A Feasible Foreign Exchange Transactions Tax

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Abstract

There is virtually no formal infrastructure for trading foreign exchange. Traders in major banks around the world communicate directly with each other or through a broker. By contrast, the infrastructure for settling foreign exchange trades is increasingly formal, centralized, and regulated. This is due to new technology, subject to increasing returns to scale, and to cooperation between trading and central banks to reduce settlement risk.

Settling a foreign exchange trade requires at least two payments, one of each of the currencies traded. Settlement risk is eliminated when payment obligations are matched and traced to the original trade, and then payments are made simultaneously. The technology and institutions now in place to support this make it possible to identify and tax gross foreign exchange payments, whichever financial instrument is used to define the trade, wherever the parties to the trade are located, and wherever the ensuing payments are made.

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A tax on foreign exchange transactions was proposed 20 years ago by Nobel laureate James Tobin (Tobin, 1978). Tobin intended it to increase monetary policy independence and reduce nominal exchange rate volatility when capital flows freely across international borders. Recently Tobin's tax has also been promoted to defend exchange rates from speculative attacks, manage transitions between exchange rate regimes, and finance international public projects (Eichengreen, Tobin and Wyplosz, 1995; Felix, 1995; ul Haq, Kaul and Grunberg, 1996).

Tobin's tax is thought to be impracticable, however, by both those who object to it as an interference in an efficient market and those who support it in principle (Frankel, 1996; Garber and Taylor, 1995; ul Haq et al., 1996). Some think it impracticable because it would have to be applied globally:

> ...enforcement is a big problem. Certainly if some countries adopted the Tobin tax but others did not, the foreign-exchange trading would simply move to where it was not taxed. For this reason, everyone agrees that it would have to be imposed in virtually all countries, large and small. This would require more widespread support than seems possible politically (Frankel, 1996, p. 156).

Even if Tobin's tax were internationally legislated, for example by making it a condition of membership in the International Monetary Fund (Eichengreen et al., 1995), some think it still impracticable because foreign exchange trades are hard to monitor (Garber and Taylor, 1995). The international foreign exchange market is decentralized and does not have a systematic, comprehensive system for recording individual trades. Instead, to regulate private banks and financial institutions and measure capital flows, central banks and supervisory bodies require them to register overnight balance sheet positions. However, in today's 24-hour global marketplace, foreign exchange traders can hide positions by shifting them between branches in different time zones and so always remain within working hours, or they can use derivative financial instruments that do not show on balance sheets (Garber, 1998). Finally, traders can avoid the foreign exchange market altogether by buying and exchanging securities, such as bonds or treasury bills, denominated in different currencies (Garber and Taylor, 1995).

However, every foreign exchange trade has to be settled with an exchange of assets – usually bank balances – denominated in different currencies. Compared to the market for trading foreign exchange, the international infrastructure in place to settle foreign exchange trades is increasingly formal, centralized, and regulated. Can Tobin's tax be applied to foreign exchange trades as they are settled? The answer depends on whether the settlement infrastructure permits a one-to-one correspondence between foreign exchange payments and their originating trades, and on whether the tax can be applied to payments made offshore and to foreign exchange derivatives.

This paper contends that a transaction tax applied to foreign exchange payments is feasible. The contention is based on an analysis of recently established settlement technology and institutions designed to reduce and eliminate settlement risk. "Settlement risk" exists when one party to a transaction makes an

irrevocable payment of a currency, or delivery of a security denominated in that currency, before his or her counterpart makes the opposing payment to complete the exchange of assets and settle the transaction. The risk is that the counterpart will default on the payment. Settlement risk is eliminated when the two payment obligations are matched and traced to the original foreign exchange trade, and then the two payments are made simultaneously. In exchanges of bank balances, this is known as "payment-versus-payment" (PVP) settlement; if securities are exchanged, it is known as "delivery-versus-payment" (DVP) settlement. The technology and enforcement mechanisms that make this possible in various settlement institutions also make Tobin's tax feasible.

1 Overview of the Argument

We evaluate the feasibility of a tax on foreign exchange payments made to settle interbank foreign exchange transactions. We believe that such a tax is now feasible as a result of the recent formalization and centralization of the international infrastructure for making interbank foreign exchange payments. This organization of the interbank foreign exchange settlement system is due to rising foreign exchange trading volume, new payment processing and communications technology, and coordinated efforts between central and major trading banks to reduce settlement risk.

There are three ways for major trading banks and other financial institutions ('banks') to make interbank foreign exchange payments. One way is for banks to make payments to each other in domestic large-scale payment systems, which are overseen by the central bank that issues the currency being paid. Another way is for banks to cancel mutually offsetting amounts owed among banks in offshore netting systems or securities clearinghouses. Finally, banks can use derivative foreign exchange instruments to define the terms of a transaction. If the derivative is of the "contract for differences" (CFD) variety, it does not require payments of principal to settle the trade, but only of earnings from movements in the exchange rate.

There is no other way for major trading banks to make foreign exchange payments, unless they drop out of the interbank market and into the retail market for foreign exchange. There, settlement procedures are informal and decentralized, and transaction costs are correspondingly higher, so much so that retail banks cannot compete with wholesale banks (those that settle in the interbank market) in foreign exchange trading.

A tax on interbank foreign exchange payments is feasible if one can i) identify gross payments made to settle individual foreign exchange transactions; ii) enforce the tax in offshore payment netting systems; and iii) tax implicit payments underlying foreign exchange derivatives. Three corresponding features of the current payment or settlement infrastructure in the interbank foreign exchange market satisfy these requirements.

First, most modern domestic payment systems are Real Time Gross Settlement (RTGS) systems, meaning that they process payments individually. RTGS systems support PVP settlement of domestic financial transactions (where both payments made to settle a transaction are denominated in the domestic currency). That is, domestic payments are matched and traced to the original financial trade, then processed simultaneously.

Domestic payment systems with RTGS capability do not currently support PVP settlement of foreign exchange transactions. This is because settling a foreign exchange trade requires payments to be made in different domestic payment systems, often in different time zones. If the working hours of the two payment systems do not continuously overlap, the payments cannot be matched and processed simultaneously. By mid-2000, however, a central global settlement bank – the Continuous Linked Settlement (CLS) Bank – will open. This bank will operate around the clock throughout the week and, with direct links to numerous domestic payment systems, will support PVP settlement for foreign exchange transactions. In effect, the CLS Bank will be an extension of domestic payment systems.

When the CLS Bank opens, it will support PVP settlement of foreign exchange payments. Then participating domestic payment systems will be able to directly identify and tax individual foreign exchange payments, by matching them and determining if they are denominated in different currencies. In the meantime, since domestic payment systems already support PVP settlement of domestic financial transactions, if a payment in the domestic currency is not matched with another payment in the domestic currency, it can be treated as a foreign exchange payment and taxed.

Foreign exchange netting systems and securities exchange clearinghouses also operate PVP or DVP settlement by netting. Foreign exchange payments or securities submitted for netting are matched and traced to the original trade before netting proceeds for both payments or securities simultaneously. This is needed to maintain the integrity of the netting system since, when payments or securities are accepted for netting, the original foreign exchange obligations between the two parties to the trade are replaced by obligations between each party and the netting system. PVP or DVP netting ensures that the netting system does not take a net creditor, debtor, or open foreign exchange position. Thus, gross foreign exchange payments can be identified and taxed as part of the netting process.

Second, central banks or their supervisory bodies regulate offshore foreign exchange netting systems and enforce those regulations. The same mechanisms can be used to enforce a foreign exchange payments tax offshore.

The right of central banks to individually and collectively regulate offshore netting systems was codified in 1990 as the 'Lamfalussy Minimum Standards' by the BIS Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries. This prerogative of central banks was re-affirmed by the same Committee in 1998. The Standards provide for measures to reduce settlement risk and otherwise promote domestic and international financial stability. Central banks enforce the regulations by refusing non-cooperating netting systems access to the domestic payment system, and by sanctioning banks that are members of both the domestic payment system and the offshore netting system. This is effective because offshore netting systems cannot process a currency payment unless they have access to the domestic payment system. Further, banks are not accepted as members of the netting system unless they trade in the interbank market for foreign exchange, which is to say they participate in a domestic payment system.

Offshore netting systems and offshore netting activity are easy to identify because the technology is subject to increasing returns to scale and therefore requires many participants to be viable. Also, most netting services, whether

in formal systems or informally between pairs of banks, are provided by a single third party, the Society for World-wide Interbank Financial Telecommunications (SWIFT). Nearly all electronic netting activity can be accessed via SWIFT. SWIFT also provides the standard automated communications network for individual banks and for netting and domestic payment systems worldwide, effectively integrating worldwide netting and communications systems.

Third, implicit principal payments underlying foreign exchange derivatives of the CFD variety can be taxed via the derivative contract, wherein the currency principal implicitly traded is specified. The derivative contract is transferred between parties when it is bought and when it is executed. The price of the contract, reflecting expected net profits and risk, would be taxed directly via the payment made to purchase the contract. The implicitly traded principal would be taxed when the contract is executed. Since a derivative is a contract to trade, rather than an immediate trade, it leaves an "audit trail" which can be accessed to enforce the tax. The contract is therefore treated as a virtual payment of principal. Like actual payments, derivative contracts can also be netted periodically, through "netting by novation" in clearinghouses and "master agreements" for "over-the-counter" (OTC) derivatives. Both methods also leave a record of transactions.

Currently there is little use of foreign exchange derivatives other than simple outright forwards and swaps. Other foreign exchange derivatives, such as options, are now normally settled with a transfer of a paper contract. However, should the market for CFD foreign exchange derivatives grow significantly, it is almost certain that the contracts will be prepared and exchanged electronically. SWIFT already offers an electronic confirmation and matching service for OTC derivatives. This means that implicit exchanges of foreign exchange principal, entailed by the purchase of a relevant CFD derivative contract, could be taxed just as explicit exchanges to settle spot market trades would be taxed.

2 A Tax on Interbank Foreign Exchange Transactions

In the retail market for foreign exchange, foreign exchange transactions occur between end-users or between major trading banks and their customers. In the interbank market for foreign exchange they occur among major trading banks. We consider a tax on interbank foreign exchange transactions exclusively for two reasons: first, they are the natural target for a tax that aims to modify exchange rate behaviour; and second, since they have a well-defined and regulated settlement infrastructure, there is little scope to avoid the tax by shifting trading outside the interbank market. Appendix A and the accompanying Figures 1 to 4 outline the settlement infrastructure of the interbank foreign exchange market.

Participants in the interbank market for foreign exchange are called "tier one" banks, while banks in the retail market may be "tier two" or "tier three" banks. Banks achieve tier one status on the basis of their financial and trading importance and their reputation for creditworthiness. This status provides them with direct access to the domestic payment system, which usually means having an account with the central bank. Selection of tier one banks

requires the explicit or implicit agreement of the central bank as the ultimate guarantor of domestic financial stability. Like market-makers on securities exchanges, tier one banks routinely make and accept offers to trade with other such banks, as well as with retail banks. They locate in major financial centres to take advantage of the liquidity available to facilitate domestic currency payments. This is also why banks trading in a foreign currency maintain foreign exchange trading balances in correspondent banks located in a financial centre of the foreign country.

Tier two and lower banks operating in the retail market for foreign exchange do not have direct access to the domestic payment system. They incur substantially higher transaction costs than tier one banks because of lost economies of scale and greater exposure to settlement, credit, liquidity and operating risks. To minimize these additional costs, retail banks keep domestic currency trading balances in correspondent banks with access to the domestic payment system. Retail foreign exchange transactions thus are also eventually settled in the interbank market.

We do not address a tax on open currency positions on overnight bank balance sheets (Kenen, 1996), from which international capital flows are measured. Overnight balance sheets reflect neither within-the-day and after-hours deals nor off-balance sheet trades, such as those using derivatives. These omissions are important because banks tend to avoid taking open overnight balance sheet positions, regarding them as too risky because of the high volume of trading that continues abroad (ul Haq et al., 1996). They do take open currency positions during the day and off balance sheets (Lyons, 1995; Lyons, 1991; Lyons and Rose, 1995; Garber, 1998).

Overnight positions are taken primarily by non-bank financial institutions, such as hedge funds (private closed-end investment funds) and institutional investors (mutual and pension funds, and insurance companies) (IMF, 1993). These are retail transactions processed in the interbank market via correspondent banks. The information gleaned from them and other transactions made by banks in the interbank market determines the daily exchange rate. For these reasons, an effective Tobin tax must be assessed on individual interbank foreign exchange transactions.

3 Settling Interbank Foreign Exchange Transactions

The settlement infrastructure in both foreign exchange and securities markets is evolving in response to rising trading volume, new technology, and heightened awareness of settlement risk. The trend is to formalize and centralize settlement systems in order to exploit economies of scale and reduce or eliminate settlement risk. As a result, settlement systems in the interbank foreign exchange market look much like those of organized securities exchanges, which themselves are becoming more centralized through the sharing of clearinghouses.

There are three ways to settle foreign exchange transactions in the interbank market. Each way is becoming more organized and the links between them are strengthening. The end result will be largely realized with the achievement of full PVP foreign exchange settlement, expected with the creation of the CLS

Bank (CLS Services Ltd., 1998), as described below.

To settle interbank foreign exchange transactions one can:

- make a payment in the domestic payment system of the country that issues the currency being sold;
- cancel offsetting payments between traders in an offshore netting system; or
- use a foreign exchange CFD, where available. CFDs, like domestic financial derivatives, only require payment of profits or losses realized as a result of movements in the exchange rate relative to the notional principal amounts traded.

In practice these settlement methods are used sequentially, in reverse order. For example, a CFD could be used to define a trade, although currently this is very rare (Garber, 1998). Payments arising from numerous trades involving all kinds of financial instruments, CFDs and others, are then netted, typically in an offshore netting system or securities clearing system. Finally, net amounts due are paid in domestic payment systems (Figure 3 illustrates the connection between netting and domestic payment systems for foreign exchange cash transactions; Figure 4 does the same for foreign exchange securities transactions).

Because the various ways to settle interbank foreign exchange transactions are used together, participants in netting systems are typically also members of the relevant domestic payment system, or keep foreign currency trading balances with a correspondent bank that is a member of the domestic payment system. This is also why both PVP foreign exchange settlement and Tobin's tax must be coordinated across settlement institutions to be effective.

3.1 Domestic Payment Systems

The most direct way to settle an interbank foreign exchange transaction is for each party to the trade to make a gross payment, consisting of a transfer of bank balances for the full sale of the currency, in the domestic payment system of the country that issues the currency (Figure 1). This means that the two or more payments needed to settle the transaction are made in different systems, possibly located in different time zones. Unless the payments are coordinated and the operating hours of the payment systems overlap, the payments occur at different times, creating settlement risk. In the case of domestic financial transactions where all payments are denominated in the domestic currency, however, there is no settlement risk if the linked payments are made simultaneously in the domestic payment system.

When PVP foreign exchange settlement is available in domestic payment systems, it will also be possible for gross payments from a single foreign exchange transaction to be matched and processed simultaneously. There are two ways to achieve this in domestic payment systems. One is to have all payment systems operate around the clock, so that operating hours continuously overlap. The other is to create a global settlement institution to process payments continuously, 24-hours a day, with direct links to domestic payment systems. This is the objective of the new CLS Bank, headquartered in New York and

with operations in New York and London. It is expected to open in mid-2000 (Figure 2) (CLS Services Ltd., 1998).

The CLS Bank concept was developed at the urging of the G-10 central banks by a group of major foreign exchange trading banks. These banks organized in 1995 and created CLS Services Ltd (CLSS) in 1997. CLS Bank is designed to settle worldwide trading in all major currencies (Financial Times, 1997). It will eliminate settlement risk by simultaneously making the two or more payments of a foreign exchange transaction on its own accounts. Payments will be final by legal dispensation of the countries whose currencies are being settled. In most cases, CLS Bank will be operationalized by giving it settlement accounts directly with central banks. In other cases, CLS Bank will access domestic payment systems through correspondent banks. Effectively, CLS Bank will be an extension of participating domestic payment systems.

3.2 Netting Systems

A complementary way to settle interbank foreign exchange transactions is to periodically cancel offsetting payments due among banks (Figure 3). Traditionally, this was done informally between pairs of banks, an activity that is hard to systematically monitor. However, since the late 1980s netting has increasingly occurred in formal systems exploiting new technology and economies of scale and using standard processes (IMF, 1996; Summers, 1991). These systems are easy to identify and access.

New technology now permits continuous multilateral netting of payments in the various currencies of members located around the world. The greater the number of participants and currencies, the more effective the netting in terms of the volume and value of payments that can be offset against each other. For this reason, the leading multilateral and multicurrency netting systems – Exchange Clearing House Organization (ECHO) and Multinet International Bank (MIB) – are merging, with each other and with CLS Bank, to create a global, one-stop, foreign exchange settlement institution. Netting systems are now able to settle up to 90 percent of foreign exchange payments submitted to the system, compared to about 25 percent for bilateral netting (Perold, 1995).

Netting software and interfaces are also becoming standardized and automated in both formal systems and in informal bilateral activity. Netting for both is now done by a common third party, SWIFT – a nonprofit cooperative owned by banks – through its Accord service (BIS, 1998a; BIS, 1993). Accord is, in effect, a virtual central netting system encompassing both physically centralized netting institutions (including the new ECHO in London) and physically dispersed netting between pairs of banks. Hence, virtually all netting activity is now done through formal, centralized services.

3.3 Contracts for Differences

A relatively unexploited way to settle foreign exchange transactions is through CFDs. Like some domestic financial derivative instruments, CFDs allow parties to a trade to settle foreign exchange transactions by making a payment equal to the profit or loss due to movements in the exchange rate, without having to exchange principal amounts. This would be especially suited to trades made

for speculative or hedging reasons, which involve round trip flows in the foreign currency.

An early example of a CFD-like foreign exchange derivative is the Rolling Spot currency futures contract introduced by the Chicago Mercantile Exchange in 1993 (Perold, 1995, p. 74). The contract is designed to replicate the net gain or loss from an overnight spot currency position, without requiring payments of the principal amount invested. When the Rolling Spot contract is not used, principal payments are made to purchase, and then sell, the foreign currency. This typically is achieved with a spot/next currency swap (a spot foreign exchange transaction coupled with an opposing one-day forward transaction). By contrast, when a Rolling Spot contract is purchased, one pays only the price of the contract, reflecting the overnight movement in the exchange rate, and the difference between overnight interest rates in the money markets of the two currencies, as specified by the contract. The sum of these two obligations, made in a single payment, is equal to the net gain or loss from an overnight spot currency position.

CFDs or similar derivative instruments are not yet important in the foreign exchange market (Garber, 1998). Whether they can be introduced on a wide scale depends on their suitability to foreign exchange trading conventions. For example, the Rolling Spot contract was created to reduce the transactions costs of an oft-used means of taking a low-risk foreign exchange position.

It also depends on the adaptability of the means of settling foreign exchange derivative contracts so as to realize reductions in transactions costs (BIS, 1998b). Currently most foreign exchange derivatives are traded with a transfer of paper contracts. This is an unwieldy practice that results in frequent and risky confirmation and settlement delays (BIS, 1998a). Significant use of foreign exchange derivatives will almost certainly entail a systemic move to electronic contracts, at least for all but the most complex derivatives. The rapid growth of offshore money markets and the global foreign exchange market was similarly largely due to significant reductions in transactions costs following electronic automation and standardization of communications protocols (Perold, 1995). Use of electronic derivative contracts is already beginning, encouraged by the Bank for International Settlements (BIS). SWIFT's Accord service now offers automated confirmation and matching of electronic OTC derivative contracts (BIS, 1998a).

4 Requirements of a Feasible Transactions Tax

A tax on foreign exchange transactions is feasible if the settlement infrastructure permits one to identify and access gross foreign exchange payments in domestic payment and offshore netting systems and securities exchanges, and to identify and access the notionally traded currency specified in derivative contracts. In light of this and the preceding discussion, necessary and sufficient conditions for achieving these capabilities are three-fold.

- Domestic payment and offshore netting systems must process gross foreign exchange payments or payment obligations, and match them to the originating individual foreign exchange transactions.
- Central banks or their delegates must enforce Tobin's tax in offshore netting systems and securities exchanges.

- CFD-type derivatives contracts must be accessible.

Three features of foreign exchange settlement systems satisfy these conditions. First, both domestic payment and offshore netting systems and securities clearinghouses have technological capability for PVP settlement. Second, central banks regulate offshore netting systems, and have the means to identify such systems and enforce the regulations in them. Third, CFD derivative contracts specifying the notionally traded principal are exchanged when purchased or executed, and can be treated as explicit payments of principal for tax purposes.

4.1 Identifying Foreign Exchange Transactions

For tax feasibility, domestic payment systems must process gross payments individually for two reasons. The first is to match linked domestic financial payments, equivalent to PVP financial settlement, so as to distinguish them from foreign exchange payments. The second is to tax gross foreign exchange payments submitted directly to the payment system. Modern systems that simultaneously process linked gross payments are RTGS systems. The desire to achieve domestic financial PVP settlement is the reason why nearly all G-10 countries – and many others, including Thailand, Hong Kong, Korea, the Czech Republic, and, soon, China – have RTGS payment systems.

RTGS domestic payment systems do not currently support PVP settlement of foreign exchange transactions, for institutional reasons outlined earlier that are unrelated to technological capacity. Thus, it is not currently possible to directly identify payments made to settle a foreign exchange transaction. Only the domestic currency payment passes through the domestic payment system and it is not matched to its counterpart in another payment system. With PVP domestic financial settlement one can, however, indirectly identify and tax foreign exchange payments as those that cannot be matched with a counterpart payment in the same currency. When PVP foreign exchange settlement is available in domestic payment systems, via the CLS Bank, it will be possible to directly identify and tax gross foreign exchange payments.

In RTGS systems, small processing or user fees are already routinely imposed on payments (Summers, 1991). User fees are equivalent in application and effect to Tobin's tax except that they are applied to all payments rather than only to foreign exchange payments.

Most foreign exchange payments are netted before being submitted to domestic payment systems. Hence, Tobin's tax must also be applied to gross payments submitted for netting at the point or during the process of netting. For this, netting systems must process gross payments individually, just as RTGS domestic payment systems do, and must be able to identify payments deriving from foreign exchange transactions.

Netting systems can do this because, as a result of settlement risk controls imposed by central banks and their regulatory bodies, they operate PVP settlement in the netting process. This means that netting systems match multiple payments originating in a common transaction and then net them simultaneously, or not at all.

When a netting system accepts payments for netting, the original foreign exchange payment obligations between the two parties to a foreign exchange trade are legally replaced by payment obligations between each party and the

netting system. That is, the netting system itself incurs payment obligations to confer payment finality, just as when payments are made in domestic payment systems. To eliminate the settlement risk exposure of the netting system and ensure that the system does not make net loans to or receive net loans from its member trading banks (beyond certain limits allowed to enhance settlement liquidity in the netting system), it processes payments associated with a common foreign exchange trade simultaneously, according to the PVP principle. The netting system therefore does not take open foreign exchange positions. The transfer of the payment obligation from the traders to the netting system occurs when the gross payments have been successfully matched (BIS, 1998b; ECHO, 1998). In the process it would be easy to automatically and systematically identify foreign exchange payments and apply Tobin's tax.

Securities exchanges around the world also operate DVP netting and settlement in their clearinghouses, for the same reasons as foreign exchange netting systems (BIS, 1992; Borio and Van den Bergh, 1993; Economist, 1998). It is therefore also technologically easy to apply Tobin's tax to foreign exchange transactions intermediated by an exchange of securities (Figure 4).

4.2 Enforcing Tobin's Tax in Offshore Netting Systems

Although it is technologically possible to apply Tobin's tax in both domestic payment and netting systems, it remains to be shown that the tax can be enforced in offshore netting systems.[1] There are two dimensions to this problem. One is the ability of central banks or their delegates to regulate recognized offshore netting systems. The other is their ability to identify netting systems or less formal netting activity.

4.2.1 Regulating Offshore Netting Systems

The interest and ability of central banks and supervisory bodies to regulate offshore netting systems, and the willingness of netting systems to comply with such regulations, stem from the institutional links between the two systems. Net amounts owed by netting systems to their member banks, and vice versa, are paid in the domestic payment system of the relevant currency. This requires formal and legally defined links between netting and domestic payment systems. Netting systems are often offshore and process multiple currencies, so they maintain such links with numerous domestic payment systems.

Netting systems and their members maintain close ties to domestic payment systems for several reasons. First, net payments made in domestic payment systems have legal status, and the regulator of the domestic payment system can also confer legality on the gross payments that were settled by previous netting. This is important in the event of a default when losses need to be distributed among members of the netting system. Legal status also renders payments made in the netting and domestic system irrevocable. Second, domestic money markets are integrated into the domestic payment system, and the central bank is ready to "lend as a last resort" to safeguard the integrity of the system. Thus, credit and liquidity to support netting and payments are to hand. Third, the domestic financial and payment system is supervised and regulated to ensure

[1] The discussion refers to foreign exchange netting systems, but is equally relevant to securities exchange clearinghouses.

the creditworthiness of member banks and control systemic risk. Only members of domestic payment systems have access to formal netting systems (BIS, 1990).

Central banks or their delegated regulatory bodies are also interested in maintaining ties with netting systems. If a netting system were to fail, the viability of participants who are members of the domestic payment system would be at risk, as would the domestic financial system.

The right of central banks to individually and collectively supervise netting procedures and risk control measures in offshore netting systems, for the purposes of controlling settlement risk specifically and financial stability generally, is codified in the Lamfalussy Minimum Standards and was recently re-affirmed (BIS, 1998b; BIS, 1990). The Standards establish three principles governing offshore supervision, which apply irrespective of the type of financial instrument or the payment netted.

> Firstly, their application should ensure that cross-border systems are subject to review "as systems" by a single authority with responsibility to consider the system's impact in different countries. Secondly, they should provide a cooperative approach to ensure that the interests of different central banks and supervisory authorities are reflected in the oversight of any one system. Thirdly, cooperation between central banks should, in particular, help preserve the discretion of individual central banks with respect to interbank settlements in their domestic currency (BIS, 1990, p. 7).

These principles support both effective coordinated supervision of netting systems and the prerogative of individual central banks to maintain their own interpretation of measures necessary to preserve domestic financial stability. For example, ECHO, based in London, is regulated by the Bank of England in consultation with other interested central banks under the terms of the Lamfalussy Report (CLS Services Ltd., 1998). To process a new currency, ECHO needs the permission of the central bank that issues the currency. This is granted depending on ECHO's settlement risk management safeguards and the legal enforceability of the netting process in the domestic payment system of the currency.

> We [ECHO] therefore need to work very closely with the local regulators on understanding how the local payment system works and to know the law on netting...The central banks have agreed that trades in their respective currencies may be settled within the system and that the rules, operational structures and systems of ECHO are appropriate to their national markets (ECHO, 1998).

Similarly, the CLS Bank will be formed under US Federal law and supervised by the Federal Reserve: "The [CLS] consortium's plan is in response to a demand by central banks that the private sector find a solution to the problems of settlement risk in foreign exchange markets..." (Financial Times, 1997).

Individual central banks reserve the right to unilaterally regulate any offshore netting system that processes its currency to control settlement risk. In accordance with the Lamfalussy Minimum Standards, the US Federal Reserve now requires systems that net obligations denominated in US dollars to monitor and limit net amounts owed by each participant. The Federal Reserve also

requires such systems to have procedures in place to prevent contagion effects in the event that the participant with the largest net amount owing is unable to make the payment. These procedures may include reversing the netting operation yielding the payment due and using collateral or the system's capital to cover the original gross amounts due (Federal Reserve, 1994).

Central banks enforce regulations in offshore netting systems by exploiting the institutional links between them and the domestic payment system.

> To enforce these regulations, the Federal Reserve reserves the right to prohibit the use of Federal Reserve payment services to support fund transfers that are used to settle, directly or indirectly, obligations on large-dollar multilateral netting systems that do not meet the Lamfalussy Minimum Standards. ...Moreover, in order for Federal Reserve Banks to monitor the use of intraday credit, no future or existing privately operated large-dollar multilateral netting system will be permitted to settle on the books of a Federal Reserve Bank unless its participants authorize the system to provide position data to the Reserve Bank on order (Federal Reserve, 1994).

Hence, by refusing to process or settle net payments from non-cooperating systems, central banks can unilaterally enforce a netting tax in offshore systems netting payments of the domestic currency. They can also impose less onerous sanctions on members of the domestic payments system that participate in non-cooperating offshore netting systems.

4.2.2 Identifying Offshore Netting Activity

It is easy to identify and regulate organized offshore netting systems that process a particular currency. For example, the preceding Federal Reserve requirements apply to all systems with three or more participants that net payments or foreign exchange contracts involving US dollars, and have on any given day net payments in any currency or currencies combined of more than US$ 500 million, or routinely process individual payments or foreign currency contracts with a daily average value larger than US$ 100,000. Further, netting systems that meet these threshold criteria are subject to the requirements if they or any of their participants are members of the Federal Reserve System, or if participants' net payments are settled through a Federal Reserve settlement account (one that is on the books of the Federal Reserve), which account belongs either to the netting system, the participants in the netting system, or their agents individually.

It is now also relatively easy to identify less formal netting activity between pairs of banks. This is because most such activity is done by SWIFT, which also provides the netting services of many formal netting systems such as ECHO. In addition, SWIFT provides the standard communications and messaging network among banks, as well as between banks and netting and domestic payment systems (Perold, 1995; BIS, 1993). SWIFT is ubiquitous because it is cost-effective to have such sophisticated services provided by a central third party, and to standardize the services to achieve an automated and seamless interface between all participants in the foreign exchange settlement system. SWIFT's dual function as a virtual netting and interbank communications system enables automatic and electronic recording of the transit, matching, netting and final

settlement history of foreign exchange payments. This would also facilitate coordination of Tobin's tax among netting and settlement systems.

SWIFT's main service is to continuously confirm, store, and deliver payments of bank balances, securities and OTC derivatives. Payments identify the sending and receiving banks and generate automatic status reports. SWIFT's Accord service also does continuous payment and OTC derivative contract monitoring, matching, and netting for individual banks and netting systems (BIS, 1998a; BIS, 1993). Accord provides both parties in a foreign exchange trade with accurate information about the progress of both payments from the time the trade is made through the netting process and the final payments in domestic payment systems (ECHO, 1998). Many domestic payment systems either use SWIFT's technology directly or allow payments sent between two or more banks via SWIFT to be reformatted electronically and channeled through the domestic payment system without further intervention. SWIFT also automatically copies payment information to the operator of the domestic payment system so as to reduce errors or delays. SWIFT is therefore an integral part of domestic payment systems.

4.3 Taxing Foreign Exchange Derivatives

Most foreign exchange derivatives in use today, such as outright forward and swap contracts, do not challenge the feasibility of Tobin's tax, since they have no purchase price and require payments upon execution of the principal amounts of the currencies traded (BIS, 1998a). Foreign exchange options, which have a price and may never be executed, and CFDs, which do not require payment of principal, need closer examination.

The price of a foreign exchange option reflects the expected profit from an open position or the value of the reduction in risk when an open position is hedged. The price or value of the option can be taxed when payment is made to purchase the contract, just as payments to settle spot or forward foreign exchange transactions would be taxed. If the option is executed, the resulting payments of principal would be taxed in the same way.

Principal payments underlying foreign exchange derivatives that are purchased but not executed, such as foreign exchange options, would also be effectively reached by Tobin's tax, via the arbitrage relationship with the synthetic equivalent of the derivative contract. The value of a derivative contract depends on its underlying financial instrument. In the case of a foreign exchange derivative, the underlying instruments are the relevant currencies. Hence, a derivative contract can always be synthetically duplicated by spot or forward foreign exchange transactions, in combination with parallel domestic money market transactions in each of the two currencies. Arbitrage by major foreign exchange trading banks, entailing purchases of both derivative contracts and execution of their synthetic equivalents (but not necessarily in a one-to-one ratio), ensures that both methods of achieving a given foreign exchange position are equally valued, after accounting for differences in transactions costs. Indeed, the more complex derivatives are priced on the basis of this arbitrage relationship.

CFD-type foreign exchange derivatives are specifically designed to obviate the need to make principal payments. However, just as in the case of OTC domestic financial derivatives, standard CFD contracts must specify the face value or notional principal currency amounts traded, on which profits or losses

resulting from movements in exchange rates are calculated. Tobin's tax could then be assessed on the principal implicitly traded, as coded into the CFD contract or electronic template. This treats the CFD contract itself as a foreign currency payment, and will be easier to do as contracts are increasingly made and exchanged electronically, just like explicit payments.

5 How to Implement a Foreign Exchange Transactions Tax

Unlike foreign exchange trading, the global infrastructure for making payments to settle interbank foreign exchange transactions is formal, organized and regulated. It has become so due to new technology, rising trading volume and efforts to eliminate settlement risk. Thus, while there are serious doubts about the feasibility of imposing a foreign exchange transactions tax on foreign exchange trades, it seems feasible to collect the same tax on the payments made to settle foreign exchange trades.

It is now possible to automatically, electronically and seamlessly match gross payments to the originating individual foreign exchange transactions, and tax them both onshore and offshore, regardless of the financial instrument used to define the terms of the transaction or the location of the parties to the transaction. This can be done by coordinating a payments tax across domestic payment systems and offshore netting systems, and treating CFD-type foreign exchange derivative contracts as actual payments of the notional principal amounts traded. The technological means for doing this are available in the RTGS domestic payment and PVP offshore netting systems, linked by the standard interbank and netting communications systems and protocols implemented by SWIFT. The enforcement mechanisms are the same as those now used to ensure PVP netting offshore.

A Notes to the Figures

Figures 1 to 4 illustrate various features of the foreign exchange interbank settlement infrastructure referred to in the text.

Foreign exchange trades are made among banks in financial centres around the world and between banks in different centres. The figures identify financial centres by the currency of the country in which they are located and by the name of the domestic payment system. Fedwire processes dollars in New York; Clearing House Automated Payment System (CHAPS) processes pounds sterling in London; and the Bank of Japan (BOJ-NET) processes yen in Tokyo. Banks within centres are so-labeled: "N" denotes banks and other financial institutions in New York; "L" banks in London; and "T" banks in Tokyo.

Since there will not be any global payment system until mid-2000 and each foreign exchange transaction involves payments in two currencies, trading banks make payments in the domestic payment systems of the currencies involved in the trade (Figure 1). To do so they use "correspondent" banks located in the countries that issue the traded currencies. Correspondents are banks or other financial institutions with access to the domestic payment system for a currency (tier one banks). This means that they have an account with the

central bank that issues the currency, because payments are ultimately made by entries debiting the sender's account and crediting the recipient's account on the books of the central bank. Domestic banks which do not have an account with the central bank – so-called second or third tier banks – use domestic correspondent banks to make payments.

In the figures, correspondent relationships between banks are indicated by bank identifiers having the same whole number digit (to the left of the decimal point). For example, N3 and L3 in Figure 1 have a correspondent banking relationship, as do N1.1 and N1 in Figure 3. There are two second tier banks in Figure 3, both in New York, identified by a digit to the right of the decimal point (N1.1 and N2.1). The others are first tier banks.

In Figure 1 an agreement to exchange bank balances denominated in US dollars and pounds sterling, respectively, is made between traders located in the two associated centres (New York and London). Settling the agreement requires two payments, one of dollars and the other of sterling. In this case, since only one trade is pictured, there are no opportunities to net payments. The transaction is completed when the two payments are made in the associated payment systems, not necessarily simultaneously.

Figure 2 illustrates a similar foreign exchange transaction, this time involving yen and pounds sterling. However, in this case there is PVP settlement of the transaction, whereby the payments of yen and sterling are matched and made simultaneously in CLS Bank. CLS Bank is a central payment system with direct links to offshore netting systems (ECHO) and domestic payment systems.

Foreign exchange payments may also be made by cancelling offsetting payments in offshore systems. In Figure 3 the netting system is ECHO, the most ambitious of the multilateral netting systems. The figure illustrates ECHO's netting of payment obligations created by two foreign exchange transactions. One is a retail trade between tier two banks in New York. This trade is settled for the tier two banks by their tier one correspondent banks, also in New York. The other trade is an interbank trade between tier one banks in New York. The two trades require four payments, three of which are denominated in foreign currency and are sent to ECHO for processing. The payment denominated in domestic currency (dollars) is sent directly to Fedwire in New York. At ECHO there is an opportunity to net payments, since the yen payment by N2 is partially offset by the yen payment from N1. After netting, ECHO makes payments of the remaining amounts due in yen and sterling in Tokyo and London, respectively. Netting results in a volume reduction of one payment and a value reduction of 540 yen in domestic payment systems.

In general, payments of net amounts due from offshore netting systems such as ECHO are made in domestic payment systems (Figure 3) or in CLS Bank (Figure 2). ECHO may have access to domestic payment systems via correspondent banks (Figure 3) or may have direct access, as in the CLS Bank (Figure 2).

For the purposes of Tobin's tax, securities clearinghouses operate much like foreign exchange netting systems. Figure 4 illustrates a foreign exchange transaction settled by an exchange of securities denominated in different currencies. Net payments from securities clearinghouses are also made in domestic payment systems.

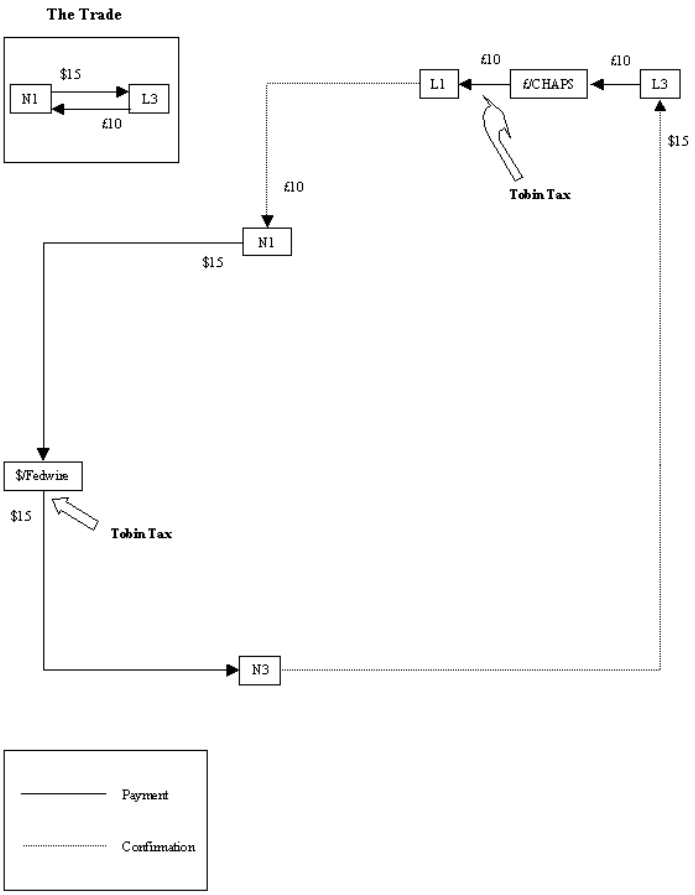

Figure 1: Settling a Foreign Exchange Trade in Domestic Payment Systems

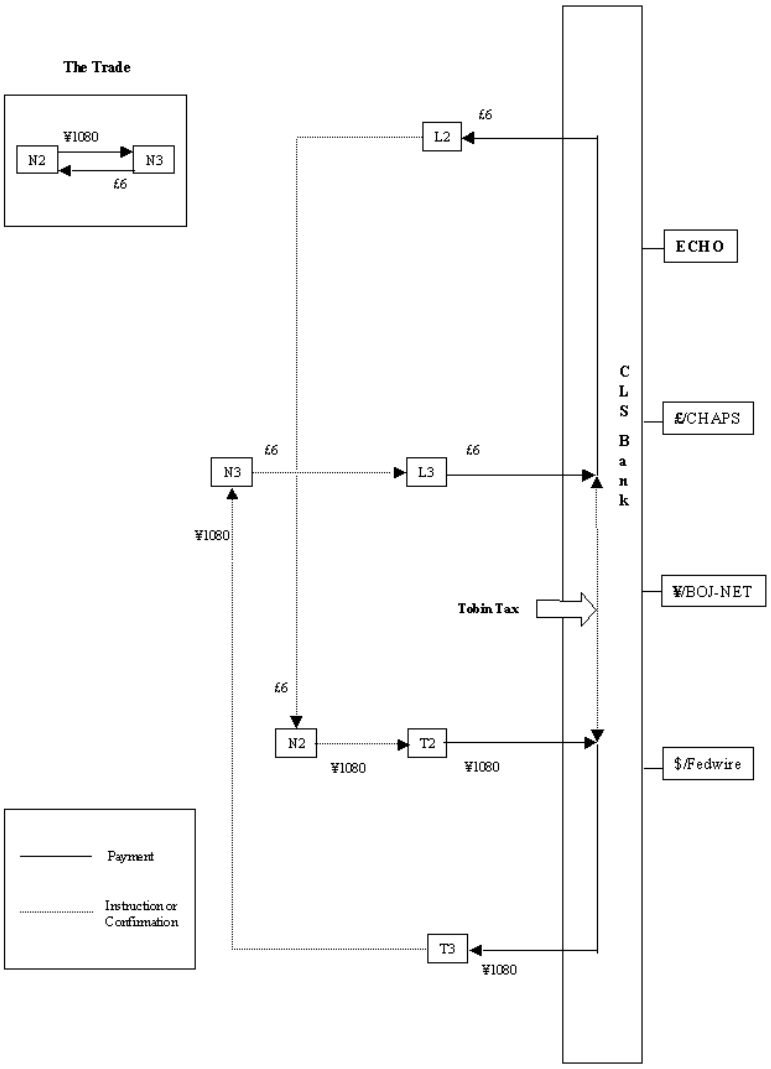

Figure 2: PVP Foreign Exchange Settlement

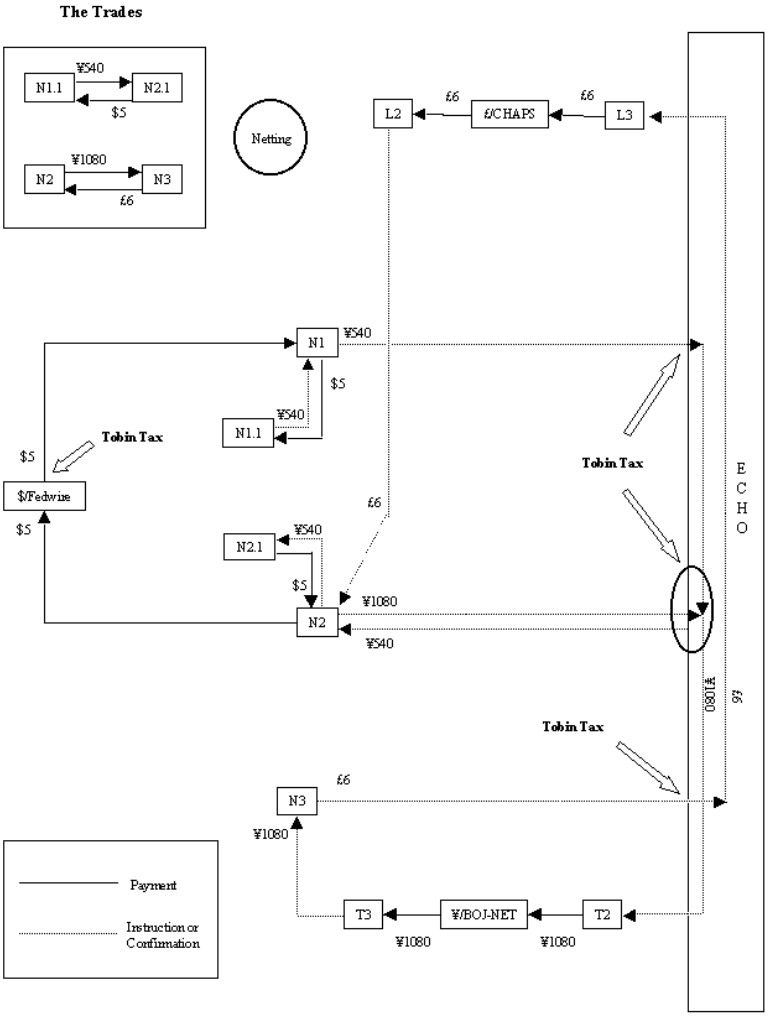

Figure 3: Offshore Netting of Foreign Exchange Trades

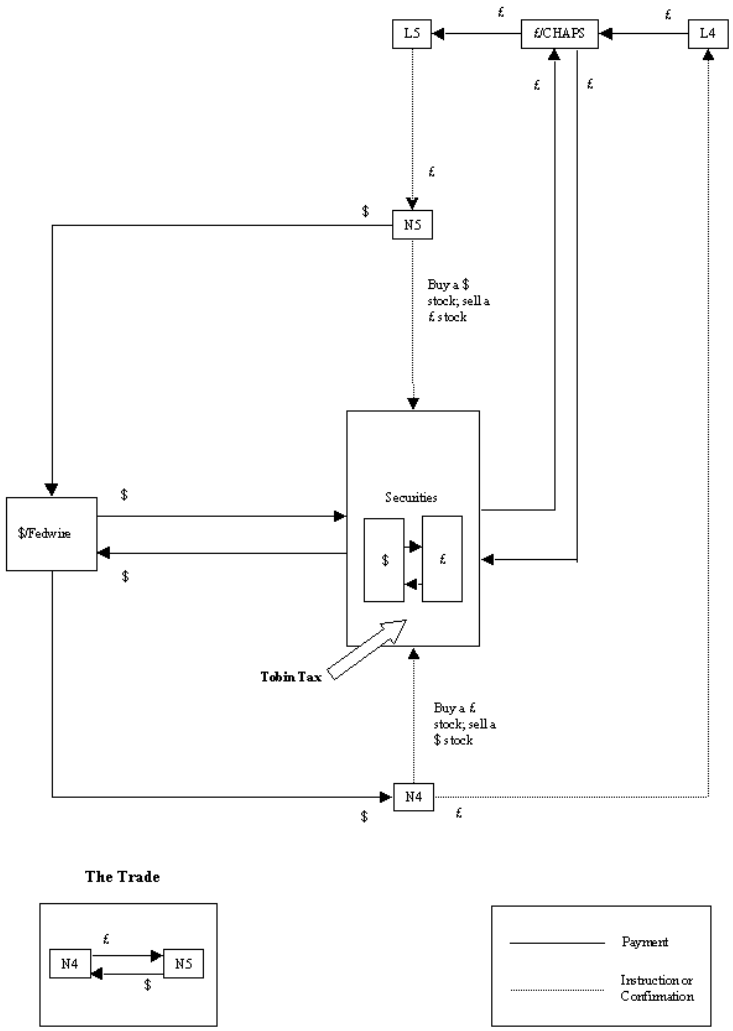

Figure 4: A Foreign Exchange Trade intermediated by a Securities Trade

References

BIS (1990). Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries (Lamfalussy Report), *Technical report*, Bank for International Settlements, Basle.

BIS (1992). Delivery versus payment in securities settlement systems, *Technical report*, Bank for International Settlements, Basle.

BIS (1993). *Payment Systems in the Group of Ten Countries*, Bank for International Settlements, Basle.

BIS (1998a). OTC derivatives: Settlement procedure and counterparty risk management, *Technical report*, Bank for International Settlements, Basle.

BIS (1998b). Reducing foreign exchange settlement risk: A progress report, *Technical report*, Bank for International Settlements, Basle.

Borio, C. and Van den Bergh, P. (1993). The nature and management of payment system risks: An international perspective, *BIS Economic Papers 36*, Bank for International Settlements.

CLS Services Ltd. (1998). An introduction to continuous linked settlement, Brochure.

ECHO (1998). Exchange Clearing House Organization, 10 October 1998, URL http:/www.exchangeclearinghouse.co.uk/.

Economist (1998). 9 May 1998.

Eichengreen, B., Tobin, J. and Wyplosz, C. (1995). Two cases for sand in the wheels of international finance, *Economic Journal* **105**: 162–172.

Federal Reserve (1994). Policy statement on privately operated large-dollar multilateral netting systems, *U.S. Federal Register 59/249 Part IV*, U.S. Federal Reserve.

Felix, D. (1995). Financial globalization vs. free trade: The case for the Tobin tax, *Discussion Paper 108*, UNCTAD.

Financial Times (1997). 27 June 1997.

Frankel, J. (1996). Recent exchange-rate experience and proposals for reform, *AEA Papers and Proceedings* **86**(2): 153–158.

Garber, P. (1998). Derivatives in international capital flow, *Working Paper 6623*, National Bureau of Economic Research.

Garber, P. and Taylor, M. (1995). Sand in the wheels of foreign exchange markets: A sceptical note, *Economic Journal* **105**: 173–180.

IMF (1993). *Exchange Rate Management and International Capital Flows*, Vol. I of *International Capital Markets*, International Monetary Fund, Washington DC.

IMF (1996). *Developments, Prospects and Key Policy Issues*, Vol. I of *International Capital Markets*, International Monetary Fund, Washington DC.

Kenen, P. (1996). The feasibility of taxing foreign exchange transactions, *in* M. ul Haq, I. Kaul and I. Grunberg (eds), *The Tobin Tax: Coping with Financial Volatility*, Oxford University Press, New York, pp. 109–128.

Lyons, R. (1991). Private beliefs and information externalities in the foreign exchange market, *Working Paper 3889*, National Bureau of Economic Research.

Lyons, R. (1995). Tests of microstructural hypotheses in the foreign exchange market, *Journal of Financial Economics* **39**: 321–351.

Lyons, R. and Rose, A. (1995). Explaining forward exchange bias...within-the-day, *Working Paper 4982*, National Bureau of Economic Research.

Perold, A. (1995). The payment system and derivative instruments, *in* D. Crane, K. Froot, S. Mason, A. Perold, R. Merton, Z. Bodie, E. Sirri and P. Tufano (eds), *The Global Financial System: A Functional Perspective*, Harvard Business School Press, Boston, pp. 33–80.

Summers, B. (1991). Clearing and payment systems: The role of the central bank, *Federal Reserve Bulletin* **77**(2): 81–91.

Tobin, J. (1978). A proposal for international monetary reform, *Eastern Economic Journal* **4**: 153–159.

ul Haq, M., Kaul, I. and Grunberg, I. (1996). *The Tobin Tax: Coping with Financial Volatility*, Oxford University Press, New York.