforward cash flow transaction (with the reservations made earlier regarding derivatives), there are no substantial exemptions at a personal or institutional level, and the tax rate is uniform and proportional. Furthermore, the foreign exchange market is relatively well structured, and the number of licensed participants is limited: most transactions (70 percent) are effected between registered dealers (BIS (1993), p. 11).

Moreover, transactions take place in a small number of geographical centers. The United States, the United Kingdom, and Japan accounted for 55 percent of all countries' total reported turnover in 1992. If the next four most important centers--Singapore, Switzerland, Hong Kong, and Germany--are added, about 78 percent of total trading is accounted for (BIS (1993), p. 13).

Finally, foreign exchange transactions all rely heavily on automated processing and on telecommunications networks, which renders tax administration particularly simple. Tax assessment rules could be built into existing computer algorithms, and the collection and enforcement of the tax made automatically at the settlement stage. The focus of tax administration would then be on surveillance and auditing.

Tobin's idea is to use national tax administrations to assess and collect the tax even though the rules would be fixed at a supranational level. This is feasible if an initial agreement can be reached among the countries with the major financial centers. As stressed before, non-cooperating countries could eventually be encouraged to join the international tax regime if transactions to and from such centers in the regulated core countries are penalized through higher tax rates.

In 1992, in nine countries (including the United States and the United Kingdom), one third of recorded transactions value was arranged through brokers. Another third was arranged through electronic dealing systems in the United States, and one quarter in the United Kingdom (BIS (1993), p. 23/24). The importance of an electronic system varies greatly among countries, but seems to be increasing. There is also a tendency toward greater market concentration, which facilitates the administration of the tax.

However, complications may arise, particularly from cross-border transactions with nonbank institutions. It would thus become necessary to license all foreign exchange market participants at a supranational level, which would become the legal basis for their being subject to the tax. The licensing must be comprehensive and include banks, brokers, securities companies, fund managers, insurance companies, pension funds, leasing companies, and, eventually, larger commercial firms.

Most foreign exchange transactions have to be settled eventually (with the major

exception of options not exercised), which is effected through central bank accounts. Because most deals are wholesale transactions, settlement uses the payments systems of the countries that issue the currency concerned. This is another advantage for administering the tax. It is, however, preferable not to impose the tax at this final stage of settlement. The tax should become due (and payable) when the contract is drawn up, to influence the effective fixing of the exchange rate. This may complicate matters, however, as there is a risk of double-taxation for intermediate transactions (especially cross-border) until the settlement is finalized. But this could be avoided by adding an electronic routing slip to the transaction, which would track the tax record and payment until the transaction is settled on a central bank account. The central bank would be entitled to discount the tax from the amount to be settled and to transfer the amount to the destined institution.

Generally speaking, there seem to be no major administrative problems associated with the operation of a Tobin tax, although difficulties may arise in detail, in particular in the derivatives markets. The main problem relates to international cooperation and legal enforcement in a system that will have to rely on national taxing authorities. The cooperation of national tax administration is, therefore, inseparable from the pivotal role played by the tax assignment question.

VII. A Blueprint for Options

There are not many alternatives to the Tobin tax as a stabilizing device. One option-- tax on the domestic stock of foreign assets, not on the flows of foreign exchange transacted, as used in the past by some countries (Germany, Switzerland)-- would increase the opportunity costs of holding foreign assets, causing investors to shift into home assets. It is questionable, however, whether a tax on stocks can deter short-run speculation. Such a tax will have a longer-term structural impact. It may also be questioned whether discriminatory taxation of foreign and domestic assets is consistent with the spirit of the OECD's Liberalization of Capital Markets Code or the GATT.

A second option would be taxes on capital outflows or inflows. Such taxes have been used, for instance, by the United States on capital outflows during the 1960s (interest rate equalization tax) or, more recently, by Israel on capital inflows. Again, these measures have a structural impact, and they are futile as antispeculation tools. They have also been unsuccessful in coping with the underlying structural problems on a more permanent basis, and they are difficult to reconcile with the freedom of capital movements. This may be why they were ultimately abandoned.

A third option would be a sliding scale capital gains tax, which would apply higher rates to short-term capital gains. Such a tax would presumably have to be embedded in national income tax legislation. It is difficult to see how such a tax could be coordinated at the international level. Experience with national withholding taxes on interest income demonstrates that there is little incentive to cooperate internationally for those financial markets that benefit from low or nonexisting taxation on income or capital gains of foreigners. Such a tax would also pose severe administrative problems, because the tax rate would have to vary according to the term structure of capital gains. Furthermore, in a world of integrated information and telecommunication networks, it is increasingly difficult to pin down a locational incidence of capital gains. They can easily be shifted into tax havens.

But, the Tobin tax as a financial transactions tax has a number of attractions. Its base is broad--possibly involving less distortions than more narrowly based taxes. The tax could raise substantial revenue, and it is administratively simple. To render the Tobin tax operational, the design issues discussed in the previous sections will have to tackled, and some will require international coordination and difficult political choice. However, a two-tier rate structure, as outlined in this section, could eventually become feasible.

1. General remarks

As stressed before, stabilizing exchange rates would require high and varying tax rates, which would seriously obstruct the workings of international financial markets. In contrast, a small charge on international financial transactions would hardly cause significant distortions, but such a tax is unlikely to inhibit exchange rate speculations.

One possible solution would be to consider both a low-rate transactions tax *plus* a surcharge as an antispeculation device, whereby the latter would be triggered only during phases of exchange rate turbulence and based on well-established criteria. The former would function on a recurrent basis and raise substantial and stable revenue without necessarily impairing the normal liquidity function of world financial markets. It would also serve as a monitoring and controlling device for the exchange surcharge, which would be administratively attached to it.[1] The exchange surcharge would be dormant in times of normal operations of the exchange market and, ideally, raise no revenue at all. It would, however, function as an automatic circuit breaker whenever speculative attacks against currencies occur (if they materialize at all under the regime, which is doubtful). The two taxes would thus be fully integrated, the former tax constituting the operational and computational vehicle for the latter.

2. The underlying transactions tax

A minimal nominal charge on foreign exchange transactions of, say, one basis points (.001 percent) would raise the cost of capital only slightly, but would probably be neutral as to the volume of currencies transacted.[2] The tax could also be employed on derivative trades, at a standard lower rate of, say, half the standard rate. This would allow derivative markets to continue functioning at low costs, yet prevent the emergence of derivatives as tax avoidance schemes. However, given an approximate net value of about $1 trillion changing hands per business day, the tax would still raise close to $25 billion per year. The tax base remains, however, vulnerable to structural changes in international financial markets, such as the introduction of a common European currency.

If agreement could be reached on which organization is entitled to appropriate this revenue and/or what purposes it should serve, such an international tax could become an interesting option in the future. The organization empowered to implement the tax would license financial institutions and brokers engaging in international transactions and oblige them to administer the tax on its behalf. Administration would be almost costless as it implies only small changes to existing computer programs. It would probably also impose little costs on over-the-counter (OTC) and customer-related transactions, but as the number of banks and business enterprises engaging in foreign exchange is much greater than the number of electronic networks, there would be extra compliance and auditing costs. These could become so high as to render the use of networks more widespread, which is probably the general market trend in the longer run.

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[1] The administrative aspects are essential for the two-tier tax structure, not its revenue-raising capacity. If the purpose of the two-tier tax is *not* to raise revenue, the tax rate on the underlying transactions tax could well be zero. It would still be necessary to have that tax as a monitoring device.

[2] This rate corresponds approximately to a 25 percent charge on gross profits relating to a highly liquid transaction. If this tax rate is thought to be too high, the financial transaction tax could eventually be credited against national income tax.

The tax would be due in advance before the transaction order can be executed. To prove that the tax has been paid, and avoid double-counting or the discrimination of currency transactions through vehicle currencies (such as the Eurodollar market), an electronic routing slip would be attached to any transaction that contains corresponding tax information until the transaction is finally settled on a central bank account. The routing slip authorizes the settling central bank to discount the tax from the amount to be settled.

The tax would, of course, discriminate against smaller currencies and favor the use of vehicle currencies, since exclusive dealings within one key currency would be tax free.[1] However, the incidence pattern of the tax would not differ much from that induced by private transaction costs at present.

As discussed more fully before, a higher tax rate should be imposed on capital transactions with those financial institutions that do not impose the tax and refuse to adopt the international scheme. This would likely dry up the noncooperating offshore markets and tax havens, which would make them reconsider their long-term interests and foster multilateral solutions.

3. The exchange surcharge

The exchange surcharge would be administered in conjunction with the underlying transactions tax, but it would pursue a different objective and function. The objective would be to tax negative externalities associated with excessive volatility *per se*. For normal operations, the tax would be zero, which would secure the liquidity of the markets and allow efficient trading. Only during phases of speculative trading would the tax be levied, yet it would bite rather hard under these circumstances. It could be confined to cash transactions, yet it could easily be extended to the derivatives market if need be, because derivatives would already be taxed under the transactions tax. Ideally, revenue from the exchange surcharge would be nil, if it is to achieve its objective.

There are three possible surcharges: a discretionary tax, a quantity-oriented tax, and a price-oriented tax ("windfall gains" tax).

a. Discretionary tax

Similarly to unilateral monetary defense schemes of central banks today, the tax could be activated by an international organization *ad hoc* whenever speculative tendencies become apparent. The organization would announce a tax rate (or a set of rates) applying to specific transactions, and the tax policy would be enforced immediately, albeit only

[1] There should thus be little political resistance from governments of countries that issue vehicle currencies. It should be mentioned, however, that the logical extension of the tax would be a tax on *all* financial transactions, international and national. This would, of course, raise objections by the countries that issue vehicle currencies, unless a satisfactory solution on international revenue sharing is found.

temporarily.

Such a discretionary tax has a number of disadvantages. There must be close surveillance of markets, and firm criteria for market intervention would have to be established in advance. Markets would try to anticipate the tax policy, and fiscal response would then always come too late. Also, the activation of the tax through discretionary policy would imply adverse signaling to financial markets, and it must hence provoke and intensify a speculative mood. Furthermore, there would be shocks to the liquidity position of market participants, which could seriously jeopardize the stability of the financial system. Finally, no national parliament would reasonably vest its own government with such discretionary powers, let alone an international organization. The approach should therefore be discarded as a viable economic and political option.

b. Quantity-oriented tax

Rather than activating the exchange surcharge exogenously through a policy decision, it could be switched on automatically whenever the daily transaction volume of a specific currency market transcends a predetermined level. This level could be determined by a crawling peg (like a moving average over the last 20 business days) plus a safety margin in percent. The margins may differ for different currencies, but the same rules would apply to all markets and to all institutions operating in the market. Of course, the shorter the time interval for the crawl, the greater the scope for short-term fluctuations. The interval should, however, be sufficiently short to avoid "leaning against the wind," and to allow markets to adjust to changes in fundamentals.

Whenever the tax is activated, transaction costs will become significantly higher than before, which should induce markets to smooth out large fluctuations to avoid such costs. Traders would have to be given the right to recontract, however, since the transaction costs involved cannot be known in advance. This would render a significant proportion of contracts contingent, and speculative attacks would become more difficult as traders would automatically withdraw from markets in the case of large volume fluctuations. Ideally, this will lead to markets behaving more smoothly, and the tax would never be activated.

The proposal has a number of drawbacks, however. While quantity fluctuations may be small for the global market, they may be large at the level of regional markets and of financial institutions, and hard to fix for intraday trading. Switzerland, for instance, loses about 90 percent of its normal foreign exchange business whenever there is a bank holiday in the United States (BIS (1994), p. 175); it is therefore difficult to fix the reference point for the peg as well as the margin for "normal" fluctuations. Although the tax could work as an automatic stabilizer, its implementation would meet substantial difficulties in practice.

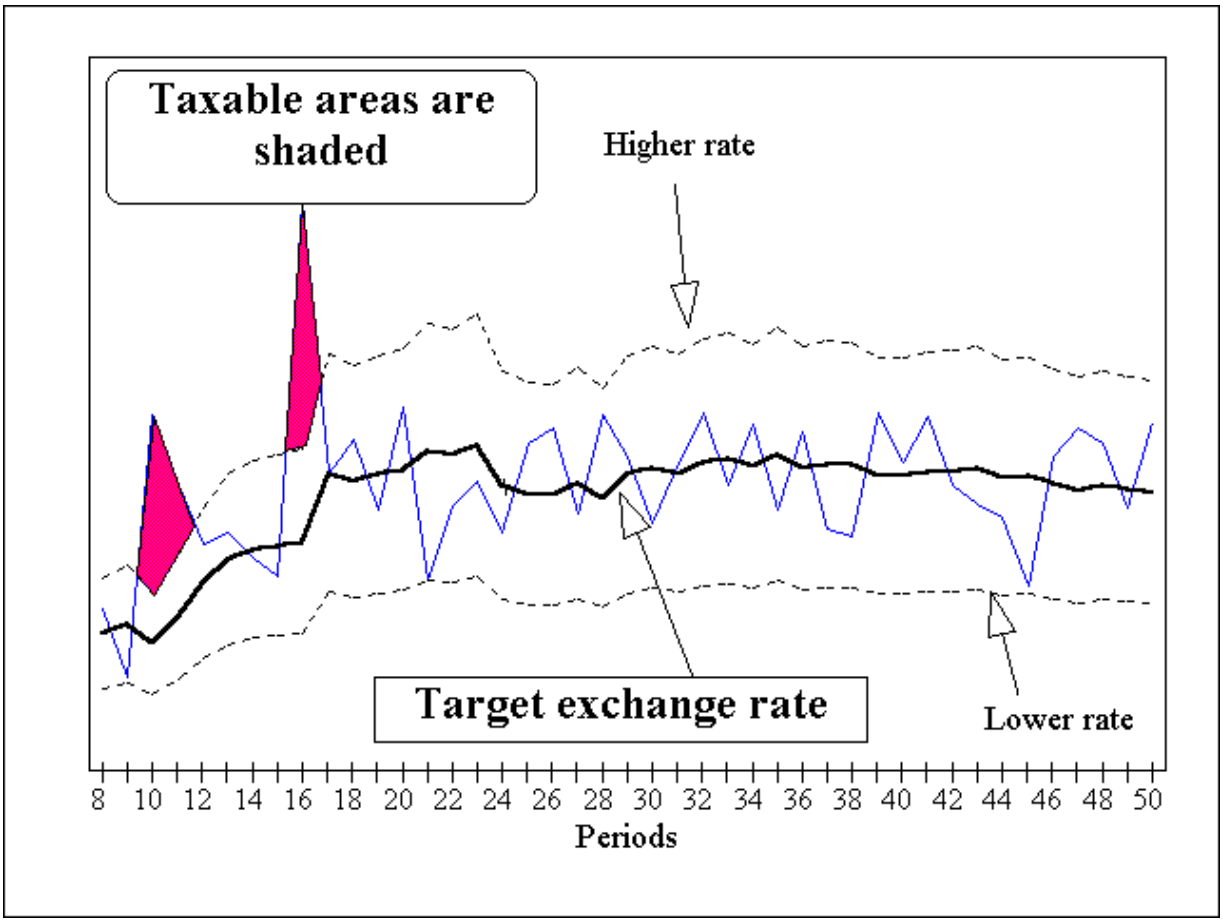
c. Price-oriented tax

The remaining option is obviously a tax that is price-sensitive rather than reactive to quantity variations. Its philosophy is identical to that discussed for the quantity-oriented tax, except that the untaxed "band" is defined with respect to a price--the target exchange rate. Whenever the effective exchange rate transgresses the band, the difference between the band rate next to it and the effective exchange rate is considered a negative externality and a windfall gain for one of the contracting partners. It would become the direct base of taxation. The idea is more formally explained in Appendix 3 and illustrated in Chart 1 where an effective exchange rate is simulated over 50 periods with a forward-looking moving average as the target exchange rate for each period.[1] Higher and lower tolerable rates are defined in proportion to the target rate. As long as the daily fluctuations remain within the band, no tax is levied. Once the effective rate moves beyond the tolerable range, the difference between the band and the effective rate (shaded area) is taxed at a high (eventually confiscatory) proportional rate.[2]

The scheme works quite like the actual exchange rate stabilization mechanism of the European Monetary System.[3] However, rather than lending support to a weakening currency through interest rate subsidies or sacrifice of valuable foreign exchange reserves, the currency is defended by taxing technically well-defined windfall profits that occasionally accrue to market participants.

[1] In the example, this moving average is based on a seven-period lag with equal weight.
[2] In Tornell's (1988) model, the rate could be as high as to confiscate all speculative gains from trading.
[3] Technically, the exchange surcharge is defined relative to an autoregressive scheme, while the European Monetary System's "anchor" is a weighted basket of currencies, the ECU.

Chart 1. Illustration of the Working of the Exchange Surcharge



Contrary to the Tobin tax, which taxes all transactions without discrimination at the "wrong end" and hence impacts negatively upon normal liquidity trading, the exchange tax only applies to transactions at the "speculative end," leaving normal trading unharmed. This does not exclude normal traders from the tax whenever they effect financial transactions during phases of exchange rate volatility. But one could argue that such transactions are only partially taxed to the extent that the exchange rate deviates from a targeted rate by a margin, and that even the "normal" trader would create an externality and make a windfall profit/loss to that degree. Moreover, financial markets can be relied on to be sufficiently ingenious and creative as to rapidly develop various types of contingent contracts--similar to currency options today--which allow their customers to hedge against possible tax risks. Contingent claims markets would thus emerge in the spirit of Stockman and Hernández (1988), as discussed in Appendix 2. Most likely, however, markets would adapt to the new situation by smoothing out financial transactions and avoiding currency speculation altogether since the expected speculation gain is automatically curtailed (or even annihilated) by the tax.

4. Unilateral application of the scheme

The scheme described would ideally work on a global scale, like the tax originally proposed by Tobin. It is stressed, however, that the multilateral adoption of the project could entail political costs and that an international consensus would be difficult to reach. The question is therefore whether the scheme could not also be implemented unilaterally by one (or a small number) of countries initially.

A first criticism of such a suggestion could result from the experience of countries that have used (or are using) financial transactions taxes unilaterally, such as the United Kingdom, Germany, Portugal, or Sweden. Such experience demonstrates that transactions taxes have a negative impact on the development of a local financial market, they are highly distortive, and encourage evasion through moving financial operations abroad. However, the same *cannot* be said for the proposed variant of the Tobin tax. The setting up of a parallel market for domestic currency conversions abroad is costly and will only be profitable if transaction costs are higher at home on a *consistent and permanent basis*. This is not true for the exchange surcharge. Provided the underlying transactions tax has a very low (or zero) rate, the exchange surcharge itself is unlikely to deter normal financial business because it is evoked only occasionally or, perhaps, never.

Moreover, all transactions in highly liquid home currency would have to be settled on an account with the central bank. This would give the bank the option to administer the surcharge unilaterally and to discount the tax from the total amount settled, even on an asymmetrical basis.

However, unilateral adoption of the scheme could entail complications through the workings of cross-exchange rates. The multilateral scheme could probably define target exchange rates on an autoregressive basis for each pair of exchange rates without interfering with cross-currency arbitrage, provided the bands are appropriately set for the various currencies. A unilateral scheme would probably face such difficulties, however. It is therefore more appropriate to define the target rate relative to a basket of currencies (as in the European Monetary System) and let the market determine cross-exchange rates. However, this could eventually trigger the exchange surcharge whenever the reference currency (basket) is subject to volatility, which cannot be excluded *a priori*. A unilateral "defense" scheme for a smaller currency would then be invoked, although its fundamentals are unchanged simply because basket currencies exhibit volatility. This would call for a comprehensive basket of currencies to mitigate fluctuations associated with individual "anchor" currencies. While not ideal, the unilateral adoption of the scheme seems to be feasible. This is true in particular for countries that try to peg their currency unilaterally to a vehicle currency like the U.S. dollars.

5. Structural implications of the scheme

Of course, the scheme is unable (like any other short-run stabilizing monetary policy measure) to compensate for structural problems of the currency. Redressing an ailing economy is *not the purpose* of the exchange surcharge. On the contrary, the scheme allows the smooth adjustment to "fundamentals" by avoiding a leaning against the wind policy. Desirable corrections of the exchange rate are possible as the target rate--the moving average--is allowed to converge to its equilibrium value. But erratic short-term volatility induced by speculation would be reduced through the scheme.

It can be argued that the exchange surcharge could not prevent speculative trading in the case of sudden fear of payment defaults or political crises. Speculative capital would then be withdrawn irrespective of the costs. Again, the surcharge (as any other policy measure including capital controls) is *not* able to act against "animal spirits" or irrational behavior. Its effectiveness also depends on the tax rate chosen, which could reach confiscatory levels in which case trading outside the band could be stopped effectively. In any case, it avoids the negative effects of alternative monetary policy measures which would sacrifice valuable international reserves or offer excessively generous interest rates under these circumstances. Instead of depleting public assets, the surcharge would raise revenue in such instances. It would also eliminate expectations of recurrent bail-outs by central banks, which would diminish moral hazards and reduce the incidence of financial crises.

Moreover, it can be anticipated that the tax would also stabilize longer-term exchange rate movements, this would work through its impact on investors' expectations. Although the tax would not interfere with normal liquidity trading among banks nor with transactions motivated by trade or fixed capital formation of international investors, short-run speculative investments might eventually face the partial confiscation of speculative windfall gains once the exchange surcharge is triggered. If investors have rational expectations, this should reduce the scope for short-term speculation against currencies and the capital inflows in countries with weaker fundamentals. Consequently, exchange rates would reflect fundamentals more judiciously. Of course, reduced inflows of speculative capital would lessen the vulnerability of a country because the potential volume of speculative outflows would also be reduced. The term structure of international capital investments would likely adjust to the tax, and the exchange rate would reflect more strongly the impact of longer-term capital movements.

For instance, some Latin American countries have recently benefited from significant inflows of capital, which has strengthened their respective exchange rates and may even have led, in some instances, to an overvaluation of their currencies according to fundamentals. But it is not always possible to determine the term structure of these capital flows, and some of these countries may have been tempted to count on revolving finance, even in the presence of clear short-term investments. This entails severe financial risks in

the case of a reversal of trends.[1] An overvaluation of a currency may then be followed by a sharp depreciation once the speculative bubbles burst. However, the tax, through its impact on investors' expectations, could eventually avoid such bubbles and keep exchange rates closer to their medium-term equilibrium values.

It can also be assumed that potential distortions in international capital formation and financing decisions would be negligible under the exchange surcharge. Similarly to Tornell's (1988) tax, the surcharge reduces the variance of the domestic interest rate without changing its long-run expected value, for example, it does *not* drive a wedge between long-term domestic and foreign interest rates. Its impact on longer-term investment decisions should therefore be neutral.

[1] Such risks are exacerbated if the government of capital importing countries absorbs such funds irrespective of their short-run nature, and if the country's financial institutions are weak and unable to offer corresponding short-term placements in the private sector. Eventually, short-term funds appropriated should be re-exported if they exceed the short-term absorption capacity of a country. This has often been the case in Switzerland, for example, but it obviously requires an efficient and internationally versatile banking sector.

Appendix 1

The Impact of the Tobin Tax on Short- and Long-Term Trading

The differential impact of the Tobin tax on short- and long-term trading can be demonstrated as follows.

If τ is the proportional tax rate on foreign exchange dealings to be applied on both outward and inward transactions, h is the holding period ($h = 52$ denoting a one-week, $h = 12$ a monthly, and 0.2 a five-year holding period, etc.), i^* is the (annualized) interest rate for foreign assets, i_h^* the corresponding interest rate for the holding period ($[1 + i_h^*]^h = [1 + i^*]$), and i is an alternative annual after-tax rate of return denoted in home currency, the following arbitrage condition must hold:

$$(A1) \quad [(1 - \tau)(1 + i_h^*)]^h (1 - \tau) = (1 + i).$$

The term in square brackets denotes the after-tax amount of an outward transaction of one dollar at repatriation time $s + 1/h$ (in years), where s is the time of investment; and the amount invested is again subject to tax when repatriated. It is assumed that there is no real exchange rate risk or speculative gains to be realized for the transactor (purchasing power parity).

To derive the annualized foreign interest rate needed to render the foreign investment at least as profitable as the investment in home currency, the following formula for i_h^* can be derived from (A1):

$$(A2) \quad 1+i_h^*=\left[\frac{(1+i)}{(1-\tau)^{1+h}}\right]^{\frac{1}{h}}$$

The corresponding annual rate i^* is then

$$(A3) \quad i^*=\frac{(1+i)}{(1-\tau)^{1+h}}-1$$

Formula (A3) allows one to calculate the pretax foreign exchange return required for each currency transaction subject to the Tobin tax for different maturities of the foreign asset as depicted in Table 1.

Appendix 2

Some Variants of the Tobin Tax in the Literature

This appendix briefly describes some specific variants of the Tobin tax as found in the literature. They are examined in light of Tobin's original proposal and its economic, political, and administrative feasibility.

The Reinhart variant [1]

Reinhart (1991) examines a Tobin tax in the context of a general equilibrium model of exchange rate determination for a small open economy under rational expectations (in line with Calvo and Rodríguez (1977)). He does not seem to pursue a specific policy goal, but he compares the impact of the tax with alternative measures, notably tariffs on net imports and money creation, which may point to the implicit objective of avoiding such options.

Reinhart applies the tax to the domestic stock of foreign assets, not to the flows of foreign exchange transacted. It thus drives a wedge between domestic and foreign interest rates which must have an "effect on investors' desired stock of assets at a point in time, and revenue consequences for the government that will affect the flow of assets over time" (Reinhart (1991), p. 420).

Reinhart's study focuses on the dynamic properties of his exchange rate model, in particular those engendered by a Tobin tax. He demonstrates that the imposition of a tax on domestic holdings of foreign assets increases the opportunity costs of holding such assets and causes investors to shift into home assets. The need to repatriate capital entails a transitory appreciation of the domestic exchange rate and a deterioration of the country's trade balance (assuming that foreign residents do not hold domestic money). The initial appreciation of the currency is followed by a real depreciation of the exchange rate as the holdings of foreign assets approach their equilibrium value and the gap in the trade balance is closed.

An implicit result of Reinhart's exercise, not sufficiently pursued by the author, is that a decumulation of foreign assets would also affect the net real interest rate for holdings of domestic assets.[2] The repatriation of capital normally requires the domestic real interest rate to decline in relative terms. The Tobin tax would thus become a tax on foreign *and* domestic capital holdings.[3]

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[1] With digressions on Stockman and Hernández (1988), Liviatan (1980), and Dornbusch (1986a and 1986b).
[2] The gross real interest rate in Reinhart's model is implicitly given by the world rate (small open economy).
[3] Stockman and Hernández (1988) would probably contest this view. They claim that sophisticated financial markets would allow a shift of private wealth across states of the world, so the wealth effect of an increase in terms of trade caused by introducing taxes on foreign currency acquisition would be nil.

It may be useful to contrast the Reinhart model with a study by Stockman and Hernández (1988) who also explore the Tobin tax within a general-equilibrium, rational-expectations model of a two-country world economy. The authors examine the effects of taxes on purchases of foreign currency and differential taxes on income from foreign interest-bearing assets on portfolio allocation, trade, and prices.[1] Households do not only hold assets in domestic and foreign currency, they also acquire contingent claims to domestic and foreign moneys that are subject to future uncertain taxation. This renders future asset trades redundant since contingent claims can be traded on the spot market.

Stockman and Hernández (1988), find an increase of taxes on foreign currency acquisition to raise the cost of imports. This reduces the level of imports and raises the terms of trade (TOT). Yet the effect of the TOT change on households' wealth is neutral since highly sophisticated financial markets allow households to shift wealth across states tax free under the assumption of the model. The rise in TOT requires an exchange rate appreciation unless nominal export prices are affected (which is assumed away by a separable utility function of households for domestic and exportable goods). The tax also lowers the speculative demand for foreign money, which reinforces the exchange rate appreciation.

These results differ substantially from those obtained in models without contingent assets or in which households are assumed to ignore the possibility of changes in government policies. In either of these cases, an increase in the domestic tax rate on foreign currency acquisitions not only leads domestic households to substitute away from foreign currency into domestic currency and other assets, but affects the distribution of wealth. Substitution out of foreign currency reduces the demand for the foreign good and lowers its relative price. This redistributes wealth from owners of foreign firms to owners of domestic firms....In our model, in contrast, domestic consumption...is unaffected if utility is separable, and more generally could rise or fall....Domestic ex post utility falls...because financial markets eliminate the wealth redistribution[2] (Stockman and Hernández (1988), p. 369).

It should also be noted that the Reinhart variant of the Tobin tax bears resemblance to the RIET proposed, for instance, by Liviatan (1980) and Dornbusch (1986a and 1986b). Dornbusch wants to use such taxes to avoid "the adverse and totally unwarranted effects of U.S. policies abroad" (Dornbusch (1986a), p. 54) arguing that the allocational costs of such taxes "are in any sense commensurate with the costs that are avoided by their preventing imported inflation in Europe" (Dornbusch (1986a), p. 54). Both Liviatan and Dornbusch would apply such taxes only temporarily, yet it remains unclear how the tax could be

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[1] The Stockman and Hernández tax is on all currency conversions caused by real flows (trade, and income), but *not* for acquiring stocks like the purchase of foreign bonds. It is questionable whether such a tax is suitable for securing exchange rate stability. However, the exchange-rate stabilization problem is assumed away by Stockman and Hernández *via* the rational-expectation hypothesis combined with a full set of contingent-claims markets where households can self-insure against risks in future changes of government policies.

[2] The latter is, of course, related to the assumption that trade in foreign bonds is not subject to the tax.

designed and administered so as to render coverage complete and automatic. The only hint is the following: "One avenue that commends itself is a transitory withholding tax on interest-bearing, dollar-denominated assets" (Dornbusch (1986a), p. 54). If "dollar-denominated assets" are replaced by "holdings of foreign assets," the analogy to the Reinhart variant of the Tobin tax becomes more apparent.

The Tornell variant

Tornell (1988) demonstrated that a tax on international transactions can eliminate short-run interest rate volatility, and hence uncertainty, which reduces "short-termism"[1] and fosters real over financial investment. He shows that "real capital can be increased by just reducing the variability of the domestic interest rate, without changing its long-run expected level. This can be done with a sequence of taxes on all international financial transactions (Tobin taxes), that vary inversely with the state of expectations" (Tornell (1988), p. 5).

The market distortion Tornell wants to remove is the "option to wait," which is lost once a real investment is undertaken. This option has a positive value in the presence of policy uncertainties, even in a risk-neutral world (McDonald and Siegel (1986)). This must lead to underinvestment, which is typical for many developing countries. Tobin taxes are then a second-best policy for reducing the value of the option to wait while leaving long-run expected returns in financial markets unchanged, that is, these taxes do *not* drive a wedge between long-term domestic and foreign interest rates.

Tornell starts from the following arbitrage condition:[2]

(B1) $i_t = i^* + Z_t, \qquad i^* > 0,$

where Z_t is a process composed of a deterministic and a stochastic component taking the form

(B2) $dZ_t = a\,(i^* - i_t)\, i_t\, dt + \sigma\, i_t\, dW_t,\ 0 < a < 1.$

The first component of (B2) is the drift, a mean-reverting process. It secures that the long-run expected value of i is equal to i^* if fundamentals are correct. The second component is a stochastic process with increments that are independent from each other, and normally distributed (i.e., $dW \in N(0,1)$). At each point in time and for each level of interest, the process may go up or down at random, however, the expected value of the

[1] Quoting from *The Wall Street Journal* of September 30, 1988, he defines short-termism as the "pervasive mix of chronic anxiety and skepticism that leads to an inability to plan beyond next week. The result is the region's [Latin America's] scarce investment, casino-like financial markets and capital flight."

[2] Tornell positions himself in a small economy with policy uncertainty. Hence, the foreign interest rate is fixed while the domestic interest rate fluctuates. The arguments based on equations (A1) through (A3) in Appendix 1 take the opposite view where the (volatile) foreign interest rate is compared to a stable domestic rate for a dominant home currency.

increment is zero.

By substituting (B2) into (B1), the following process for the domestic interest rate is obtained:

(B3) $di_t / i_t = a\,(i^* - i_t)\,dt + \sigma\,dW_t$.

Tornell would apply a proportional Tobin tax of rate τ to the "change in the investors' expectations" (Tornell (1988), p. 11), that is, formula (B3) becomes:

(B4) $di_t / i_t = dZ_t\,(1 - \tau) = [a\,(i^* - i_t)\,dt + \sigma\,dW_t]\,(1 - \tau)$,

and the change in the value of the tax, dT_t, is[1]

(B5) $dT_t = dZ_t\,\tau = [a\,(i^* - i_t)\,dt + \sigma\,dW_t]\,\tau$.

The tax would only be effective for outflows in the case of pessimistic rumors (i.e., $dZ_t > 0$), since no inflows would occur. Similarly, it would be effective only for inflows in the case of optimistic rumors (i.e., $dZ_t < 0$). The tax reduces the variance of the domestic interest rate without changing its long-run expected value.[2] This implies symmetric use of taxes and subsidies. The expected long-run value of the tax is zero.[3] The tax does not introduce a wedge between domestic and foreign interest rates because the process governing Z has a mean-reverting drift. This also implies that authorities are not allowed "to pursue systematically 'wrong policies'" (Tornell (1988), p. 12). Finally, T_t would be a sequence of taxes that vary according to the state of expectations.

Tornell's tax differs substantially from Tobin's original proposal. In particular, the tax base is an expectational variable rather than straightforward spot transactions, and it is questionable whether this could be operationalized. However, Tornell (1988) considers his tax

[1] The volume of the tax T_t at any point in time is obtained by integrating over time. If the tax is introduced at an equilibrium point when $(i^* - i_t) = 0$, the expected value for the initial tax T_0 is equally zero. The integral for $t \rightarrow \infty$ also converges to zero because the process is means-reverting. This implies that taxes and subsidies are used symmetrically, canceling each other out over the long run.

[2] For a tax rate of 100 percent, variations of the domestic interest rate di_t / i_t would vanish altogether.

[3] This is a consequence of the fact that the tax is seen from a national point of view and the foreign interest rate is invariably given.

to be less a fiscal than a monetary scheme: he asserts that the tax "can be implemented through a dual exchange rate system" (Tornell (1988), p.13).[1]

However, Tornell's contribution draws attention to one important fact that cannot be disregarded if Tobin taxes are to be implemented at some future date. Since expectations regarding policy developments or "rumors" in financial markets are not stationary and vary significantly over time, an optimal Tobin tax would either have to be applied to a varying tax base (like the one proposed by Tornell), or the tax rate on effective market transactions would have to change over time. The rate would ideally be zero under normal conditions when no speculative flows of funds occur, and assume prohibitive levels in the case of speculative attacks against currencies (perhaps, fully confiscating the expected gain). The tax rate would also have to be different for various currencies in accordance with their varying risks. This would conflict with Tobin's vision of a worldwide uniform tax rate. As discussed in the main text, a nonoptimal fixed rate Tobin tax cannot eliminate exchange rate volatility, which takes place "beyond the margin" of the tax, while the tax severely afflicts normal liquidity trading within its reach.

The Eichengreen/Wyplosz variant

Eichengreen and Wyplosz (1993) consider miscellaneous options to stabilize exchange rates between currencies of members of the European Monetary System or, more generally, of the EU. In this context, they also discuss a Tobin tax on foreign exchange transactions. However, they prefer an implicit tax to direct fiscal intervention. The "tax" would result from the requirement of banks to "deposit a *sum equivalent to the transaction* [in foreign exchange], interest-free, with [the central bank] for one year" (Eichengreen and Wyplosz (1993), p. 120; emphasis added). A similar alternative is mentioned in UNCTAD (1994, p. 112) where non-interest-bearing deposits corresponding to *increases in open positions* in foreign exchange are discussed.[2] The implicit tax rate corresponds to the opportunity costs of holding these mandatory funds, and, since they have to be placed for one year, it would coincide with the annualized interest rate. If the domestic interest rate responds to speculative pressures, the wedge between domestic and foreign interest rates would widen, and the opportunity costs of holding deposits against foreign exchange positions increase accordingly. The proposal is thus similar to the Tornell tax to the extent that variations of the expected return of financial assets in home and foreign currencies are reflected in an interest-rate differential.[3]

It is obvious that the Eichengreen and Wyplosz variant of the tax raises the cost of

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[1] The Tobin tax in its Tornell variant is not equivalent to capital controls. It is "imposed only on swaps between domestic and foreign financial assets, not on the repatriation of dividends from real capital. Their purpose is to reduce the excess mobility of financial capital...not to lock-in domestically held capital" (Tornell (1988), p. 13).

[2] Such a measure was pioneered by the Banca d'Italia and used by the Spanish Government during recent EMS crises to fend off speculation against the peseta.

[3] However, Eichengreen and Wyplosz do not mention possible subsidies. Thus, their proposal, contrary to Tornell's, drives a wedge between domestic and foreign interest rates.

cross-border capital flows, and it penalizes short-term capital movements more heavily than long-term investments. There are, however, several aspects of the proposal not adequately discussed by the authors. First, if they really had intended to mandate domestic currency deposits against all foreign exchange transactions, the deposit rate would have to be well below 100 percent to avoid an overkill. Second, the opportunity costs of a deposit for one year correspond to the *annual interest rate*, not to the *annualized short-term interest rate* as purported by the authors.[1] Third, it should be noted that high short-term interest rates--as offered, for instance, by the Swedish Central Bank during recent speculative attacks against its currency--constitute a *subsidy* to deposits in krona, which must represent opportunity costs for all those preferring to hold assets in other currencies. This in itself can be considered equivalent to a tax (on non-krona assets). Mandatory non-interest-bearing deposits against foreign exchange transactions as proposed by Eichengreen and Wyplosz (1993), are thus *substitutes* (rather than *complements*) to short-term interest rate policies of the Swedish type. High interest rate volatility and hence fluctuations of the implicit tax rate, would then be mitigated if not avoided.

More recently, the form of the proposal made by Eichengreen and Wyplosz has been refined considerably (Eichengreen, Tobin, Wyplosz (1995)). They clarify that the central bank deposit at zero interest is based on a proportion of any net short positions in their domestic currency holdings, which is similar to the UNCTAD proposal discussed below.

The UNCTAD version of the implicit Tobin tax uses open foreign exchange positions of banks as the counterpart for mandatory non-interest-bearing deposits.[2] Open foreign exchange positions of banks could also serve as a basis for capital charges (UNCTAD (1994), p. 112). In this version, the tax has the advantage in that it applies to balance sheet positions (stocks) and not to individual transactions (flows). It then serves as an indirect tax on speculation without being susceptible to the objection of raising the *specific* costs of financing international trade and capital formation.[3] However, the argument may be countered by the fact that nonbank speculative traders do not have to carry the costs directly. The costs are spread over *all* foreign exchange operations whether speculative or not; moreover, open positions of banks are usually very small, and even a

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[1] Eichengreen and Wyplosz claim that the implicit tax rises to triple-digit levels if, as in Sweden and Ireland during their EMS crises, the 24-hours deposit rate increases to such high levels. If this is the case, a 100 percent (500 percent) overnight rate for short-term deposits, for instance, would correspond to a 50 percent (83 percent) tax rate if the full amount were deposited. [This can be derived from equation (A2) on page 38 by solving for τ.] The relationship is thus not linear. Clearly, the effective equivalent tax rate would be lowered to the extent that mandatory deposits are below 100 percent of the transaction volume, which must be significant.

[2] The approach also conforms with initiatives directed more narrowly to the objective of a prudent supervision of banks. Reference is made to the work of the Basle Committee on Banking Supervision concerning standards for the supervision of banks' market risks, and foreign exchange risks in particular.

[3] The analytics of the UNCTAD version of the proposal by Eichengreen and Wyplosz are similar to the Reinhart tax variant and to Dornbusch's proposed RIET, because it is the holding of foreign assets that is charged, not the transaction. The definition of the assets to be taxed may vary between the two proposals, however.

deposit rate of 100 percent does not necessarily affect the level of worldwide transactions. The effectiveness of this proposition rests wholly on the assumption that the exchange rate is driven by open foreign exchange positions of banks, a hypothesis that must be tested.

Garber and Taylor (1995) discuss the effects of compulsory central bank deposits as proposed by Eichengreen and Wyplosz (1993) and UNCTAD (1994). As a unilateral measure--adopted by the Spanish authorities during the speculative attacks on the peseta during the fall of 1992--the policy might become completely ineffective as the banks subject to mandatory deposits can eventually avoid net foreign exchange positions because settlement can be effected through loans in home currency from national to foreign banks. Even if the objective of raising the cost to non-residents of raising funds for speculation through the swap market are successful, "...as with simply raising interest rates to defend a weak currency, it is virtually impossible to burn the speculators without simultaneously affecting other sectors of the economy." (Garber and Taylor (1995), p. 178).[1] Furthermore, the effect of compulsory deposits depend on how open foreign exchange positions are defined in practice (Garber and Taylor (1995), p. 180).

Eichengreen and Wyplosz do not elaborate on the institutional aspects of their proposal. Nothing is said on which agency would appropriate the proceeds from the "tax." The answer to this question would probably spur controversy relating to the use of the tax yield and to alternative means of financing, in particular money creation, as discussed in Reinhart (1991). Presumably, central banks would administer the tax and receive the benefits from lending against interest-free deposits. No fiscal revenue would be expected in this case. However, UNCTAD (1994) also considers the imposition of capital charges on banks' open positions in foreign exchange as an equivalent to non-interest-bearing deposits. While this alternative would raise some fiscal revenue, it lacks the automaticity of varying opportunity costs that accompany speculative attacks since capital charges would presumably have to operate with fixed proportional rates.

The need to coordinate their variant of the Tobin tax at the international level is ignored by Eichengreen and Wyplosz. They think that international competition would not be relevant, and that the tax could be used unilaterally by national governments. Especially if implemented as a temporary device, discouragement of local financial market activities would be limited. Deposit requirements "work by reducing the cost to the government in question of supporting its exchange rate. By creating a wedge between domestic and foreign interest rates analogous to the capital-control wedges..., they would limit the domestic dislocations caused by policies of defense" (Eichengreen and Wyplosz (1993), p. 121). It is questionable, however, whether markets will also perceive it this way. The measure could equally be interpreted as easing the pressure on the government to pursue sound fiscal and monetary policies. UNCTAD (1994) is more critical in this regard, in particular as to the imposition of capital charges on banks' open positions, where UNCTAD

[1] As the Spanish example demonstrates, the wedge between the internal and external swap rates engendered by compulsory deposits was trivial and hardly susceptible to deter speculator who expected an imminent devaluation of some 5 percent or so.

considers international coordination necessary. Like transaction taxes, the multilateral adoption of a uniform policy by all countries with significant banking centers is essential to avoid having the foreign exchange business moving to nonregulated financial centers.

Eichengreen and Wyplosz do not consider deposit requirements as a substitute tax to be the best of all worlds, yet they emphasize that it would be "the best of all *possible* worlds" (Eichengreen and Wyplosz (1993), p. 122). In particular, such measures would "not violate either the letter or the spirit of the Maastricht Treaty or the Single European Act" (Eichengreen and Wyplosz (1993), p. 120).

Appendix 3

The Working of the Exchange Surcharge

The working of the exchange surcharge can be sketched as follows. If q_s and q_d are random sell and buy orders in a specific bilateral currency market from liquidity traders, and e_a and e_b the dealers' posted asked and bid prices with mean e^*, the actual price e at which positions can be closed is "determined after orders from liquidity traders have been received and accepted by interaction in the market with price-sensitive speculative traders who buy or sell at the actual price and expect to reverse their transaction later at the mean price" (Black (1991), p. 513). The price e is thus implicitly determined through

(C1) $q_s + b(e - e^*) = q_d - a(e - e^*)$,

where $b(.)$ and $-a(.)$ represent the price-sensitive traders' supply and demand functions for foreign exchange. The aim of the tax would be to vary the transaction costs in a way as to secure that price variations remain limited. Similarly to the quantity-related version of the tax, a crawl could be established for e (which would become the market's expected value for e^*), and the actual exchange rate would be allowed to fluctuate within $e^*(1 \pm \eta/100)$, where η is a fixed percentage rate determining the relative width of the band with brackets $e^u = e^*(1 + \eta/100)$, and $e^l = e^*(1 - \eta/100)$, within which the exchange rate can move freely without activating the surcharge. A daily ± 1 percent band could represent a reasonable policy objective.[1]

The formula for the target exchange rate would be the following:

(C2) $$e^*_t = \frac{\sum_{s=1}^{T} \alpha_s CDOT e_{t-s}}{\sum_{s=1}^{T} \alpha_s}$$

where e_{t-s} is the effective (lagged) exchange rate, T is the number of periods used for the moving average, and α_s are appropriate weights.[2]

Whenever the actual rate exceeds the ceiling e^u or falls below the floor rate e^l, the tax is brought to bear as a circuit breaker. It could skim off as much as the *full difference*

[1] The daily variability of selected dollar exchange rates measured as their standard deviation from the mean was 0.62 for the deutsche mark, 0.46 for the yen, 0.60 for the British pound, 0.69 for the Swiss franc, 0.62 for the French franc, and 0.61 for the ECU in April 1992, (BIS (1993), Table 6-A).

[2] In Chart 1, $T = 7$ and the α_s are identical.

between the market rate and the infringed target rate times the volume transacted at the market rate, which would be considered an externality and an unexpectable windfall gain to one party in the market. The tax rate would become implicit and variable in this case.[1] Alternatively, the tax rate could be predetermined at a high level (say, between 50 and 100 percent), to be applied to $(e - \rho e^{u})q$, or $-(e - \rho e^{l})q$, respectively, where $0 < \rho < 1$, and q is the volume of the currency purchased.

[1] This renders the scheme similar to the workings of the import levies of the EU's agricultural policy whenever the import price falls below the intervention price. Therefore, the "tax" should possibly be called a "levy."

Appendix 4

Unilateral Financial Transaction Taxes Around the World

(Part 1)

Country	Description
Argentina (March 1993)	Transfers of shares are subject to **stamp duties** (*impuestos de sellos*), provided the transfer is made through a written agreement. The normal rate is 1 percent.
Australia (July 1994)	Certain states and territories impose a **financial institutions duty** on banks and other non-bank financial institutions. Generally the rate of financial institutions duty is 0.06 percent of the value of the transaction, with a maximum duty of A$ 1,500 on any single transaction. An additional **stamp tax** was removed in 1991.
Austria (June 1992)	There are three capital transfer taxes, the **capital duty** (*Gesellschaftsteuer*), the **securities tax** (*Wertpapiersteuer*), and the **stock exchange turnover tax** (*Börsenumsatzsteuer*). The capital duty is imposed on, inter alia, contributions to capital. The securities tax is imposed on the first issue of interest-bearing bonds. The turnover tax applies to transfers in Austria or if it takes place abroad and at least one party involved is a resident of Austria. The base is the sales price, and the rate varies between 0.04 percent (government bonds) and 0.15 percent (dividend-bearing securities).
Belgium (April 1992)	A **stock exchange tax** is levied on transfers of title to shares, bonds, and other securities, whether traded on the stock exchange or not. The rate is 3.5 Bfrs. per thousand Bfrs. worth of securities. However, reduced rates of 0.85 per thousand, 1.4 per thousand, and 1.7 per thousand apply in special cases.
Brazil (December 1993)	A tax on **financial operations** (*Imposto sobre Operações de Crédito, Câmbio e Seguro e sobre Operações relativos a Títulos e Valores Mobiliários*) is levied as specified by law. The tax is payable by borrowers, insured persons and purchasers of securities or foreign currency. The tax rate may be as low as 0.0041 percent for loans and financial transactions, 1.5 percent on longer-term financial operations (maturity exceeding 365 days), and as high as 130 percent on foreign exchange transactions. However, Decree 329 of 1 November 1991 reduces the latter rate to zero for specified transactions. A **temporary tax on financial transfers** was levied until 31 December 1994 at a rate of 0.25 percent on each cheque drawn or deposited and on investments in the financial markets. No tax is levied on share transfers. **Registration and stamp duties** are not significant.
Canada (November 1993)	There are **no financial transaction taxes**.
Chile (March 1994)	There are **no financial transaction taxes**, but there are **stamp duties** (*Impuestos de Timbres y Estampillas*) on certain financial transactions whose scope is, however, limited. The tax is basically levied on loans.
China (March 1994)	In Shenzen, securities transactions have recently become subject to the **stamp tax** at the rate of 0.6 percent of the market price of transferred stock.
Colombia (June 1994)	A **stamp duty** is applied on certain financial transactions, but the issuance and transfer of shares and bonds are exempt from stamp duties or other transfer taxes.

Unilateral Financial Transaction Taxes Around the World

(Part 2)

Country	Description
Denmark (October 1993)	A **transfer duty** on the transfer of Danish or foreign shares (*aktieafgift*) is levied at a rate of 1 percent of the market value of the transferred share. The duty is payable if the seller is resident in Denmark. Exemptions apply to stockbrokers, banks and other financial institutions, the issuance of shares, the exchange of shares, mergers etc. These is no tax on the issuance of shares, but the issuance of debentures and loan agreements is subject to a **stamp duty** at a rate of 0.3 percent (registered) or 1 percent (bearer instrument).
Finland (August 1994)	The transfer of shares and other securities is subject to a **stamp duty** of 1.6 percent of the sales price, but only if the transfer is not made through the stock exchange. No stamp duty is payable on transfers between non-residents. .
France (June 1994)	A **registration tax** is levied at a rate of 4.8 percent on the higher of the sale prices or fair market value of sales of shares (*parts*), founder shares (*parts de fondateur*), profit-shares (*parts bénéficiaires*) or profit participations in companies whose capital is not divided into shares. If a deed is drafted, it attracts a **transfer tax** of 1 percent with a ceiling of 20,000 Ffrs. A **stock exchange tax** (*impôt sur les opérations de Bourse*) applies to the sales of securities on the Stock Exchange or over the counter, and any sale in which a broker or professional intermediary intervenes in the sale, except banks and financial establishments which make firm purchases of securities on issue and re-sell to their clients. The rates of the stock exchange tax are regressive (0.3 percent up to 1,000,000 Ffrs, and 0.15 percent excess over 1,000,000 Ffrs.). A tax reduction of 150 Ffrs. per transaction applies, and there is a ceiling of 4,000 Ffrs. per transaction. Since January 1994, the stock exchange tax (which is due on both the sale *and* the purchase) is no longer due on the part of the transaction carried out by non-residents.
Germany (October 1994)	There were three capital transfer taxes, the **capital duty** (*Gesellschaftsteuer*), the **securities tax** (*Wertpapiersteuer*), and the **stock exchange turnover tax** (*Börsenumsatzsteuer*). These taxes were abolished as of 1 January 1991.
Hong Kong (September 1994)	**Stamp duty** is levied under the Stamp Duties Ordinance and applies to documents evidencing financial transactions. A fixed duty is payable on certain documents and an ad valorem duty on others. Fixed duties range from HK$ 3 to HK$ 20, and ad valorem duties from 25 cents per HK$ 100 to HK$ 3 per HK$ 100. There is no stamp duty on foreign exchange transactions.
India (September 1992)	Where a company increases its nominal share capital, a notice must be filed with the Registrar of Companies which is subject to a **registration duty**. The Central Government imposes **stamp duties** on financial documents.
Indonesia (December 1993)	**Stamp duty** is imposed on financial documents with a value exceeding 1,000,000 Rp. The rates vary from 500 Rp. to 1,000 Rp.
Italy (April 1991)	The transfer of shares, bonds and other securities may be subject to **registration tax** at the fixed amount of 100,000 lire. **Stamp duties** (*imposta di bollo*) are levied on certain documents as specified in the Stamp Duty Law.

Unilateral Financial Transaction Taxes Around the World

(Part 3)

Country	Description
Japan (April 1992)	There is a **securities transaction tax** on the transferor of securities in Japan. Transfer by gift, bequest or through merger is exempt from tax. In the cases of sale, the tax base is the actual sales price; in other cases, it is the market price at time of transfer. The tax rates vary according to financial instrument, and they are lower for securities companies. The normal rates are 3, 16, and 30 per ten thousand for government bonds, convertible debentures, and shares.
Luxemburg (October 1994)	There are **no financial transaction taxes**.
Malaysia (April 1993)	**Transfer taxes** are imposed on a wide range of documents at varying rates, including bills of exchange and securities.
Mexico (March 1994)	The transfer of shares is **not** taxed.
Netherlands (December 1993)	There are **no financial transaction taxes**. However, **capital duty** becomes payable on the issue of shares. No tax is due on the issue of bonds, debentures and loan agreements (except a once-only **fee**).
New Zealand (November 1994)	**Stamp duties** are payable on the issuance and transfer of bonds, debentures, and shares. A **cheque duty** at NZ$ 0.05 is payable on bills of exchange.
Norway (June 1994)	There are **no financial transaction taxes**.
Portugal (June 1993)	The incorporation of companies attracts a **stamp tax** (*imposto do selo*) and a **registration fee**. Stamp tax is also collected, at varying rates, on virtually all domestic business transactions including the transfer value of shares and other securities.
Singapore (October 1994)	There is a **registration fee** on the registration of companies and on the lodging notice of an increase in share capital. Furthermore, **stamp duties** are imposed on a wide variety of legal documents including the conveyance, assignment or transfer of stock (at 0.2 percent of the value of the consideration) and other property. Stamp duties are limited to a maximum of S$ 500 on debentures. A great number of financial instruments is exempt from stamp duty, including offshore arrangements, Asian dollar bond certificates, stock options, contract notes, and electronic share transfers on the Singapore Stock Exchange.
South Korea (March 1992)	There is a **securities transaction tax** on the value of securities at the time of transfer. The rate is 0.5 percent, but may be reduced (even to zero) by Presidential Decree for purposes of encouraging the development of the capital market.
Spain (June 1992)	There is a **transfer tax**, but the transfer of shares, bond and other securities, whether quoted or not, is normally exempt from transfer tax unless certain conditions apply (e.g., the transfer leads to control over a company in which case a 6 percent transfer tax applies).

Unilateral Financial Transaction Taxes Around the World

(Part 4)

Country	Description
Sweden (August 1993)	**No special tax** is levied on the transfer of shares, bonds and other securities. There is a **stamp duty** on the issuance of shares. The **turnover tax**, which was levied by the State at rates between 0.15 percent and 1 percent, was abolished on 1 December 1991.
Switzerland (April 1994)	There is a **stamp duty** levied on the transfer for valuable consideration of securities by a dealer in securities. The rate applies to the purchase price, and it is 0.15 percent for Swiss securities, and 0.3 percent for foreign securities. Securities include bands, annuity bonds, mortgage bonds, treasury and bank notes, shares, profit-sharing certificates of investment funds, and commercial papers. Certain types of transactions are exempt from the duty.
Taiwan (January 1994)	**Securities transaction tax** is levied on the buying and selling of bonds (excluding those issued by government), shares, debentures and any other securities. The taxpayer is the seller of the securities. The rates are 0.3 percent of the transaction price for a transaction in shares issued by a company, and 0.1 percent on other transactions. .
Thailand (April 1993)	**Stamp duty** is charged on a number of documents and transactions as specified in the Stamp Duty schedule of the Revenue Code. The transfer of shares, debentures, bonds, or certificate of indebtedness issued by a company is taxed at 10 stang for every 100 baht or fraction thereof of the paid-up value of the shares, or of the nominal value of the instrument, whichever is greater. Transactions effected through the Bangkok International Banking Facilities (BIBF) are exempt from stamp duties.
United States (March 1993)	There are **no financial transaction taxes**, except for state taxes in some cases and an SEC fee, but the latter are quite small.
United Kingdom (December 1993)	Generally, a **stamp duty** at a rate of 0.5 percent ad valorem is levied on the transfer on sale of stock, shares, loan capital, and marketable securities ("chargeable securities").

Source: Staff compilation on the basis of *Taxes and Investment in Asia and the Pacific*, Vol. 1, International Bureau of Fiscal Documentation, Amsterdam (for Asia and the Pacific), *The Taxation of Companies in Europe*, Guides to European Taxation: Vol. II, International Bureau of Fiscal Documentation, Amsterdam (for Europe), *Taxation in Latin America*, Vol II, International Bureau of Fiscal Documentation, Amsterdam (for Latin America), and *Doing Business in the United States*, and *Doing Business in Canada*, Price Waterhouse, New York (for the United States and Canada).

References

Adams, Charles, and Jeremy Greenwood, "Dual Exchange Rate Systems and Capital Control: An Investigation," *Journal of International Economics* (Amsterdam), Vol. 18 (No. 1/2, February 1985), pp. 43-63.

Aiyagari, S. Rao, and Mark Gertler, "Asset Returns With Transactions Costs and Uninsured Individual Risk," *Journal of Monetary Economics* (Amsterdam), Vol. 27 (No. 3, June 1991), pp. 311-31.

Bank for International Settlement, *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries*, (Basle: BIS, and Group of Ten, 1990).

___, *Central Bank Survey of Foreign Exchange Market Activity in April 1992*, (Basle: BIS, March 1993).

___, 64th Annual Report, 1st April 1993 - 31st March 1994, (Basle: BIS, 1994).

Black, Stanley W., "Transactions Costs and Vehicle Currencies," *Journal of International Money and Finance* (London), Vol. 10 (No. 4, December 1991), pp. 512-526.

Calvo, Guillermo A., and Carlos A. Rodriguez, "A Model of Exchange Rate Determination Under Currency Substitution and Rational Expectations," *Journal of Political Economy* (Chicago), Vol. 85 (No. 3, June 1977), pp. 617-25.

Campbell, John Y., and Kenneth A. Froot, "International Experiences with Securities Transaction Taxes," National Bureau of Economic Research (Cambridge, Massachusetts),Working Paper No. 4587, (December 1993).

DeLong, J. Bradford, Andrei Shliefer, Lawrence H. Summers, and Robert J. Waldmann, *The Economic Consequences of Noise Traders*, National Bureau of Economic Research (Cambridge, Massachusetts), Working Paper No. 2394, (1988).

Dornbusch, Rudiger (1986a), *Dollars, Debts, and Deficits*, (Cambridge: The MIT Press, 1986).

___ (1986b), "Flexible Exchange Rates and Excess Capital Mobility," *Brookings Papers on Economic Activity* (Washington D.C., No. 1, 1996), pp. 209-235.

___ (1986c), "Special Exchange Rates for Capital Account Transactions," *World Bank Economic Review* (Washington D.C. No. 1, 1986), pp. 3-33.

Edwards, Franklin R., "Taxing Transactions in Futures Markets: Objectives and Effects," *Journal of Financial Services Research* (Norwell, Massachusetts), Vol. 3, (1992), pp. 75-91.

Eichengreen, Barry, and Charles Wyplosz, "The Unstable EMS," *Brookings Papers on*

Economic Activity (Washington D.C., No. 1, 1993), pp. 51-139.

Eichengreen, Barry, Andrew Rose, and Charles Wyplosz, *Is There a Safe Passage to EMU? Evidence on Capital Controls and a Proposal*, Paper presented to the CEPR-NBER-Bank of Italy Conference on the Micro Structure of Foreign Exchange Markets (Perugia, July 1994).

Eichengreen, Barry, James Tobin, and Charles Wyplosz, "Two Cases for Sand in the Wheels of International Finance," *The Economic Journal* (Oxford, England, and Cambridge, Massachusetts), Vol 105, (January 1995), pp. 162-172.

Felix, David, *The Tobin Tax Proposal: Background, Issues and Prospects*, (Unpublished paper commissioned by UNDP, Human Development Report Office, New York, 1995).

French, Kenneth, and Richard Roll, "Stock Return Variances: The Arrival of Information and the Reaction of Traders," *Journal of Financial Economics* (Amsterdam), Vol. 17 (1986), pp. 5-26.

Friedman, Milton, *The Case for Flexible Exchange Rates: Essays in Positive Economics*, (Chicago: University of Chicago Press, 1956).

Garber, Peter, and Mark P. Taylor, "Sand in the Wheels of Foreign Exchange Markets: A Sceptical Note," *The Economic Journal* (Oxford, England, and Cambridge, Massachusetts), Vol 105, (January 1995), pp. 173-180.

Grandcolas, Christophe, *La gestion des risques de change et de leur trésorerie - devises par les entreprises internationales*, (Paris: Direction Générale des Impôts, September 1986).

Hakkio, Craig S., "Should We Throw Sand in the Gears of Financial Markets?," *Economic Review* (Kansas City: Federal Reserve Bank of Kansas City, 2nd Quarter, 1994), pp. 17-30.

Heaton, John, and Deborah Lucas (1992a), "The Effects of Incomplete Insurance Markets and Trading Costs in a Consumption-Based Asset Pricing Model," *Journal of Economic Dynamics and Control* (Amsterdam), Vol. 16 (July - October 1992), pp. 601-20.

___ (1992b), *Evaluating the Effects of Incomplete Markets on Risk Sharing and Asset Pricing*, Mimeograph, (Cambridge, Massachusetts: M.I.T., November 1992).

Hubbard, R. Glenn, "Securities Transaction Taxes: Tax Design, Revenue, and Policy Considerations," *Tax Notes* (Arlington, Virginia), (November 22, 1993), pp. 985-1000.

International Monetary Fund, *International Capital Markets: Developments,*

Prospects, and Policy Issues, (Washington D.C.: IMF, September 1994).

Jackson, P. D., and A. T. O'Donnell, *The Effects of Stamp Duty on Equity Transactions and Prices in the UK Stock Exchange*, Discussion Paper No. 25, (London: Bank of England, October 1985).

Keynes, John Maynard, *The General Theory of Employment, Interest, and Money*, (First published 1936; first Harbinger Edition, San Diego, New York, London: Harcourt-Brace-Jovanovich, 1964).

Kiefer, Donald W., "The Security Transactions Tax: An Overview of the Issues," *Tax Notes* (Arlington, Virginia), (August 13, 1990), pp. 885-901.

Kupiec, Paul, Patricia White, and Gregory Duffee, "A Securities Transaction Tax: Beyond the Rhetoric," *Research in Financial Services: Private and Public Policy*, JAI Press, Vol. 5, (1993).

Lindgren, Ragnar, and Anders Westlund, "How Did the Transaction Costs on the Stockholm Stock Exchange Influence Trading Volume and Price Volatility?," *Skandinaviska Enskilda Banken Quarterly Review* (Stockholm), Vol. 2, (1990), pp. 30-35.

Liviatan, N., *Anti-inflationary Monetary Policy and the Capital Import Tax,* Warwick Economic Research Papers (Warwick), No. 171, (1980).

McDonald R., and D. Siegel, "The Value of Waiting to Invest," *Quarterly Journal of Economics* (New York), (No. 4, 1986), pp. 707-27.

Modigliani, Franco, "International Capital Movements, Fixed Parities, and Monetary and Fiscal Policies," in *Development and Planning: Essays in Honour of Paul Rosenstein Rodan*, ed. by Jagdish Bhagwati and Richard S. Eckaus, (Cambridge, Massachusetts: M.I.T., 1973), pp. 239-253.

Reinhart, Vincent, "The 'Tobin Tax', Asset Accumulation, and the Real Exchange Rate," *Journal of International Money and Finance* (London), Vol. 10, (No. 4, December 1991), pp. 420-31.

Roll, Richard, "Price Volatility, International Market Links, and Their Implications for Regulatory Policies," *Journal of Financial Services Research* (Norwell, Massachusetts), Vol. 3, (1989), pp. 211-46.

Ross, Stephen A., "Commentary: Using Tax Policy To Curb Speculative Short-Term Trading," *Journal of Financial Services Research* (Norwell, Massachusetts), Vol. 3, (1989), pp. 117-20.

Schwert, G. William, "Stock Market Volatility," in *Market Volatility and Investor*

Confidence, The Report of the Market Volatility and Investor Confidence Panel to the New York Stock Exchange, (New York, June 7, 1990), C-1 to C-24.

___, and Paul J. Seguin, "Securities Transaction Taxes: An Overview of Costs, Benefits and Unresolved Questions," *Research Report*, (Chicago: MIDAMERICA Institute, April 1993).

Shiller, Robert J., "Speculative Prices and Popular Models," *Journal of Economic Perspectives* (Stanford), Vol. 4 (No. 2, Spring 1990), pp. 55-65.

Shleifer, Andrei, and Lawrence H. Summers, "The Noise Trader Approach to Finance", *Journal of Economic Perspectives* (Stanford), Vol. 4 (No. 2, Spring 1990), pp. 19-33.

Spahn, Paul Bernd, and Helmut Kaiser, "Tax Harmonization or Tax Competition as Means to Integrate Western Europe," *Konjunkturpolitik* (Berlin), Vol. 37, (No. 1/2 1991), pp. 1-44.

Stiglitz, Joseph E., "Using Tax Policy To Curb Speculative Short-Term Trading," *Journal of Financial Services Research* (Norwell, Massachusetts), Vol. 3, (1989), pp. 101-15.

Stockman, Alan C., and Alejandro D. Hernández, "Exchange Controls, Capital Controls, and International Financial Markets," *The American Economic Review* (Nashville), Vol. 78 (No. 3, June 1988), pp. 362-374.

Summers, Lawrence H., and Victoria P. Summers, "When Financial Markets Work Too Well: A Cautious Case for a Securities Transaction Tax," *Journal of Financial Services Research* (Norwell, Massachusetts), Vol. 3, (1989), pp. 261-86.

___, "The Case for a Securities Transactions Excise Tax," *Tax Notes* (Arlington, Virginia), (August 13, 1990), pp. 879-84.

Tobin, James, "A Proposal for International Monetary Reform," *Eastern Economic Journal* (Philadelphia), Vol. 4, (July-October 1978), pp. 153-59.

___, "On the Efficiency of the Financial System," *Lloyds Bank Review* (London), Vol. 153, (July 1984), pp. 1-15.

___, *International Currency Regimes, Capital Mobility, and Macroeconomic Policy*, Cowles Foundation Discussion Paper (New Haven, Yale University, No. 993, 1991).

Tornell, Aaron, "Real vs. Financial Investment: Can Tobin Taxes Eliminate the Irreversibility Distortion?," Discussion Paper Series No. 408 (New York: Columbia University, October 1988).

___, "Real vs. Financial Investment: Can Tobin Taxes Eliminate the Irreversibility Distortion?," *Journal of Development Economics* (Amsterdam), 1990, Vol. 32, pp. 419-44.

Triffin, Robert, *Gold and the Dollar Crisis: The Future of Convertibility*, (New

Haven: Yale University Press, 1960).

United National Conference on Trade and Development (UNCTAD), *Trade and Development Report, 1994*, (New York: United Nations, 1994).