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World Institute for Development Economics Research

Discussion Paper No. 2003/81

Revenue Potential of the Currency Transaction Tax for Development Finance

A Critical Appraisal

Machiko Nissanke*

December 2003

Abstract

The paper assesses the potential of currency transaction taxes (CTT, widely known as the Tobin tax), to raise revenue for global development. Though Tobin proposed and others assessed CTTs in terms of reducing exchange rate volatility and improving macroeconomic policy environments, this paper considers the CTT first and foremost from the standpoint of revenue. With a view of establishing a 'permissible' range of tax rates to obtain realistic estimates of revenue potential, it first reviews the debate over the effects of CTT on market liquidity and the efficiency of foreign exchange markets, and assesses the Spahn proposal for a two-tier currency tax. It then moves to a discussion of the technical and political feasibility of CTT, followed by an evaluation of several new proposals, such as those advanced by Schmidt and Mendez. The paper presents revenue estimates from CTT in light of recent changes in the composition and structure of foreign exchange markets.   .../.

* School of Oriental and African Studies, University of London, email: mn2@soas.ac.uk

The paper argues that CTT should be implemented in a cautious manner, starting with a very low tax rate, taking into account fully of its effect on market efficiency and liquidity as well as technical and political feasibility. Revenue generated at low rates could be much smaller than those derived from earlier studies. It suggests the very high expectations raised with respect to CTTs' revenue-generating capacity on its own are not yet warranted in light of the prevailing economic and political reality today. Nor does CTT by itself, implemented at low rates, have sizeable effects on restoring macroeconomic policy autonomy. However, if CTT is successfully administered in the two-tier structure stipulated by Spahn or in conjunction with other measures such as capital controls or security transaction tax (STT) in a coordinated fashion, benefits in double dividends from these measures for achieving global financial stability could be substantial. Hence, CTT deserves serious consideration and debate over its implementation.

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1   Introduction

The dramatic rise in cross-border financial flows in the post-Bretton Woods period has been associated with the unprecedented increase in financial instability and crisis.

Indeed, while economic theory emphasizes the potential advantage of global financial trading for economic development and world welfare, it is by now abundantly clear that financial globalization entails genuine costs, risks and hazards for participating countries not only in their increased susceptibility to financial instability and crisis but in the loss of autonomy in macroeconomic management—a condition known as the 'macroeconomic policy trilemma for open economies' or 'inconsistent trinity' thesis.[1] The thesis stipulates that an open capital market deprives a government of the ability simultaneously to target its exchange rate and to use monetary policy in pursuit of other economic objectives.[2]

Financial globalization could also lead to a loss of fiscal autonomy, if financial openness makes it hard to tax internationally footloose capital relative to labour due to the competition for foreign savings through tax incentives and general financial arbitrage.[3] Many countries reduced or eliminated taxes on capital transactions and lessened the rate of capital gain taxes or corporate taxes considerably in this process of tax competition and in fear of asset migration and capital flight. A critical analytical work is required to examine whether or not international tax coordination is welfare increasing nationally as well as globally.[4]

The Tobin tax has been debated in the context of this particular historical trend towards an accelerated pace of financial globalization over the recent decades. Tobin proposed a currency transaction tax first at the Janeway Lectures delivered at Princeton in 1972 and again at the presidential address to the Eastern Economic Association in 1977 (Tobin 1974, 1978). The currency transaction tax (CTT), widely known as the Tobin tax, was initially proposed, therefore, for enhancing the efficacy of national macroeconomic policy and the operation of the international monetary system by reducing short-term speculative currency flows.

As Tobin himself notes (1996), however, his proposal did not receive serious consideration from fellow academics or policymakers in the 1970s and 1980s. It was either dismissed almost at stroke as impractical on the grounds of technical and political infeasibility or rejected as an unnecessary intervention that interferes with the efficiently functioning of markets by injecting 'distortions'. However, in contrast to the its

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[1] See Obstfeld (1998) for a summary exposition how economic theory weighs costs and benefits associated with financial globalization. For a more critical literature review of economic propositions concerning the effects of financial globalization on economic development and welfare, see Nissanke and Stein (2003).

[2] Interestingly, the very constraints that financial openness places on the policymakers of emerging market economies in macroeconomic management are often treated as beneficiary, since international capital market is seen to play a role of 'disciplining' policymakers 'who might be tempted to exploit a captive domestic market' (Obstfeld 1998:10).

[3] This also means less freedom for providing social safety nets to people adversely affected by globalization (Rodrik 1997).

[4] See Boadway (2003) and Fuest, Huber and Mintz (2003) for a most detailed discussion on this issue.

disappointing response in the 1970s, followed by the long silence over the subject in the 1980s, there has been a sudden surge of interests in the Tobin tax since the early 1990s.

The renewed interests in the Tobin tax in recent years certainly reflect the growing recognition that there is an urgent need for creating a new international financial architecture governing cross-border capital flows in face of the repeated severe financial crises, including self-fulfilling currency crises in a large number of European countries in the exchange rate mechanism (ERM) and emerging market economies. In particular, in developing and transitional economies, some small initial changes in perception towards their currencies could cascade into generalized financial and economic crises in no time.

For the purpose of this paper, however, it is critical to note that the surge of interests in the scheme is also explained by its potential for generating a tax revenue of substantial size, which could more than offset the declines in official aid from OECD countries to developing and transitional economies. It has been argued widely that the revenue from CTTs has the potential to serve as an important source of finance for 'global public goods'. Responding to these emerging interests, a number of recent studies have assessed the potential of CTTs, not only for taming exchange rate volatility and averting financial crises but also as an important tax instrument to generate revenue for global development. Many of these studies have articulated modifications to Tobin's original CTT proposal in order to address a variety of technical and political concerns.

The principal objective of this paper is to assess the potential of taxes on CTTs to raise revenues that can be used for developmental purposes. Thus, though Tobin proposed and others assessed CTTs in terms of reducing exchange rate volatility and improving macroeconomic policy environments, this paper considers the CTT first and foremost from the standpoint of revenue. Unlike other papers on this subject, this paper treats the assessment of the potential of the CTT to achieve valuable double dividends, such as the promotion of financial stability and policy autonomy, as a subsidiary objective.

With a view of establishing the 'permissible' range of tax rates to obtain realistic estimates of revenue potential from CTTs, section 2 reviews the debate over the effects of CTTs on market liquidity and the efficiency of foreign exchange markets, and assesses briefly the Spahn proposal for a two-tier currency tax. Section 3 discusses a number of issues raised in the debate over the technical and political feasibility of CTTs, followed by an evaluation of several new proposals, such as those advanced by Schmidt and Mendez. Section 4 presents my estimates of the potential revenue from CTTs in light of recent changes into the composition and structure of foreign exchange markets. Section 5 presents my concluding assessment of the potential of CTTs as a revenue-raising tax instrument. It also evaluates CTTs' ability to achieve double dividends.

2   The debate over the effects of the CTTs on market liquidity and efficiency

At the breakdown of the Bretton Woods system of adjustable pegged exchange rate regimes with capital controls, Tobin proposed an idea of instituting a currency transaction tax to tackle excessive exchange rate fluctuations, promote autonomy of national macroeconomic policies, and to improve the operation of the international

monetary system by reducing short-term speculative currency flows. Acting as 'sand in the wheels', Tobin suggested that CTT could make short-term trades more costly and by doing so, it would increase the maturity structure of international capital flows (Tobin 1994, 1996).[5] In particular, it was conjectured to reduce considerably exchange rate volatility by 'penalizing short-horizon roundtrips, while negligibly affecting the incentives for commodity trade and long-term capital investments' (Tobin 1996: x).

Filtering transactions by maturity on the understanding that speculators would have shorter horizons and holding periods, Tobin predicted that CTT is capable of reducing 'noise trading' from foreign exchange markets. In Tobin's own words, the tax is to set to 'make exchange rates reflect to a larger degree long-run fundamentals relative to short-range expectations and risks' by strengthening the weight of regressive expectations relative to extrapolative expectations' (Tobin 1996: xii).[6]

The proposal has drawn strong criticism on efficiency and liquidity grounds.[7] Indeed, the debate on the effects of CTT on market liquidity and efficiency is inevitably shaped by varied perceptions about how well foreign exchange markets function and whether or not short-term speculation is destabilizing. A question is raised whether speculators or traders make exchange rates excessively more volatile than warranted by fundamentals.

Critics of the Tobin tax claim that speculators would not increase exchange rate volatility as their expectations are guided by fundamentals, and that their presence tends to reduce volatility by providing necessary liquidity to markets.[8] In particular, speculators who could act as informed investors guided by their expectations about future underlying fundamentals (i.e. as traditional fundamentalists or 'informed' traders)

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5 See Frankel (1996) for a mathematical model illustration how a Tobin tax discourages short-term destabilizing speculation without discouraging investment and trade flows with longer maturities. Indeed, Frankel identifies the ability of the Tobin tax to penalize short-term roundtrips relative to those transactions with longer maturities as its most attractive attributes. Davidson (1997) argues, however, that the effect of the Tobin tax on speculative flows is overstated when it is derived from calculations based on annualized rates. He suggests that the Tobin tax, like all transactions costs, is independent of the round trip time interval and therefore its deterrent capability is not a function of the time period. He argues instead that investors/traders base their decisions in relation to transaction costs and that so long as the Tobin tax rate is an insignificant addition to transaction costs and very marginal compared to expected gains from speculation, it does not deter short term round trip transactions. In my view, so long as traders/investors' decision on asset portfolio is made in relation to a certain asset-holding period, calculation on relative returns based on uncovered interest parity condition is relevant in measuring the effect of the Tobin tax on short term interest arbitrage. However, since traders' decisions are also based on the relative cost-benefit configuration in immediate future, transaction costs are undoubtedly a critical parameter against which the tax rate has to be evaluated (see section 4).

6 In this connection, it is also worth noting here that in Dornbusch's overshooting model, the assumption of *regressive* expectations plays a critical role in ensuring a return of short-run overshooting exchange rates to the long-run equilibrium level dictated by the purchasing power parity (Dornbusch 1976).

7 See Dooley (1996), Davidson (1997), Habermeier and Kirilenko (2003) and Dodd (2003), among other numerous papers.

8 Habermeier and Kirilenko (2003), emphasizing the informational role of liquidity in the price discovery process, argue that taxing financial transactions introduces additional frictions into this process.

are seen to keep exchange rate in line with the macroeconomic fundamentals and help stabilizing markets around new equilibrium.

From the perspective of opponents, the Tobin tax is a device that tends to decrease market efficiency by creating liquidity problems for the day-to-day operation of currency markets, affecting adversely the bid-ask spreads and hence deterring arbitrage transactions. In the 'wholesale' segments of currency markets in particular,[9] marketmakers' position, whose act as arbitrageur provides a guaranteed counter-part, is seen to be compromised with reduced liquidity by CTT, as they need liquid markets to avoid large fluctuations in their net positions. It is thus clear that in most of the arguments against the Tobin tax, the concept of speculation is conflated with that of arbitrage, as noted by Davidson (1997).

In contrast, proponents of the Tobin tax argue that markets function inefficiently. For example, Frankel (1996) notes that speculative bubbles—a deviation from the value justified by fundamentals—are generated, as 'noise traders' (as opposed to 'traditional fundamentalists' or 'informed traders') follow the herd in the face of uncertainty.[10] In their analyses, a critical distinction is usually made between informed traders and noise traders: while informed traders act on homogeneous rational expectation, noise traders make their decisions on the basis of 'fad' which are unrelated to fundamentals.

In this context, Jeanne and Rose (1999) suggest that whilst the volatility in exchange rates is generated both by fundamentals and noise, the source of excessive exchange rate volatility (i.e. speculative bubbles) is attributed to the presence of noise traders. In particular, their model shows that noise traders are attracted to the market in search for a risk premium, and that as the number of noise traders increases, so does the volatility of exchange rates. It predicts that when the volatility of fundamentals is low, there is a single equilibrium where noise traders are not active, resulting in a low volatility in exchange rates. Conversely, when the volatility of fundamentals is high, a large number of noise traders enter the market, producing a high volatility in exchange rates. When the volatility of fundamentals is in the intermediate range, however, multiple stable equilibria are possible, depending on the number of noise traders seeking for a risk premium.

The excess volatility generated by noise traders is also analysed in the model of asset markets, advanced by De Long *et al.* (1990a, 1990b), with focus on the interesting interface between arbitrageurs and noise traders. 'Arbitrage does not eliminate the effects of noise because noise itself creates risk' (De Long *et al.* 1990b: 705). That is, the unpredictability of noise traders' beliefs and expectations, which can be erroneous and stochastic in light of fundamentals, could create a 'noise trader risk'—a risk in the price of assets that deters rational arbitrageurs from aggressively betting against them. This is because arbitrageurs are likely to be risk averse, acting with a short time-horizon. Hence, they tend to have limited willingness to take positions against risks created by noise traders. As a result, 'prices can diverge significantly from

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[9] Inter-dealers and inter-bank transactions are referred to as 'wholesale' transactions, as opposed to transactions involving non-financial customers in 'retail' segments. See section 4 for the composition of currency transactions by counter-party and its recent shifts in markets.

[10] Keynes (1936) uses a 'beauty contest' analogy to describe fund managers' herd behaviour, in that they must guess in an instant how other market players will interpret a new event and follow them accordingly.

fundamental values even in the absence of fundamental risk' (De Long *et al.* 1990b: 705). Moreover, bearing a disproportionate amount of risk thus generated enables noise traders to earn a higher expected return than rational investors engaged in arbitrage against noise. Clearly, their model challenges the standard proposition made by Friedman (1953) that irrational noise traders are counteracted by rational arbitrageurs who trade against them and in the process drive asset prices close to fundamental values.

Overall, these model supports the view that speculators, acted on 'fads' or guided by extrapolative expectations at short-term horizon, can exert destabilizing effects on markets and 'overshooting of the overshooting equilibrium' takes place.[11] Furthermore, destabilizing speculation of this type can be profitable, contrary to Friedman's reasoning. The Tobin tax is often viewed by its proponents as particularly effective to counter such speculations and speculative bubbles in floating currency markets at short horizons by eliminating destabilizing noise trading.[12] It is also argued that the Tobin tax, by breaking the interest parity condition, could in principle allow policymakers to pursue monetary policy for domestic consideration without a fear of impending large exchange rate fluctuations (Eichengreen 1996).

Interestingly, Frankel (1996) reports the survey results which show that traders, using the 'Chartist technical analysis' or the 'momentum' models, act on extrapolative expectations at short horizons under three months, while they act on adaptive, regressive or distributed lag expectations at longer horizons of three months to one year. Hence, he suggests that the former generates destabilizing speculations, while the latter produces stabilizing effects. Further, Spahn (2002) notes that chartists may be found more among institutional investors such as investment fund managers, rather than dealers-arbitrageurs. These empirical observations point to the importance of distinguishing those who act as arbitrageurs from those whose behaviour tends to be speculative, pushing markets away from equilibrium.

On one hand, Frankel's empirical results above tend to suggest that traders' behavioural pattern is a function of time-horizons over which they act, so the Tobin tax is seen effective for moderating destabilizing speculation by penalizing trading with a short-term horizon. On other hand, Spahn's observation above implies that traders' behaviour depends upon their motivations for participating in currency trading. A complication arises, in my view, because the interface between arbitrageurs and noise traders is non-linear, as de Long *et al.* (1990a, 1990b) indicate, while the market composition between the two types of traders shifts as market conditions change, for the entry and behaviour of noise traders is influenced by the level of volatility of fundamentals and the size of risk premium, as shown by Jeanne and Rose (1999). Equally, traders could switch their

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[11] In this context, it is worth noting that in Krugman's model of the target zone (1991), the result that speculators could have a stabilizing effect at margins of the target zone depends critically on two assumptions: (i) speculators' expectations are guided by macroeconomic fundamentals; and (ii) the government's credible commitment to intervene prevails.

[12] Applying the interest parity condition, Frankel (1996) estimates that even at a very modest rate of transaction tax rate of 0.001 per cent, for traders with a one-day time horizon to engage in speculative transaction, the foreign yield would have to rise to 46.5 per cent, compared to domestic yield of 10 per cent. Similarly, Spahn (2002) estimates that at tax rate of 0.1 per cent, foreign yields would have to rise to 50.7 per cent, 18.5 per cent and 10.7 per cent compared to domestic yield of 5 per cent, for traders with one day and three days and one week time-horizon, respectively.

positions from arbitrageurs to 'destabilizing' speculators depending on market conditions.

Now, a critical issue is whether the Tobin tax could always be successful in distinguishing between these two types of traders. Williamson (1997) notes it is naïve to equate short-term movements with market destabilization. Spahn (2002) further remarks that the Tobin tax cannot unfortunately discriminate between destabilizing noise trading and stabilizing liquidity trading. Davidson (1997) goes a step further to suggest that the Tobin tax is more likely to be a constraint on arbitrage flows rather than on speculative flows. If this is the case, the Tobin tax could adversely affect market efficiency. Hence, the critics argue forcefully that this 'liquidity' consideration alone provides a sufficient ground to oppose the Tobin tax.

Certainly, the liquidity-efficiency dimension has a critical bearing on the question about what the optimal (or permissible) range of the tax rate could be, when one attempts to estimate the revenue potential of the Tobin tax.[13] Liquid markets are certainly necessary for arbitrageurs to perform important functions of reducing price volatility, settlement risk and the cost of hedging. As discussed above, Jeannes and Rose (1999) show that markets are likely to be dominated by arbitrageur rather than noise traders under 'tranquil' market conditions with a low volatility of fundamentals. Hence, the tax rate cannot be set above a very low threshold level to undermine liquidity and market efficiency. Too high rates certainly risk reducing unduly liquidity necessary for arbitrage operations as well as deterring international trade transactions and long-term investment.

While Kaul and Langmore (1996) set a ceiling at 0.25 per cent absolute maximum, Felix and Sau (1996) assess the tax rates less than 0.05 per cent (5 basis point) as those with no 'sand in the gears'. Hence, these authors use tax rates between 0.25 per cent and 0.05 per cent for their revenue calculation. Though we suggest in the following the use of a much lower rate of 0.01-0.02 per cent for revenue estimation on the efficiency and feasibility ground, there has emerged some consensus in literature that the liquidity question is likely to favour 0.1 per cent or lower as the upper ceiling to the tax rate. The lower rates are favoured on the basis of the growing recognition that a loss of liquidity resulting from CTT should be kept minimum, so that transaction costs and spreads as well as the trade volume and market structures would not be affected adversely.

At a modest tax rate of 0.1 per cent or lower, it is assumed that CTT would not entail a discernible disincentive to long-term investments or international trade, as the tax could be a very marginal part of other larger trade- and investment-related transaction costs. It can also be argued that a tax burden of this kind of low rates is less likely to exceed the cost of using derivative instruments to hedge against currency fluctuations (Eichengreen and Wyplosz 1996). By affecting the cost of trading with a very short-term horizon (see

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[13] It has been suggested that the Tobin tax could be set as a percentage of spreads, which can eliminate the need for setting a tax rate as a percentage of trade turnover. However, in our view, because of the fragmented nature of the retail segments of currency markets, this would simplify neither tax administration nor revenue estimation as such. We shall return to this question in section 4.

note 12), it has been argued that CTT at these low tax rates could still reduce currency speculation and swings at margin.[14]

However, the low tax rates such as discussed here would certainly not be effective in countering large-scale speculative attacks on pegged exchange rates. as observed in recent currency crises. Yet, currency crises have increasingly become 'self-fulfilling' in character, where substantial financial gains are assured for speculators who take a position against the viability of currency pegs as in the ERM crisis. In the self-fulfilling crises, even though a fixed exchange rate is sustainable in terms of consistency between exchange rate policy and other macroeconomic fundamentals as it stands, agents' expectations about possible inconsistency in the future can trigger a speculative attack (Obstfeld 1996).

As in the first generation model of currency crises (Krugman 1979), the main issue at stake here is still the credibility of a government committing to a fixed exchange rate regime in the presence of market speculation. However, instead of facing a real reserve constraint as a result of a deterioration of economic fundamentals as in the first generation model, the government facing a possible attack from speculators tries to address trade-off between the benefits of continuing to defend the currency and costs of doing so in terms of hardships resulting from economic costs such as high interest rates and unemployment. Speculators in turn try to second-guess government capabilities and intentions. A speculative attack occurs when the government is not believed to be able or willing to defend the peg at high cost and is expected to devalue.

Importantly, agents' expectations about possible future depreciation feed into current economic variables and increase wages and prices. In short, speculation in itself creates objective economic conditions that make devaluation likely, while macroeconomic fundamentals determine the existence and multiplicity of possible equilibria. In the end the government is forced to validate the expectations ex post by devaluing. Thus, the inability to maintain credibility has become self-fulfilling, as the expectations of speculators regarding the behaviour of the government in a crisis situation might per se generate the crisis. Under such conditions, a regime that could have been viable in terms of economic fundamentals experiences a collapse. In effect, crises are not so much precipitated by the actual mechanisms of the economy, but rather by the speculators' expectations of the choices that a government would make in a tight crisis situation. Thus, mechanisms of self-fulfilling crises work through market expectations.

Under these crisis conditions, an issue at stake is not merely whether speculators increase exchange rate volatility, but also whether they generate and exacerbate exchange rate misalignments in terms of fundamentals. This is because noise traders could trigger a shift of exchange rate from an equilibrium with a low volatility of fundamentals to the one with a high volatility of fundamentals, by generating destabilizing speculative bubbles, as shown by Jeanne and Rose (1999).

In this regard, Williamson (1997) raises an interesting question whether the Tobin tax would curb misalignments. Referring to the fact that transaction tax would penalize both stabilizing and destabilizing speculators, he observes: 'if the object is to curb

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14 Responding to Davidson's arguments that the effect of the Tobin tax at a low rate on trade volume is minimum, Korkut (2002) suggests that the stabilizing effect of the Tobin tax is realized more through its negative impact on the *speed* of reaction of market traders to price changes.

misalignments, it seems inefficient to penalize all transactions rather than those that are subverting policy' (1997: 336). Hence, he regards the Tobin tax as an inferior instrument to more discriminatory types of capital controls in its capacity to stabilize the currency market.

Certainly, if CTT is considered as an instrument for dampening speculation to avert self-fulfilling crises, the tax rate has to be set at a much higher rate than one envisaged to deal with 'noise-trading' speculators operating under a less volatile market condition.[15] The low range of the tax rates referred to above would not deter speculative attacks on pegs, when much higher gains are at stake. Yet, as discussed above, a high tax rate would create severe liquidity problems for normal market operations. In order to address this trade-off and to deal effectively with speculators' different motivations depending on market conditions, a flexible multi-tier system of taxes would be required, rather than a time-invariant uniform currency tax.

This issue is directly addressed in the two-tier tax system proposed by Spahn (1996, 2002). The two-tier structure embedded in Spahn's proposal consists of 'a low tax rate for normal transactions and an exchange surcharge on profits from very short term transactions deemed to be speculative attacks on currencies' (1996: 24), as applied to a target zone.[16] Under this system, 'an exchange rate would be allowed to move freely within a band, but overshooting the band result in a tax on the discrepancy between the market exchange rate and the closest margin of the band', while the low transaction tax is levied on a continual basis, raising substantial and stable revenues.

Importantly, this system has to be executed under a two-tier structure, since the credibility of surcharge levy is anchored in the fact that the transaction tax system is already in place. Thus, Spahn proposes that the exchange surcharge would be administered in conjunction with the underlying transaction tax. The transaction tax would serve 'as a monitoring and controlling device for the exchange surcharge, which would be zero so long as foreign exchange markets are operating normally within a band, but would function as an automatic circuit-breaker at times of speculative attacks' (1996: 24). Thus, the exchange surcharge would be applied temporarily on a unilateral basis at the 'speculative end' and would not affect liquidity or efficiency of market functioning in a less volatile condition.

Indeed, once such system is seen to be operating efficiently with credibility, the threat of a surcharge levy alone may sufficient to keep exchange rates within a target zone, without the depletion of official reserves or other interventions such as high premium on overnight money deposits or excessively high interest rates as observed during the ERM crises. The system is seen as providing monetary authorities with breathing space for orderly realignment of exchange rates, which would reflect the development of economic fundamentals. In my view, one of interesting aspects of this scheme is that the its implementation is deemed successful, when the exchange surcharge is never levied, while the background low transaction tax generates steady revenues, as the two-tier

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15 Davidson (1997) emphasizes this problem, noting that a Tobin tax of over 23 per cent would have required to stop the speculative surge of the Mexican peso crisis of 1994-5.

16 Spahn (2002) refers the exchange surcharge as an exchange-rate normalization duty (ENRD). Further, Grabel (2003) classifies potential measures managing cross-border capital flows into 'trip wires' and 'speed bumps'. An exchange surcharge in the Spahn proposal is an example of a speed bump measure that might be activated whenever trip wires reveal that a currency is vulnerable to speculative attack.

currency tax manages to drive 'destabilizing' speculations out of the system. In particular, in relation to potential revenue estimate, which is the main objective of this paper, it is important to emphasize that the two-tier system proposed by Spahn allows to keep a first-tier tax rate at a very low indeed, such as 0.01-0.02 per cent (one or two basis points).

Now, following on this scheme proposed by Spahn, others have proposed dual taxation as a way of increasing the 'double dividend' through schemes such as a 'dual currency and securities transaction tax'. We shall come back to the issue of appropriate exchange rate regime as well as the issue of achieving effective double dividends with the use of the Tobin tax in the concluding section. However, it may worth noting here in passing that a multi-tier CTT such as Spahn's proposal is not universally accepted as a solution for averting self-fulfilling currency crises. For example, Williamson (2000) sees no role of any variation of CTT in managing the intermediate regimes against speculative attacks, whilst recommending the intermediate 'target zone' regime, governed by the BBC rule (where BBC stands for basket, band and crawl), as a more appropriate exchange rate regime for most emerging market economies in preference over one of the two-corner solutions of pure floating or hard pegs.[17] Naturally, bands are stabilizing when credibility to defend is maintained. He argues, hence, that it is important first and foremost to build credibility so that expectations are formed in a stabilizing manner.

However, Williamson recommends 'soft margins' of the bands, rather than 'hard margins' as appropriate policy for emerging market economies in order to build credibility over time. He endorses the soft target zone system, analysed by Bartolini and Prati (1997, 1998), in which the exchange rate is allowed to move outside the band in the short run, at times of shocks to 'the fundamentals', in order to diffuse tension. According to Bartolini and Prati (1998), such a softening of the target zone makes the system less vulnerable to speculative pressures, as the edges to bands provide the market with targets to attack. In their view, government interventions should instead be focused on maintaining the obligation to hold the rate within the band in the long-run.

Thus, Williamson argues that during times of large speculation the soft bands would remove the source of vulnerability without losing the main advantage of the BBC arrangement. By allowing a quick, temporary exist from commitments when a crisis situation develops, it is conjectured that credibility to commitments is not eroded permanently, while the exchange rate could revert back to the parity in the process of crisis resolution. Obviously, under such a soft target zone regime, there is no role for a circuit-breaker embedded in the two-tier CTT proposal as commitments to defend the edges of the zone are altogether abandoned.

However, it should be recalled that in the classic model on target zones (Krugman 1991), speculators could act in a stabilizing manner at the margin of the zone precisely

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17 Williamson (2000) lists the fundamental reasons found in literature for preferring a band system over floating: (i) the band performs the function of crystalizing market expectations of where the equilibrium exchange rate may lay, and thus making expectations stabilizing at the time-horizons relevant for influencing market behaviour (Svensson 1992); (ii) a band has a pronounced effect in limiting exchange rate variability by preventing noise traders, particularly, stop-loss traders from making money by introducing noise into the exchange market (Rose 1996).

because of their confidence in the government's commitment and ability to intervene.[18] A credible commitment to the exchange rate target would have a stabilizing effect on market expectations by discouraging the entry of destabilizing noise traders. Further, the 'hard' margin could avoid the large misalignments associated with soft margin in terms of very high adjustment costs (even though they are claimed to be temporary).

Ultimately, in my view, several critical questions should be addressed in deciding which target zone system (soft or hard margins) is appropriate: (i) how credibility to commitment to the target zone can be best maintained; (ii) how costly is it to abandon the zone even temporarily in terms of macroeconomic fundamentals and adjustments; (iii) how quickly can market confidence be restored to allow the exchange rate to gravitate back towards the reference rate or the parity if a soft band option is adopted. The answer to these questions appears to vary case by case. If a soft band is too costly for the economy, a hard band incorporating the two-tier CTT system remains an attractive instrument to consider.

3   The debate on the technical and political feasibility of CTT

3.1   Earlier debate on the technical feasibility of CTT

In Tobin's *original* proposal, a currency transaction tax is applied on a universal basis to spot transactions only. This raised strong scepticism on the grounds of the technical and political feasibility. In particular, it has been argued that such a tax could be too easily evaded by market migration to offshore tax havens as well as asset substitutions.[19]

Kenen (1996) addresses these concerns in a comprehensive manner. To counter the shifting of transactions to tax-free jurisdictions, he proposes two measures: imposition of a punitive rate on transfers of funds to or from such locations,[20] and taxing at the site where the deal is made (at dealing sites) rather than at the site where the transaction occurs, i.e. at settlement or booking sites. The reason for the second measure is both because too many transactions are netted out before they are settled and because tax-free jurisdictions can be used for booking all transactions with minimum cost. For example, booking and settlement sites could be easily relocated by just installing computers without moving dealing rooms or dealers, whereas relocation of dealing sites are far more costly. Hence, Kenen also proposes that tax collection is made on a market basis where the dealing site is located and each party involved in wholesale transactions would pay half the tax in retail transactions in order to equalize the tax burden across wholesale interbank transactions and retail transactions.

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[18] The empirical rejection of this model is usually explained in terms of imperfect credibility and intra-marginal interventions (Garber and Svensson 1995 and Sarno and Taylor 2003).

[19] Tobin (1996) remarks that the concerns about tax evasion may be generally overblown. Baker (2001) also argues that the 'evasion issue' has got too much attention in relation to CTTs and even capital controls. However, though this may be the case, a possibility of evasion can affect the efficacy of any tax as well as the cost of enforcement, so the evasion issue should be carefully examined. See Umlauf (1993) for the asset migration effects of transaction taxes on the Swedish stock market.

[20] Kenen suggests to impose a punitive 5 per cent tax on transactions with a new dealing site, rather than one-half of the standard rate of 0.05 per cent (i.e. 0.025 per cent for the wholesale trading).

As regards to addressing the possibility of tax evasion by asset substitutions, Kenen points to the need to extend the transaction base to derivatives such as forwards and swaps contracts, which could be used as close substitutions for spot transactions.[21] The case for taxing futures and options contracts is more complicated, as they are not perfect substitutes to spot transactions or forwards contracts and they are not typically settled by delivering currencies. However, Kenen reckons that if substantial changes to derivative markets are to be avoided, both futures and option contracts had to be taxed too.

However, those derivatives, which require high frequency trading, involving four or more transactions per contract instead of two transactions, should not be subject to double taxation. Further, these derivatives are risk-hedging instruments, so taxing them would make hedging very costly, as taxes would not eliminate exchange rate fluctuations from the market. At least, in order to remove the resulting bias against high frequency trading for hedging purpose, Spahn (1996) suggests that transactions involving derivatives should be taxed at half the rate involving spot transactions, which would allow the derivative markets to function for hedging purposes. In his more recent study, he proposes that in addition to all spot transactions, outright forwards and swaps up to one month would be taxed, while options and other financial derivatives would not be taxed (though they are taxed indirectly through the spot and forward transactions they trigger (Spahn 2002).

Now, it could be envisaged that new 'cash substitute' instruments could emerge as tax evasion mechanism. Garber and Taylor (1995) and Garber (1996) suggest that T-bills traded in liquid markets could be used for such a purpose, while Spahn (1996) foresees other possibilities involving bankers' acceptances, commercial paper or repurchase agreements made against collateral without involving cash settlements. Since the use of these substitutes involve transactions costs and interest rate risks or other credit risks, both Kenen (1996) and Tobin (1996) assess that the possibility of large-scale use of these substitutes instruments are rather exaggerated and could be avoided, if a low transaction tax is applied. However, a heavy tax burden may well encourage the development of liquid markets for new financial instruments and papers that could be used for cash substitutes.

Indeed, one of most efficient approaches to discourage all forms of tax evasion, including migration and substitutions, is to keep the tax rate at a very low level. Considering that spreads in the wholesale interbank market are well below 0.1 per cent, Kenen (1996) reckoned a tax rate of 0.05 per cent (5 basis point) as an upper bench-mark for CTT rather than a lower-bench mark in the study by Felix and Sau (1996), while Spahn (1996) suggests an underlying tax rate of 0.02 per cent (2 basis point).

Furthermore, both Tobin (1996) and Kenen (1996) suggest that for a system of CTT to be operative, CTT has to be adopted at least by the G-7 countries and a few other major financial centres such as Singapore, Hong Kong and Switzerland. Others argue, however, that for a more effective implementation and enforcement, a universal adoption of CTT under an international agreement is necessary. In particular, the universality was initially

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[21] While spot transactions are settled in less than three days, forward transactions take three or more days and swap transactions pair either a spot transaction with an offsetting forward transaction, or two forward contracts with different maturities. Hence, if only spot transactions are taxed, forwards and swap contracts could easily be used as substitutes. Tobin acknowledges the need for this modification to the taxbase (1996).

viewed as imperative in order to deal effectively with a race-to-the-bottom approach to tax competition for highly mobile financial services (Garber 1996).[22]

Such an agreement should specify uniform rules and procedures for subsequent amendments as well as the use of tax revenues. Tobin forwarded a proposal in which the administration of a transactions tax is assigned to the IMF, so that a CTT levy can be tied to IMF membership and borrowing privileges, and hence, 'universality' can be ensured. While other existing international organizations such as Bank for International Settlement (BIS) and World Bank can be considered equally as coordinating and enforcement agencies for CTT, the establishment of a specialized new institution under the UN system for this specific purpose (e.g. an international cooperation fund such as Global Development Fund or World Tax Authority) was also discussed. Under such a proposal, it was envisaged that some agreed portion of tax collected by national authorities would be funnelled to a UN sanctioned fund management system or a specially established institution.

3.2   New schemes to overcome technical and political impediments to CTT

While foreign exchange markets have hitherto been organized as decentralized dealer-driven markets, there appears to be a clear trend towards more centralized automated systems. While this rationalization may entail a reduction in gross turnover of foreign exchange transactions, it may ease considerably the problem of administration and collection of CTT, as well as that of enforcement. In fact, as Frankel (1996) argues, a CTT may indeed accelerate this centralization process. It has been suggested that automated systems, increasingly used for currency inter-bank *settlements*, could be effectively used for tax administration. Proposals made by Schmidt and Mendez fall into this category (Schmidt 1999; Mendez 1995 and 2001).

According to Schmidt's proposal, CTT would be collected and enforced at the settlement site, instead of the dealing site as in Kenen's proposal.[23] Currently, real time gross settlement systems (RTGS) for payment vs payment settlement (PVP) are used for eliminating settlement risk at the national level. In addition, the Continuous Linked Settlement (CLS) Bank is being developed as a global system of processing settlements involving a number of currencies. The CLS Bank's settlement operations would be linked to domestic systems to support PVP settlement for foreign exchange transactions. Seizing this new technological development, Schmidt proposes RTGS as a mechanism for levying a Tobin tax at the national level and CLS Bank's settlement operations for the imposition of CTT for cross-border flows in offshore netting systems. The latter will be monitored and supervised by central banks participating in CTT to deal with the threat of offshore tax evasion. Schmidt (1999) further suggests that it is technologically easy to apply the Tobin tax to foreign exchange transactions intermediated by an exchange of securities, as securities exchanges around the world operate similar netting settlement schemes through clearing houses.

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22 For a more recent proposal on the CTT coverage, see discussion below.

23 This means that tax revenues generated by the Schmidt scheme would be substantially lower than the estimates based on a CTT imposed at the dealing site, as many foreign exchange transactions are netted out.

Mendez (1995, 2001) goes a step further to propose an establishment of a global 'foreign currency exchange' (FXE) under the UN system as alternative to a CTT to involve a setting up of extensive administrative structure for taxation. Under the Mendez' proposal, the centralized exchange, as a public owned entity in the form of a specialized agency, would be a global network of members comprising of frequent users as well as brokers and dealers, with trading facilities in the major financial centres and branches in other small cities. Members would pay a licensing fee as well as commission on each transaction. In place of CTT, these licensing and user fees would constitute revenues. He predicts FXE would significantly lower the cost of changing money to end users by giving them competitive rates due to increased efficiency in exchange markets. In his view, it could also generate revenues of considerable size through transaction fees, rather than a transaction tax, while offering the potential of facilitating the operation of a Tobin type of tax with a view of reducing volatility. Mendez (2001) suggests that the distinctive advantage of FXE over CTT lies in the fact that it is a more market-based approach, and would therefore garner more political support than the Tobin tax. However, under the current international climate, it may be as equally difficult (if not more than) as with CTTs, to reach an international agreement to create and organize such a global currency market under the UN system, as proposed by Mendez.

Adopting the Schmidt proposal of collecting CTT at the settlement site, Clunies-Ross (2003) argues that a virtually universal application of CTT on *wholesale* transactions could be achieved through the cooperation of five or so monetary authorities who issue 'vehicle' currencies, since almost all wholesale transactions have one of these vehicle currencies on one or both sides. He suggests that CTT at the settlement site would simplify the formidable technical issues associated with the Tobin tax imposed on largely unregulated, decentralized currency markets at the dealing site. It is worth noting here that taxing at settlements incidentally reduces risk penalizing arbitrage transactions considerably, as a tax is applied to a trader's netted out position, rather than his/her each transaction flow.[24] The problem associated with asset substitution can also be addressed through security exchange taxes or taxes on derivative instruments using a similar centralized mechanism, as suggested by Schmidt. Clunies-Ross (2003) assesses further that using the Schmidt scheme, the two-tier structure proposed by Spahn could be implemented unilaterally by countries facing impeding currency crises, without having an international agreement.

While all these authors emphasize the technical feasibility of CTT, they recognize that the most formidable obstacle is political (Mendez 2001). Confronted with the issue of political feasibility in achieving universality for CTT, anticipating in particular intense opposition from the US administration/congress and financial industry, adoption of CTT on a regional basis has been actively considered. For example, Cecil (2001) examines the possibility of domestic or regional adoptions of CTTs such as the EU with international cooperation for enforcement. Spahn (2002) advances the distinct concept of a politically feasible Tobin tax (PFTT) in the prevailing political reality. Foreseeing fierce opposition

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24 Thus, taxing at the settlement site would mitigate, to a certain degree, the criticism against a transaction tax imposed on the *flow* in view of the understanding that speculative threats originate from an overhang of a *stock* of short-term claims. I am grateful to John Williamson for pointing to the need for drawing sufficient attention to this question.

from the US administration and Congress,[25] Spahn (2002) reckons with the fact that the Tobin tax cannot be introduced universally or multilaterally in the first instance, as the tax has to be legitimized first by existing parliamentary institutions, either national or regional (e.g. the European Council). In the light of the political reality faced by the international community, he actively considers the case in which the Tobin tax can be implemented unilaterally by a group of countries such as the European Union in cooperation with Switzerland.

Following on these arguments, Patomäki and Sehm-Patomäki (1999) also suggest an implementation of CTT in two phases: in the first phase, a group of countries, such as the Euro-EU, would establish an open agreement and a supranational body for tax administration. Member countries would agree to charge a small underlying CTT (e.g. 0.1 per cent) as well as high exchange surcharges as needs arise.[26] A higher CTT (e.g. 0.2 per cent) is charged in dealing with non-residents who are not in the tax regime, in order to solve the tax evasion problem as well as to exert pressure on outsiders to join. In the second phase, once all major financial centres and most other countries have joined, a universal and uniform CTT would be applied.

Patomäki and Denys (2002) develop this idea further in the 'draft treaty on global currency transactions tax' and propose the establishment of a CTT organization (CTTO) under the treaty, which will enter into force following the 30th ratification of the treaty or on the date on which the preparatory group has established that the contracting states, who have ratified the treaty account for at least 20 per cent of the global currency markets, whichever is later. The draft treaty has adopted the basic ideas contained in Spahn's two-tier scheme as well as the Schmidt system collection, though it stipulates CTT to be levied both on wholesale markets and retail markets.

4 Evaluation of the revenue potential of CTTs

4.1 Recent trends in the composition and structure of currency markets

There are several important changes in foreign exchange markets in recent years, which can have a critical bearing on our estimates of CTT revenues. As shown in Table 1, according to the BIS survey data conducted in April 2001, average daily *net* turnover was US$1.2 trillion, compared to US$1.49 trillion in April 1998, which is a 19 per cent decline at current exchange rates and a 14 per cent fall at constant exchange rates as calculated by BIS (2002).[27] The decline in turnover between 1998-2001 is in sharp contrast to the rapid steady increase in turnover over the last two decades, found in the earlier surveys. The level of activities in currency markets in 2001 settled down to that reported for 1995.

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[25] In the Second Session of the 104th Congress of the US, Senator Bob Dole and three other politicians introduced a bill to prohibit the UN and UN officials from developing and promoting Tobin's idea or any other international taxation scheme.

[26] Their proposed tax rate is much higher than the rates I consider realistic and permissible in the prevailing market and political conditions.

[27] Forty-eight central banks and monetary authorities participated in the Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activities conducted by Bank for International Settlement (BIS) in 2001. The geographical coverage of the BIS survey has steadily expanded from 21 countries in 1989.
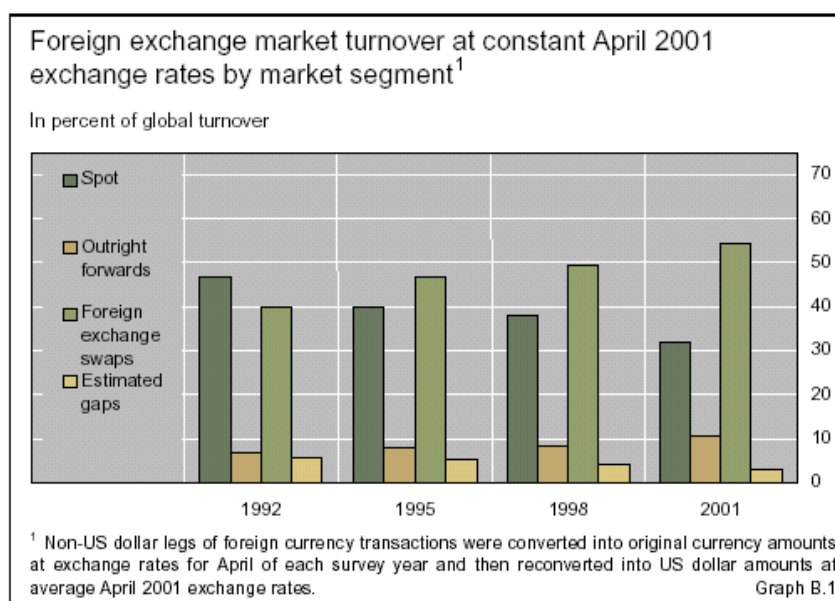
Table 1
Global foreign exchange market turnover[1]
Daily averages in April, in billions of US$

	1989	1992	1995	1998[2]	2001
Spot transactions	317	394	494	568	387
Outright forwards	27	58	97	128	131
Foreign exchange swaps	190	324	546	734	656
Estimated gaps in reporting	56	44	53	60	26
Total 'traditional' turnover	590	820	1,190	1,490	1,200
Memo: Turnover at April 2001 exchange rates[3]	570	750	990	1,400	1,200

Notes: [1] Adjusted for local and cross-border double-counting.
[2] Revised since the previous survey.
[3] Non-US dollar legs of foreign currency transactions were converted from current US dollar amounts into original currency amounts at average. Exchange rates for April of each survey year and then reconverted into US dollar amounts at average April 2001 exchange rates.

Source: BIS (2002: Table B1).

Figure 1
Foreign exchange market turnover at constant April 2001 exchange rates by market segment

Source: BIS (2002: Graph B.1).

The decline is largely accounted for by a sharp fall in spot transactions, and to a lesser extent, in foreign exchange swaps, while outright forwards transactions showed a slight increase. Thus, there are some notable changes in the market composition by type of transactions as shown in Figure 1. The share of spot transactions has steadily declined since 1992, while that of foreign exchange swaps has risen, accounting now for over 55 per cent of transactions. According to the BIS survey, 38 per cent of outright forwards and 69 per cent of swaps are with maturity up to seven days. Together with spot transactions, this brings the share of transactions with maturity up to seven days to 76 per cent in 2001, close to the estimate of 80 per cent as transactions involving roundtrips of seven days or less, as noted in Tobin (1996).
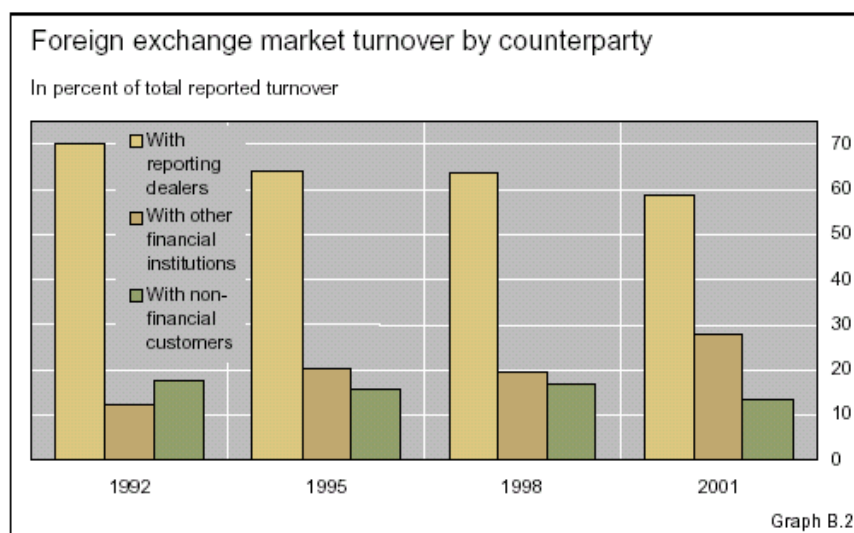
Table 2
Reported foreign exchange market turnover by counterparty[1]
Daily averages in April, in billions of US$

	1992	1995	1998[2]	2001
Total	776	1,137	1,429	1,173
With reporting dealers	540	729	908	689
With other financial institutions	97	230	279	329
With non-financial customers	137	178	242	156
Local	317	526	657	499
Cross-border	392	611	772	674

Notes: [1] Adjusted for local and cross-border double-counting. Excludes estimated gaps in reporting;
[2] Revised since the Previous survey.
Source: BIS (2002: Table B3).

Figure 2
Foreign exchange market turnover by counterparty
In per cent of total reported turnover

Source: BIS (2002: Graph B.2).

There are also some changes in relative market share accounted for by different counterparties. As shown in Table 2, trading between reporting dealers declined sharply, bringing its share in total turnover from 70 per cent in 1992 to 59 per cent in 2001 (Figure 2). A marked decline in trading between banks and non-financial customers is reported here, which now accounts only for 13 per cent of transactions. This may have reflected the acceleration consolidation process observed in the non-financial corporation sector. The increased transactions between banks and other financial institutions are accounted for by the increasing role of asset managers (BIS 2002: 2). At the same time, the role of hedge funds in foreign exchange transactions has declined since their debacle in 1998.

The marked decline in global foreign exchange market turnover in the 2001 survey undoubtedly reflects the general slowdown of the global economy and world trade as well as the increased economic and political uncertainty of recent years. However, a reduction of this scale as well as the significant changes in market structures is also an indication of the growing trend towards the centralized, automated systems in the

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settlement of wholesale currency transactions discussed above.[28] Thus, BIS (2002) also notes the growing role of electronic brokers in the spot interbank market, reducing the need for dealers to trade actively. The decline in wholesale interbank transactions is also explained by the steady trend towards concentration in the banking sector, observed in major currency markets as well as globally, thus decreasing the number of trading desks (BIS 2002: Table B.5).[29]

The introduction of the euro has also reduced gross foreign exchange market turnover, as it eliminated the need for intra-EMS trading (Table 3). Dollar/euro trade accounts for 30 per cent of the global turnover, followed by dollar/yen with 20 per cent and dollar/GBP with 11 per cent (Table 4).

Table 3
Currency distribution of reported foreign exchange market turnover[1]
Percentage shares of average daily turnover in April

	1989	1992	1995	1998[2]	2001
US dollar	90.0	82.0	83.3	87.3	90.4
Euro	–	–	–	–	37.6
Deutsche mark[3]	27.0	39.6	36.1	30.1	–
French franc	2.0	3.8	7.9	5.1	–
ECU and other EMS currencies	4.0	11.8	15.7	17.3	–
Japanese yen	27.0	23.4	24.1	20.2	22.7
Pound sterling	15.0	13.6	9.4	11.0	13.2
Swiss franc	10.0	8.4	7.3	7.1	6.1
Canadian dollar	1.0	3.3	3.4	3.6	4.5
Australian dollar	2.0	2.5	2.7	3.1	4.2
Swedish krona[4]	–	1.3	0.6	0.4	2.6
Hong Kong dollar[4]	–	1.1	0.9	1.3	2.3
Singapore dollar[4]	–	0.3	0.3	1.2	1.1
Emerging market currencies[4, 5]	–	0.5	0.4	3.0	5.2
Other	22.0	8.5	7.9	9.3	10.1
All currencies	200.0	200.0	200.0	200.0	200.0

Notes: [1] Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200 per cent instead of 100 per cent. The figures relate to reported 'net-net' turnover, ie they are adjusted for both local and cross-border double-counting, except for 1989 data, which are available only on a 'gross-gross' basis. More details about emerging market and other currencies are provided in BIS (2002: Annex Tables E.1.1 and E.1.2).

[2] Revised since the previous survey.

[3] Data for April 1989 exclude domestic trading involving the Deutsche mark in Germany.

[4] For 1992–98, the data cover home currency trading only.

[5] For 1992 and 1995, South African rand; for 1998 and 2001, Brazilian real, Chilean peso, Czech koruna, Indian rupee, Korean won, Malaysian ringgit, Mexican peso, Polish zloty, Russian rouble, Saudi riyal, South African rand, Taiwan dollar and Thai baht.

Source: BIS (2002: Table B.4).

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[28] However, as CLS Bank has become operational only in autumn 2002, the trade volume revealed by the BIS survey conducted in April 2001 could not be affected by this new technology applied to settlements in global foreign exchange trade.

[29] BIS (2002) suggests the decline in turnover can be also explained by the decrease in the risk tolerance of banks after the financial crises in 1998, which has led to a reduction in credit limits and proprietary trading.

Table 4
Reported foreign exchange market turnover by currency pair [1]
Daily averages in April, in billions of US$ and percentages

	1992		1995		1998		2001	
	Amount	% share	Amount	% share	Amount	% share	Amount	% share
US dollar/euro	–	–	–	–	–	–	354	30
US dollar/mark	192	25	254	22	290	20	–	–
US dollar/French franc	19	2	51	4	58	4	–	–
US dollar/ECU	13	2	18	2	17	1	–	–
US dollar/other EMS	43	6	104	9	172	12	–	–
US dollar/yen	155	20	242	21	256	18	231	20
US dollar/sterling	77	10	78	7	117	8	125	11
US dollar/Swiss franc	49	6	61	5	79	5	57	5
US/Canadian dollar	25	3	38	3	50	3	50	4
US/Australian dollar	18	2	29	3	42	3	47	4
US dollar/other	48	6	72	6	167	12	195	17
Euro/yen	–	–	–	–	–	–	30	3
Euro/sterling	–	–	–	–	–	–	24	2
Euro/Swiss franc	–	–	–	–	–	–	12	1
Euro/other	–	–	–	–	–	–	21	2
Mark/yen	18	2	24	2	24	2	–	–
Mark/sterling	23	3	21	2	31	2	–	–
Mark/Swiss franc	13	2	18	2	18	1	–	–
Mark/French franc	10	1	34	3	10	1	–	–
Mark/ECU	6	1	6	1	3	0	–	–
Mark/other EMS	21	3	38	3	34	2	–	–
Mark/other	20	3	16	1	20	1	–	–
Other EMS/other EMS[3]	3	0	3	0	4	0	–	–
Other currency pairs	23	3	30	3	38	2	27	2
All currency pairs	776	100	1,137	100	1,430	100	1,173	100

Notes: [1] Adjusted for local and cross-border double-counting. Data in this table are not directly comparable with Table 4 for Currency groups

[2] Revised since the previous survey.

[3] The data cover home currency trading only.

Source: BIS (2002: Table B.6).

Major trading locations such as London, New York, Tokyo continuously dominate foreign exchange transactions, together accounting for 56 per cent of global transactions (Table 5). London remains the largest centre, larger than New York and Tokyo combined. The ten trading centres listed in Table 5 handle 85 per cent of global currency transactions.

Despite the marked decline in market turnover between 1998 and 2001, the relative size of foreign exchange markets is still staggering as shown in Table 6. Annual world exports stood at US$6,121 billion, compared to the annualized global foreign exchange market turnover of US$300 trillion. This means that the ratio of global exports to global foreign exchange turnover is at 0.02—an increase from the lower level of 0.015 in 1998, but far less than the ratios observed in the 1970s. Felix and Sau (1996) report that these ratios for 1977, 1980 and 1983 were 0.29, 0.09 and 0.06, respectively.

Table 5
Geographical distribution of reported foreign exchange market turnover
Daily averages in April, in billions of US$ and percentages

	1989		1992		1995		1998		2001	
	Amount	% share	Amount	% share	Amount	% share	Amount	% share	Amount	% share
United Kingdom	184	25.6	291	27.0	464	29.5	637	32.5	504	31.1
United States	115	16.0	167	15.5	244	15.5	351	17.9	254	15.7
Japan	111	15.5	120	11.2	161	10.2	136	6.9	147	9.1
Singapore	55	7.7	74	6.9	105	6.7	139	7.1	101	6.2
Germany	–	–	55	5.1	76	4.8	94	4.8	88	5.4
Switzerland	56	7.8	66	6.1	87	5.5	82	4.2	71	4.4
Hong Kong SAR	49	6.8	60	5.6	90	5.7	79	4.0	67	4.1
Australia	29	4.0	29	2.7	40	2.5	47	2.4	52	3.2
France	23	3.2	33	3.1	58	3.7	72	3.7	48	3.0
Canada	15	2.1	22	2.0	30	1.9	37	1.9	42	2.6

Source: Compiled from Table B.7 in BIS (2002).

Table 6
Foreign exchange trading, world trade and global official reserves,
in billions of US$ and percentages

	1989	1992	1995	1998	2001
Annual world exports	3,027	3,762	5,130	5,444	6,121
Annual exports of developing countries	899	1,112	1,661	1,779	2,252
% share of developing country exports	29.7	29.6	32.4	32.7	36.9
Global official foreign exchange reserves	715	925	1,385	1,638	2,039
Foreign exchange reserves of developing countries	262	434	729	968	1,260
% share of developing country reserves	36.6	46.9	52.6	59.1	61.8
Annual global foreign exchange turnover (250 trading days)	147,500	205,000	297,500	372,500	300,000
Exports/foreign exchange turnover (%)	2.05	1.83	1.72	1.46	2.04
Reserves/exports (%)	23.6	24.6	27.0	30.1	33.3
Reserves/daily turnover (days)	1.21	1.13	1.16	1.10	1.70

Source: Author's calculation, based on data in International Financial Statistics (IMF) and BIS (2002).

Critically, global official foreign exchange reserves, which have been steadily increasing since the ERM crises in 1992, are equal merely to 1.7 days of global currency transactions. This reveals the meagre capacity of monetary authorities to intervene in foreign exchange markets in face of speculative self-fulfilling attacks on their currencies. Monetary authorities have been trying to improve their defence capacity by raising official reserve holdings from 25 per cent of global exports in 1992 to 33 per cent in 2001. Table 6 shows clearly that developing countries, which are more likely to face currency crises, are forced to hold larger reserves in relation to the size of their economies at very high opportunity costs. The share of developing countries in global reserve holdings has increased consistently from 37 per cent in 1989 to 62 per cent in 2001, in contrast to their share in world exports of 37 per cent in 2001.

Revenue potential and tax implementation

Previous studies produced various estimates of potential revenue from the Tobin tax, predicting tax revenue of very considerable size, as tax rates of 0.25-0.05 per cent are commonly used for calculation. For example, Frankel (1996) estimates that the 0.1 per cent tax applied to the 1995 global foreign exchange would generate an annual tax revenue of US$176 billion, after taking into account that the 0.1 per cent tax would result in a reduction in trade volume by 45 per cent and allowing 20 per cent deduction for exempted official trading and tax evasion. Applied to the volume reached in 1995, Tobin (1996) reckons that revenue is more likely to be US$94 billion maximum. His estimate is based on the assumption that only 30 per cent of the gross volume of transactions constitutes a taxbase if a bank's end-of-day open positions only are taxed at a 0.1 per cent one-way tax. He concedes revenue could be less than US$50 billion if the tax-induced reduction of volume is taken into account.

Felix and Sau (1996) produce a range of potential revenue estimates, applying varying assumptions with regard to: (a) tax rates of 0.25 per cent, 0.1 per cent and 0.05 per cent; (b) pre-tax transaction costs, ranging from 0.1 per cent to 1 per cent; and (c) elasticities of trade volume in response to tax-induced changes in transaction costs, ranging from 0.3 to 1.75.[30] According to their estimates, the 0.1 per cent tax applied to the 1995 global foreign exchange would generate tax revenue of US$148 billion and US$180 billion, under the assumption of pre-tax transaction costs of 0.5 per cent and 1.0 per cent, respectively. The 0.05 per cent tax rate, suggested by Kenen (1996), is estimated to produce tax revenue of US$90 billion and US$97 billion.

Felix and Sau are correct in estimating revenue potential on the basis of the elasticity of the volume with respect to currency transaction costs, which should absorb a tax burden. They note,

> by adding to transaction costs, a Tobin tax not only reduces the foreign exchange volume by an amount determined by the weighted average elasticity of volume with respect to costs, but alters its composition by squeezing hardest the low-unit-profit, high elasticity transactions such as covered interest arbitraging (Felix and Sau 1996: 228).

However, their estimated pre-tax transaction costs of 0.1-1.0 per cent appear to be too high in relation to the wholesale segments of foreign exchange markets as observed today.[31]

Transaction costs are reflected in bid-ask spreads observed in markets.[32] The more liquid markets are, the lower spreads could be. Spahn reports that the spreads currently observed in highly liquid inter-bank wholesale markets are 0.011 per cent for the US dollar/euro transactions, 0.023 per cent for the US dollar/yen transactions and 0.021

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[30] Felix and Sau (1996) allow a 35 per cent reduction for exempted official trading and tax evasion, compared to the 20 per cent allowed in Frankel's estimate.

[31] Especially, it is not correct to assume uniform transaction costs across different market segments in their model and estimation, where Felix and Sau use the weighted average size of pre-tax transaction costs.

[32] The spreads also include risk premium and premium arising out of asymmetric information.

per cent for the US dollar/GB pound (Spahn 2002: Appendix 4). However, reflecting the more fragmented nature with less competition because of asymmetric information disadvantages affecting retail, non-financial customers, spreads observed in retail segments are much larger and vary widely across markets.[33]

While CTT is supposed to reduce the trade volume in short-horizon roundtrips or to affect the speed of traders' responses, it is unable to differentiate between destabilizing noise trading and stabilizing liquid trading in the wholesale markets. Given substantial changes taking place in market structures in the wholesale interbank segments as a result of the new technological development discussed above, it is now unwise to impose a high tax rate to trigger further significant disturbances to market liquidity in the wholesale segments. Indeed, as many argue, it is best to adopt a phase-in approach, whereby markets would have a time to respond to the introduction of CTT gradually and in a stable manner.[34] This line of thinking would set an upper limit to the CTT levied on inter-bank transactions at 0.01-0.02 per cent as an 'introduction rate' in the light of the spreads in wholesale segments reported above.[35] Hence, these very low tax rates, much lower than those used in previous studies, are used in the revenue estimation produced below. Based on calculations made by Frankel and Spahn,[36] I conjecture that the tax rates considered here could still provide enough disincentives to traders for not engaging in noise trading excessively.

As mentioned above, the spreads are higher in less liquid retail foreign exchange markets, where transactions are much less cost-elastic. From this point of view, retail markets can in principle absorb a higher tax rate in transaction costs. However, the tax imposed on wholesale trading is more likely to be passed to less competitive retail transactions in the form of higher spreads, especially given the cost-inelastic demand. Since a single retail transaction typically gives rise to a chain of subsequent inter-bank transactions until a dealer closes his/her ensuing open position, an effective tax rate resulting from the 0.01- 0.02 per cent tax imposed on wholesale transactions could be translated into additional spreads of 0.04-0.1 per cent or more in retail market segments. This suggests that there may be a heavier tax burden on international trade transactions than hitherto acknowledged and tax incidence of CTT may go far beyond financial institutions, contrary to the claim made otherwise.[37] For this reason, in my view, the scale of the rise in spreads as result of the proposed CTT would approach the maximum

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[33] For this reason, the revenue calculation presented here is not based on an alternative method of calculating tax revenue as a unified percentage of spreads (see note 13 above). Indeed, a unified CTT calculated as a percentage of spreads across the two market segments could make tax effects on real cross-border trade and investment more (not less) in most cases.

[34] Felix and Sau (1996: 230) suggest that as 'the increments to the Tobin tax rates are phased in, the reduced annual global foreign exchange will become more stable, at least regarding further changes in transaction costs'.

[35] Spahn (2002) suggests that given that spreads in inter-bank transactions were in the range of 0.04-0.05 in 1995 when the traded volume was roughly similar to that observed in 2001, the 0.02 per cent tax would not damage market liquidity too adversely.

[36] See footnote 12.

[37] Considering this possibility, Davidson (1997: 679) suggests that 'a Tobin transaction tax might throw larger grains of sand into the wheels of international real commerce than it does into speculative hot money flows'.

Table 7
CTT Revenue estimate applied to 2001 foreign exchange trade volumes

	Daily average transactions[1]			0.02% Tax applied to wholesale transactions					0.01% Tax applied to wholesale transactions				
	Daily turnover	Adjusted by trade volume reduction at:		Revenue with no volume reduction[2]	Tax rate		Revenue[2]		Revenue with no volume reduction[2]	Tax rate		Revenue[2]	
		0.02%	0.01%		A	B	A	B		A	B	A	B
Total turnover	1, 200												
BIS adjusted turnover	1, 173												
less non-taxed instruments	−117												
Taxable base	1, 056												
of which: Spot transactions	348	304	333	69.6	–	0.02	–	60.8	34.8	–	0.01	–	33.3
wholesale	296	252	281	–	0.02	–	50.4	–	–	0.01	–	28.1	–
retail	52	52	52	–	0.04	–	20.8	–	–	0.02	–	10.4	–
Outright forward	118	105	114	11.8	–	0.01	–	10.5	5.9	–	0.005	–	5.7
wholesale	85	72	81	–	0.01	–	7.2	–	–	0.005	–	4.1	–
retail	33	33	33	–	0.02	–	6.6	–	–	0.01	–	3.3	–
Foreign exchange swaps	590	510	563	59	–	0.01	–	51.0	29.5	–	0.005	–	28.2
wholesale	536	456	509	–	0.01	–	45.6	–	–	0.005	–	25.5	–
retail	54	54	54	–	0.02	–	10.8	–	–	0.01	–	5.4	–
Daily revenue				140.4	–	–	141.4	122.3	70.2	–	–	76.8	67.2
Annual CTT revenue[1]				**35.1**	**–**	**–**	**35.4**	**30.6**	**17.5**			**19.2**	**16.8**

Notes: [1] Billions of US dollars.
[2] Millions of US dollars.
Source: Author's calculations based on BIS data.

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level that could be introduced to the retail segments in the initial phase. This transfer of burden across segments eliminates at least partially the need to levy differentiated tax rates to wholesale and retail segments, suggested by Kenen (1996).

Hence, in my calculation of potential revenue from CTTs, two estimates are produced: (a) one estimate on the assumption that the tax rate to wholesale transactions is one-half of that applied to retail transactions; (b) the other estimate on the assumption that a unified tax rate is applied across two segments of foreign exchange markets. It is further assumed that a tax applied to all derivative transactions will be one-half of the rate applied to spot transactions, as derivative dealings are high frequency trading by their nature and function. The taxbase is assumed to be virtually global in my estimate.

In my calculation I have also made the assumption that both retail and wholesale transactions are taxed at the dealing site on a market basis, as suggested by Kenen (1996). This assumption was adopted simply because the turnover at settlement site is not made available in the BIS survey. Hence, I assume that the major trading cites listed in Table 5 would agree to participate in CTT. The assumption of the universal application is rationalized with a view that tax structures should be simple and transparent. I also conjecture, for the purpose of simplifying revenue estimates, that the very low tax rate used in my estimate will produce a light tax burden on all transaction parties and considerably reduce the incentive for tax evasion through migration and asset substitution.

My estimates presented below are based on the assumption that alternative tax rates of 0.02 per cent and 0.01 per cent are applied to the global taxbase as described above. It is also assumed that the share of official transactions carried out by monetary authorities in global turnover is about 8 per cent.[38] Hence, this amount and other possible leakages, amounting to 10 per cent of total turnover, are deducted from the taxbase as non-taxed instruments. At these moderate tax rates, retail trading volume is assumed to be virtually unaffected, whilst excessive noise trading in wholesale segments would respond to an introduction to CTT at these rates.

In this respect, my approach differs from the assessment by Felix and Sau, who regard tax rates of less than 0.05 per cent as tax rates with no 'sand in the gears'. Instead, I reckon that tax rates of 0.01-0.02 per cent would still act as 'sand in the wheels' in the environment with equally low transaction costs and profit margins as observed in inter-bank markets today. Naturally, a reduction in volume would be much less at these low rates than the 33 per cent obtained with the elasticity about 0.32 used by Felix and Sau (1996) and Frankel (1996). In my estimates, it is assumed that a 0.02 per cent tax and 0.01 per cent tax would reduce the volume wholesale transactions (i.e. excluding transactions with non-financial customers) by 15 per cent and 5 per cent, respectively. These are somewhat arbitrary numbers as was the case in other estimates, since no estimates on the cost-elasticity of foreign exchange trading volume are known a priori. I

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[38] This figure is derived from the information in Table 4, where the share of the pair transactions between US dollar and others is reported as 17 per cent in 2001. It is assumed that about one-half of this was carried out by monetary authorities of emerging markets and transitional economies who typically exhibit 'fear of floating' (Calvo and Reinhart 2002), whereas interventions by monetary authorities in transactions between vehicle currencies were less in relative terms. With a view that a half leg of the US dollar/other currencies would constitute 4 per cent of global transactions, it is assumed that the share of official transactions globally is about 8 per cent.

have also proceeded with calculation on the basis of the additional information available in the BIS survey about the share of transactions with non-financial customers in outright forwards transactions (29 per cent) and foreign exchange swaps (9 per cent).

My estimates of CTT revenue potentials under alternative tax rates applied to different modes of transactions are shown in Table 7. My estimates show that CTT at 0.02 per cent applied to wholesale transactions would generate an annual revenue of about US$30-35 billion, while CTT at 0.01 per cent would produce US$17-19 billion. My revenue estimates are much lower than the US$53 billion suggested by Clunies-Ross (2003). My lower estimate of US$35 billion at 0.02 per cent basic tax under the scenario of no volume reduction is accounted for by the half rate applied to derivatives transactions. I have taken a view that CTT should not discriminate against high frequency transactions conducted for risk hedging purposes, without eliminating exchange rate volatilities. In general, I applied an estimation procedure, so that the estimate could provide us with some clue about the revenue size that the global community could expect from CTT at the prevailing level of foreign exchange trading activities.

These revenues would be collected on a market basis by monetary or tax authorities of the countries where these markets are located (see Table 5 for geographical location of major market sites).[39] Clunies-Ross (2003) regards CTT as ideal for global use, since the burden would be borne more or less proportionately to countries' income, adjusted by the degree of openness. He continues to suggest that 'whereas those that would be collecting it would be rich countries, and even among those countries themselves, the revenue collected would bear little or no relationship to the burden borne' (2003: 7). Hence, he concludes that revenue retention by the tax collecting governments would be highly objectionable in a moral/political sense.

While CTTs should be carefully evaluated according to economic criteria set out by Atkinson (2003b), CTTs present the potential of generating around about US$15-28 billion for global public use, if the national retention rate from CTT revenues would be agreed at 20 per cent and 70 per cent for developed and developing countries, respectively (Patomäki and Denys 2002) (though many argue that the retention rate for developing countries could be 100 per cent).

5   Concluding remarks

In this paper, I have argued that the currency transactions taxes should be implemented in an extremely cautious manner, starting with a very low tax rate. This is deemed necessary in light of recent structural changes in foreign exchange markets as well as considerations of market efficiency, liquidity, and technical and political feasibility. According to my preliminary estimates and assessments, based on these considerations, the contribution that CTT could make towards generating innovative sources for global

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[39] Since banks and exchange transactions are under the supervision and regulation of the monetary authorities, CTTs could be administered by monetary authorities, rather than by tax authorities. Alternatively, tax authorities could administer and collect CTT in cooperation with monetary authorities and with access to information generated by CLS Bank as suggested by Patomäki and Denys (2002).

finance may be much smaller than those derived from earlier studies. If CTT is collected and enforced on the netting settlement sites with use of new technology such as the CLS Bank's operations, revenue from CTT may even be smaller than those presented here. In my view, therefore, the very high expectations raised with respect to CTT's revenue-generating capacity on its own are not yet warranted in light of the prevailing economic and political reality today.

Nor does CTT by itself, implemented at the low rates, have sizeable effects on restoring macroeconomic policy autonomy. However, if CTT is successfully administered in the two-tier structure as stipulated by Spahn or in conjunction with other measures such as capital controls or security transaction tax (STT) in a coordinated fashion, potential benefits in double dividends from these measures would render support for serious consideration and the debate over its implementation. The revenue generated by CTT and STT combined could indeed far surpass the currently stagnating flows of official aid from OECD countries to developing and transitional economies, which in recent years has been running at the level of US$50 billions (see Atkinson 2003a).[40] At the same time, these measures combined may create a new condition, in which many emerging economies would be no longer forced into a *two corner-solution* of either 'fearful floating' with high, variable interest rates or 'hard pegs' such as full dollarization or monetary unions at cost of involuntarily losing an independent monetary policy.[41]

Indeed, the two-tier CTT structure proposed by Spahn or other dual taxation schemes could have the potential in achieving what the unified single transaction tax at the low tax rate alone would fail to deliver—restoration of credibility to intermediate exchange rate regimes and some autonomy of macroeconomic policy. That is, the 'impossible trinity' could be mitigated with application of this system, as three objectives—financial openness, exchange rate stability and monetary independence—become more compatible in the triad.

Furthermore, the coordinated approach considered here would curtail the potential for leakages from these policies, such as might result from asset substitution, market migration, or tax evasion. Indeed, there are substantial economies of scale to be gained from the combined application of CTTs and STTs with use of the centralized settlement mechanisms, as discussed above. The coordinated approach also increases the political feasibility of these measures by lowing substantially further the necessary tax rate on any single tax measure. Finally, the cross-border harmonization of these tax measures would reduce the potential for leakages.

Official development aid available today is vastly inadequate to the needs of developing countries.[42] The currency transaction taxes considered in this paper could serve as one critical innovative financial source for development finance. In this context, possible merits of taxing capital transactions should be evaluated against the historical

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[40] UNCTAD estimates that in 2000 the total value of world stocks, bonds, securities amounts to US$50 trillion, while total global equity market capitalization is estimated at US$37 trillion.

[41] See Frankel (1999) and Nissanke and Stein (2003) for a critical literature review on the exchange rate policy regime choice faced by emerging market economies.

[42] In particular, an allocation of bilateral aid tends to be at least partially used as a foreign policy tool by donor countries or for their economic gains (Maizels and Nissanke 1984).

background of the progressively reduced tax burden on capital income, relative to labour income, in the current era of financial globalization.

CTT may be regarded more as a new additional source for development finance, rather than as a possible substitute for (or alternative to) ODA. Naturally, this may not be the case, if the availability of vast revenues from CTT would make ODA less generously available.

The technical feasibility of implementation and enforcement can be substantially enhanced, and the cost of tax administration of CTT is also correspondingly reduced, with the introduction of automated clearing and settlement mechanisms adopted globally, such as the CLS Bank settlement scheme discussed here. However, the cost of reaching a political consensus and commitment towards the universal adoption of CTT remains high. In light of this high political (and administration) cost, many regard CTT as a 'leaky bucket' to use Atkinson's terminology. Dodd (2003) argues, for example, that the Tobin tax cannot be achieved politically, and hence the pursuit wastes much effort and resources.

Whether or not a *flexible geometry*, considered as a practical way forward with a subset of countries (Atkinson 2003b), can be successfully applied to this politically contentious tax instrument has been debated, and several schemes in this regard has been proposed, though yet to be carefully evaluated. Fuest, Huber and Mintz (2003) report the findings that there are welfare gains from regional tax coordination, but that these gains are lower than the gains from worldwide coordination.[43] A fiscal architecture emerging from such an analysis would certainly involve not only a tight coordination of the taxbase, but also close cooperation in the implementation and administration of CTT under an international agreement, such as envisaged in the treaty proposal by Patomäki and his associates.[44]

It should also be noted the tax incidence of CTT could be much deeper and wider than hitherto suggested. An impact of CTT on real economic activities, as opposed to purely speculative financial activities, could be greater than what has been acknowledged so far in literature. Hence, this is an additional factor for considering a very low tax rate. CTT could become indeed a leaky bucket in this aspect, if it discourages people from participating in international trade and investment. However, these possible negative effects of CTT on cross-border trade of goods and services and direct investment should be assessed and balanced carefully in light of the sizeable negative effects that excessively volatile exchange rates can have on international trade and investment flows. The welfare loss, endured by the affected emerging economies as well as the global community at large, as a result of a currency or financial crisis, is immeasurably large. Hence, in assessing CTT as a tax instrument for global finance, it is important to keep in mind that benefits from CTT for achieving a global double dividend for the world economy may not be negligible, in particular if CTT is successfully implemented in conjunction with other measures of capital controls or in a multi-tier system.

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[43] Naturally, CTT implemented partially on the basis of regional tax coordination alone is a second-best solution compared to the case under the global coordination, producing a negative effect, akin to trade diversion effect found in literature on Custom Union.

[44] See Boadway (2003) for economics of global taxation and Sandmo (2003) for similar issues facing environmental taxation.

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