BANK FOR INTERNATIONAL SETTLEMENTS

REPORT ON NETTING SCHEMES

Prepared by the Group of Experts on Payment Systems
of the central banks of the Group of Ten countries

Basle
February 1989

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Foreword

In mid-1988 the Group of Experts on Payment Systems from the G-10 central banks, meeting in Basle, initiated a detailed study of various kinds of internationally related financial netting arrangements. A number of such arrangements are currently operating in various countries, handling obligations and payments arising under foreign exchange and other contracts, and more netting systems are being proposed or developed. The Group was interested to see how far existing or future netting arrangements might contribute to the efficiency of the international financial markets and payment systems, and what effect they might have on counterparty credit and liquidity risks.

This report represents the outcome of that study. It identifies a wide range of issues that may be raised by different forms and structures for netting arrangements, and that therefore need to be considered carefully by central banks and banking supervisors, and also by banks and other institutions participating in those arrangements. For their part, central banks continue to review these complex and difficult issues. This report is made available now to banks, in the hope that they will find it of use in assessing their current operations and associated risks, and in contemplating participation in any future arrangements. Suppliers of telecommunication networks, and other vendors of netting systems, may also find the report of interest.

The report should be viewed solely as the product of study by the Group of Experts on Payment Systems and does not necessarily represent the views of either the central banks of the G-10 countries or the BIS. The members of a Working Party primarily responsible for drafting the report were: Mr P Allsopp (Bank of England); Mr P Fisher (Federal Reserve Bank of New York); Mr I Kuroda (Bank of Japan); Mr J Marquardt (Board of Governors of the Federal Reserve System); Mr W Michalik (Deutsche Bundesbank); Mr Y Oritani (Bank of Japan); and Dr C Vital (Swiss National Bank). Able assistance was provided by Mr K Kearney (Bank for International Settlements).

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1. Introduction

1.1 The Group of Experts on Payment Systems of the central banks of the G-10 countries ("Payments Group") decided, in June 1988, to prepare a report on various kinds of internationally related financial netting schemes that have recently begun operations, or are being seriously proposed. The aim was to assess arrangements that might be used to net out amounts due between banks arising from foreign exchange contracts or from the exchange of payment instructions, on either a bilateral or a multilateral basis. It was perceived that these arrangements should be analysed with a view towards not only their contribution to the efficiency of financial markets and international payments systems, but also their effect on counterparty credit and liquidity risks. Systemic risks were of particular concern. To obtain information for this report, a Working Party discussed technical, legal and financial issues with a number of operators and promoters of interbank netting arrangements during the latter half of 1988. This report draws on those discussions, but does not refer specifically to any particular existing or proposed netting arrangement.

1.2 This report analyses netting arrangements from two distinct vantage points: first, as models of how credit and liquidity risks can be allocated in different netting and settlement structures, and, second, as examples of the difficult international financial policy issues raised by the development and operation of "cross-border" (or "offshore") payment systems and contract netting arrangements. The analytical body of the report focuses upon credit and liquidity risk issues. However, as noted in the "Summary and observations" section of the report and throughout, the operation of these arrangements in the cross-border context challenges certain critical assumptions which underlie current perceptions of the operation and supervision of international banking markets.

1.3 It should be noted at the outset of the report that a distinction is usually drawn between netting arrangements for obligations, such as foreign exchange contracts, and those for payment instructions. For many purposes the rights granted under foreign exchange contracts differ in nature from those conferred by payment instructions. Moreover, a "spot" foreign exchange contract may have a value date one or two days hence, while a payment instruction may be for "same-day" value when it is created. Nevertheless, for the purposes of this report, a foreign exchange contract and a payment instruction share the characteristic that both can be subject to the same types of netting techniques. The report relies on this fact in its analysis of risks in institutional forms of netting.

1.4 It should also be noted that a multilateral foreign exchange netting arrangement, which would typically comprise participants from a number of countries, could in principle be used as a payment system. Thus concerns about payment systems may, in certain circumstances, extend directly to foreign exchange netting arrangements.

1.5 This report is in seven sections. Following this introduction, Section 2 draws out some key observations by the Payments Group, some of which point to issues beyond the scope of the report.

Section 3 analyses the types of financial risk to which participants in clearing systems are exposed, while Section 4 describes the reasons why banks may enter into netting arrangements and why a range of suppliers may offer such facilities. Section 5 contains a brief analysis of the legal basis for netting. Section 6 then discusses four particular institutional types of netting arrangement and analyses their different risk characteristics. Finally, Section 7 presents a global perspective of the nature of the liquidity risks facing participants in these netting schemes. An annex contains a glossary of certain terms used in the report: it is intended to bring an element of consistency into a field in which terminological inconsistencies have hitherto caused undue confusion.

2. Summary and observations

2.1 Banks currently have strong incentives to lower both counterparty credit exposures and interbank payment flows. These incentives appear to be inducing "structural innovations" in interbank clearing and settlement procedures, which in part are taking the form of increasingly frequent proposals for interbank netting arrangements. Although the focus of this report is on changes in the credit and liquidity risks produced by the netting of interbank transactions, the Payments Group believes that these structural innovations have potentially broader policy implications. In particular, netting arrangements may produce significant changes in the financial character of affected interbank markets and may also change the cross-border relationships between national banking systems. These relationship changes raise questions about the extent and quality of central banks' oversight and supervision of settlements in their currencies, and about the supervision of the evolving "offshore" payment systems as such.

Efficiency and risks of netting

2.2 ***"Efficiency" of netting***. Incentives to reduce credit exposures and payment flows are coming from several quarters. First, there are transaction costs, including fees and communications expenses, for the settlement of foreign currency transactions; there are also implicit costs of holding balances and implicit or explicit costs of obtaining credit to effect settlements. As the volume of transactions continues to increase, banks are under pressure to reduce all these costs. Second, there is an increased awareness among bankers of the general desirability of reducing counterparty exposures. Third, and partly in response to the forthcoming implementation of the Basle Capital Agreement,[1] bankers are attempting to reduce capital charges associated with their credit exposures wherever possible. At the

[1] International Convergence of Capital Measurement and Capital Standards. Committee on Banking Regulations and Supervisory Practices, Basle, July 1988.

same time, providers of communications and computer services are seeking to expand their business with the financial community, and perceive these incentives as an opportunity to do so.

2.3 Mechanisms for netting interbank contracts and payments can produce desirable efficiencies in the interbank markets and payment processes. However, narrowly defined efficiencies need to be balanced against the costs associated with the credit and liquidity risks that may be allocated or reallocated by a particular netting and settlement structure. The overall social efficiency of a netting arrangement cannot be judged solely on the basis of apparent reductions in communications expenses, or even on the basis of reductions in credit routinely required to settle a given volume and value of transactions. Judgements about overall efficiency should include consideration of the impact of netting arrangements not only on the level of counterparty risk to the participants but also on the overall level and allocation of financial risk to the banking system as a whole. "Externalities", often resulting from systemic risks, need to be evaluated. Moreover, if the shifting of risks between parties, and across borders, is not clearly defined and understood, interbank netting arrangements may create uncertainty by obscuring the actual allocation of risks.

2.4 The shifting of risks that can be caused by netting arrangements can be particularly troubling where the transaction cost efficiencies are enjoyed by banks located in one country, but the credit or liquidity risks associated with the settlement of payments resulting from that netting system may be experienced in the banking system of another country. This would be the case, for example, where the netting of payments between banks in a given currency is conducted outside the country of issue of that currency but the final settlement of the resulting net amounts occurs in the domestic payment system for that currency.

2.5 ***Risk assessment of netting structures***. Several types of netting arrangements were analysed by the Working Party. Some were organised to effect bilateral netting, others to effect multilateral netting. Some rely on the netting of financial positions ("position netting"), but in such a way that parties remain liable for the settlement of gross amounts. Others contain or propose provisions that, if legally enforceable, would make participants liable for the settlements solely of netted amounts ("netting by novation"). One type of arrangement would establish a clearing house that would be substituted as the central counterparty in deals submitted for netting by participants in the arrangement, in order to effect a binding multilateral netting among those participants ("multilateral netting by novation and substitution").

2.6 Based upon the analysis in Section 6, the Payments Group believes that certain general conclusions can be drawn with respect to the allocation of credit and liquidity risks that are produced by different institutional forms of netting. Thus, assuming the legal enforceability of netting agreements, the Payments Group believes that arrangements which net outstanding financial or

payment obligations can be ranked as follows, in comparison with the benchmark case, where no netting takes place:

(i) bilateral position netting reduces liquidity risks to counterparties, and perhaps others such as correspondent banks, relative to the case of no netting; but it leaves counterparty credit risk unchanged, or may induce increases in risk if net exposures are treated as if they were true exposures;

(ii) bilateral netting by novation reduces both liquidity and credit risks to counterparties, and possibly to the financial system (other things being equal), relative to the cases of no netting and bilateral position netting;

(iii) multilateral position netting may reduce liquidity risks relative to the cases of no netting and bilateral netting, under certain circumstances; if significant defaults occur, liquidity risks may be higher; credit risks are the same as, or may be larger than, in the case of no netting; credit risks are greater than in the case of bilateral netting by novation;

(iv) multilateral netting by novation and substitution has the potential to reduce liquidity risks more than any other institutional form, but this depends critically on the financial condition of any central counterparty to the netting; if the liquidity of a central counterparty is weak, the liquidity risks of this institutional form may be greater than in the case of bilateral netting by novation; the credit risks of this institutional form are generally less than in other forms that have been considered, subject again to the identity and condition of any central counterparty.

2.7 ***Validity of netting agreement***. A key assumption in arrangements to effect a binding netting of payments or obligations is that the netting agreements are legally valid and enforceable. This assumption undoubtedly extends to many other netting arrangements developed or proposed in the last several years. If the assumption is incorrect for arrangements governed by the laws of various financial centres, then credit and liquidity risks can be much larger than otherwise believed. Moreover, in order to evaluate the risks of any actual or proposed netting system, central banks and bank supervisors will need to examine the totality of operational, financial, legal and other institutional details relating to the system.

Broader policy issues

2.8 The Payments Group believes that, in addition to the allocations of credit and liquidity risks produced by different netting arrangements, attention needs to be focused on additional policy questions which may be raised by the development and operation of these systems.

2.9 ***Monetary implications***. Instead of the exchange of individual financial obligations for payment in money, most netting systems operate so that one financial obligation is exchanged for a similar, offsetting obligation, and only the net difference is settled in money. In essence, two counterparties, or a whole netting group, can achieve the same financial position through netting that would otherwise have required a large number of payment instructions and accompanying money flows to settle those instructions. Thus systems for the binding netting of foreign exchange and other

financial obligations provide a service that is a very close substitute for the function of money as a medium of exchange.

2.10 Over time, the large-scale development of these netting arrangements may produce both a quantitative and a qualitative change in interbank payment processes. Bank demand for both intra-day and overnight balances held at central banks, and possibly credit from central banks, may be affected. The spread of netting arrangements may also affect the prospects for the development of formalised intra-day interbank credit markets, which are discussed from time to time in several countries. Moreover, central banks will need to look beyond payment systems in order fully to assess questions of integrity and efficiency in key monetary arrangements.

2.11 ***Financial implications***. A widespread development of clearing house or similar multilateral arrangements will have the potential to change significantly the structure of interbank credit relationships. To a degree, banks are already substituting trading in organised futures markets, such as the Euro-dollar futures markets, for interest and exchange rate positioning in "cash" or deposit markets. To this extent, netted claims on clearing organisations have already replaced gross interbank credit exposures in the deposit markets.

2.12 The interbank foreign exchange markets, and other markets such as the swap market, are "over-the-counter" markets rather than organised exchanges. However, the development of multilateral clearing houses for those markets, along the lines currently being proposed, will affect credit exposures in a manner similar to a shift towards organised exchange trading. The ultimate counterparty will become a clearing house or clearing corporation, and credit exposure and risk must then be judged in the light of the financial resources of the clearing house.

2.13 The Basle Capital Agreement attaches a zero risk weight to bank claims on a clearing corporation associated with an organised financial exchange, provided that they are subject to daily margining. Claims on any clearing house which was established to net foreign exchange, or other over-the-counter, interbank transactions would not qualify for this treatment, at the very least because they would not be associated with an "organised" exchange. However, some believe that, in principle, although not necessarily in practice, such clearing houses could have similar risk characteristics to clearing corporations for organised exchanges.

2.14 ***Implications for supervision and central bank oversight***. A long-standing concern of central banks has been to ensure that the foreign establishments of multinational banking organisations are adequately supervised. The Basle Concordat[2] allocates responsibility for the supervision of banks' foreign establishments between home-country and host-country authorities. However, cross-border or

[2] Principles for the supervision of banks' foreign establishments, Committee on Banking Regulations and Supervisory Practices, Basle, May 1983.

offshore multilateral netting arrangements present several complications for the allocation of supervisory responsibility, and indeed they may currently escape supervision or oversight by any authority.

2.15 First, formalised netting arrangements and offshore payment systems are qualitatively different from individual banking organisations. Such arrangements can best be thought of as groupings of individual banks with closely interrelated credit and liquidity risks, and which have common rules and operating procedures. Because of the inherent systemic risks created by the shifting of risks among participants, providers and settlement agents in multilateral systems, it may be necessary to consider whether supervisors should examine the credit, liquidity and operational risks at the level of each system as a whole.

2.16 Second, the international sharing of supervisory responsibility for such systems may be problematic. For example, the host-country authorities for an "offshore" system are likely to have important interests in overseeing credit, liquidity and operational risks in respect of the institutions and markets within their jurisdiction. The home supervisors from various countries for the multinational participants in that offshore system will also have interests in any system that affects the solvency and liquidity of institutions they oversee. At the same time, the central bank for the country of issue of any currency cleared on that offshore system will have various monetary or supervisory interests in the efficiency and integrity of the markets which use its currency. In a multi-currency clearing house arrangement there will be more than one relevant "country of issue". Moreover, offshore clearing need not be provided by a banking institution at all, and participants in such arrangements need not be banks. For example, the netting function of a multilateral arrangement could be provided by a communications carrier which may not be based in either the country of the participants or the country of issue of the currency, while, in principle, participants could include both banks and other kinds of financial institutions, or even non-financial companies. The appropriate division and sharing of supervisory responsibilities in such cases will be extremely problematic.

2.17 A further problem for the supervision of clearing house or similar arrangements would be raised in some countries by the overlapping jurisdiction of domestic supervisory authorities. As stated above, such clearing houses are likely to have characteristics that are similar to clearing corporations for organised securities and futures exchanges. Thus, in countries where the authority to supervise banking, securities and futures activities is divided between two, or more, official bodies, jurisdictional questions may arise. In addition, if different supervisory standards or methods are applied by different bodies, then different regulatory solutions in different countries may imply differences in oversight and risk across otherwise similar clearing houses in different countries.

2.18 ***Central bank services***. A number of proposals to establish multilateral foreign exchange netting arrangements are in the course of development. Part of these proposals could be that central

banks should provide settlement and other services to facilitate the development and operation of such arrangements. Requests for such services would raise a variety of issues for individual central banks, including, among others, the legal rights of special clearing institutions to obtain services; the legality and propriety of establishing central bank accounts for non-residents; night-time settlements; night-time funds transfers to accommodate settlements; access to central bank credit; and the use of collateral.

3. Types of financial risk

3.1 Participants in both clearing systems and typical financial markets are exposed to several types of financial risk. First, they bear ***credit risk***. This is the risk that a counterparty will not meet an obligation when due, and will never be able to meet that obligation for full value. The bankruptcy of a counterparty is often associated with such difficulties, but there may be other causes as well. In a ***payment*** netting system, losses from defaults due to the bankruptcy of counterparties can be measured as the principal amount due less recoveries from defaulting parties. Forgone interest can also be an important loss. In an ***obligations*** netting system, losses from the default of a counterparty would typically be calculated from the replacement costs of one or more contracts that are not settled. If, however, one party to a contract defaults after having received settlement payments from another party, but before making required counter-payments (in the same or another currency), the loss would again be for a principal amount (less recoveries).[3]

3.2 Second, participants bear ***liquidity risk***. Narrowly defined, this is the risk that clearing, or settlement, payments will not be made when due, even though one or more counterparties do have sufficient assets and net worth ultimately to make them. For example, a temporary inability to convert assets to cash, operational difficulties of various kinds, or the inability of correspondents to perform settlement functions will all create liquidity problems.

3.3 The risk that a party will default on clearing obligations to one or more counterparties is sometimes referred to as ***settlement risk***. This risk may contain elements of either credit risk or liquidity risk, or both. The usage of the term "settlement risk" varies considerably, and may also depend on the situation being analysed. For purposes of clarity in this report, the term is not used or discussed further. Instead, the concepts of credit or liquidity risk are employed when one of these is the ultimate financial risk being addressed.

[3] Administrative and similar expenses are usually associated with any defaults.

3.4 The concept of liquidity risk is usually defined more broadly, with reference to a whole range of obligations that participants in financial markets incur, including payments due within specific clearing systems. The risk is that a financial market participant will have insufficient liquid resources to make ***all*** its payments on the due date, including its liabilities in a payment system. This notion is useful because it implicitly recognises that liquidity problems in a payment system can add to, or be part of, much larger liquidity difficulties in an economy.

3.5 Third, payment systems and financial markets generally can be subject to ***system***, or ***systemic***, ***risk***. This is the risk that the inability of one participant in a payment system, or in the financial markets, to meet obligations when due will cause other participants to fail to meet their obligations when due. For some analytical purposes it is possible to distinguish "systemic liquidity risk" from "systemic credit risk". Of the various kinds of risk, it is usually systemic risk in some form that is of most concern in assessing the risks associated with payment systems.

4. The market for netting arrangements

4.1 Banks and others enter into netting arrangements in respect of their obligations to pay and receive sums of foreign currencies for at least four separate purposes. The first is to reduce the number of payment messages that have to be exchanged between the counterparties and their correspondent banks in the country of each relevant currency. This lowers message transmission costs, and possibly handling costs, as well as the chance of mistakes by correspondents. It also provides a simple audit and reconciliation trail.

4.2 The second purpose is to reduce both counterparty credit risk and liquidity risk. This can be done by entering into formal agreements resembling, in many respects, a legal "right of set-off" between a banker's liabilities to his counterparty and his claims on that counterparty. A legally enforceable netting scheme will reduce a bank's credit risk on its unsettled foreign currency transactions from a gross amount to a net amount, on either a day-by-day basis or the basis of the total position, depending on the form of netting adopted.

4.3 The third purpose is to reduce the need for intra-day liquidity or credit used to bridge timing gaps between gross payments and gross receipts. The need for such intra-day liquidity can be particularly acute if payments must be sent and received over interbank systems that employ or are subject to binding credit or intra-day overdraft constraints. Netting can also reduce the need to hold liquid clearing balances, on an overnight basis, with foreign correspondents, or at the central bank of the currency in question.

4.4 The final purpose for which a netting scheme might be entered into relates to the implementation of the Basle Capital Agreement. By effecting a binding reduction in its on- or off-

balance-sheet assets and/or liabilities, through netting or otherwise, a bank may be able to minimise the amount of free capital required to be allocated to that segment of its business.

4.5 These various demands for netting schemes are being met by an increasing supply. Advances in information technology have made it feasible for interbank networks, computer and telecommunication companies and other suppliers to offer netting facilities on a competitive commercial basis. Automated handling of payment messages, reliable processing systems and timely communications all contribute to a situation where substantial operational benefits can be offered by the suppliers, quite apart from any reductions in credit risk or liquidity risk that can also be obtained.

5. Legal forms of netting

5.1 Several legally distinct forms of netting can be applied to conventional foreign exchange transactions, spot or forward, and to a variety of other financial obligations and payments.[4] ***"Position netting"*** is a form of offset under which two banks informally arrange to make one net payment between themselves, for each currency and value date for which several amounts are due. (This is also described as "payments netting" or "bulking of payments".) Because there is no change in their contractual obligations, the credit risks between the parties are unchanged, and they remain legally obligated for the gross amounts of their transactions. However, this does reduce the number of settlement messages and the amount of funds needed for routine settlement of their transactions.

5.2 Counterparties may also agree to a binding netting of their bilateral payment obligations. Two banks can recognise that they have various obligations to pay each other sums in a given currency on a single date, and enter into a formal agreement to accept a single net amount, to or from one another, in discharge of those payment obligations. This can be termed legally ***"binding payments netting"***. This type of netting does not directly effect a discharge of the underlying foreign exchange contracts or other obligations which have generated the payments being netted, and the parties remain obligated to settle the gross amounts of these obligations.

5.3 ***"Netting by novation"*** provides a means of reducing counterparty credit risk by effecting a discharge of each individual foreign exchange contract, or other obligation, as it is netted. (This can also be referred to as "obligation netting".) Two banks can enter into a formal agreement under which one running net amount will be due between them for each future value date in each currency they trade. This is achieved by netting the second, and each subsequent, deal with the first for that particular date and currency, and thereby effecting a new (novated) contract for the net amounts. This

[4] In addition to the legally distinct concepts involved in these various netting arrangements, their precise form will vary with the laws of the countries in which they are established.

novation process may take place automatically within the trading day, on the exchange of confirmations between the two banks: the bilateral agreement can provide that, at the instant the confirmations are matched, the previous contracts shall have been satisfied by means of the novation process and are therefore extinguished and replaced by the novated contract. This process can be repeated an infinite number of times until the cut-off time for a particular settlement date. Then settlement instructions, for the final net amounts, are sent to the participants' correspondent banks in the countries of the currencies concerned.

5.4 Netting by novation aims to satisfy all the purposes described in Section 4 above: in particular, it aims to reduce liquidity risk, on both the counterparty and its correspondent bank, and to reduce counterparty credit risk from a gross to a net basis in respect of each separate forward date. The utility of netting by novation, in terms of reducing these risks, depends entirely on the legal enforceability of the novated net contract having superseded the original gross contracts so that they cannot be selectively revived by a receiver or liquidator of a counterparty that is closed.

5.5 A bilateral agreement for netting by novation can be drawn up so as to provide that the novated net amounts due on each separate forward date for each currency form a single stream of payments due under the master contract between the two banks. If such an agreement is upheld, any receiver or liquidator of one of those banks will be unable to be selective in terms of the currencies or the payments to be received or made on the individual forward dates.

5.6 Although netting by novation is, in essence, a bilateral mechanism, it can be operated on a multilateral basis within a larger group of banks, but in that case a third party may be employed - for instance, some form of clearing house - to undertake the novated net obligation as counterparty to each participating bank. This process is described as ***"novation and substitution"***.

5.7 ***"Netting by close-out"*** relates to the treatment of future obligations between two banks when a defined event of default, such as the appointment of a receiver or liquidator, occurs. Two banks can enter into a formal bilateral agreement stipulating that, if a close-out event occurs, the present value of all future amounts due between them will be calculated to provide amounts due that day, and then be recalculated into a base currency to produce one single payment due to or from the closed bank, which the receiver or liquidator is obliged to honour, so as to satisfy all the outstanding obligations between the two banks.[5] Close-out can apply either to gross liabilities and claims arising under the original contracts between the two banks, or to their novated net liabilities and claims, in the event that they both also participate in an agreement to net by novation. Close-out provisions can be found in both bilateral and multilateral netting arrangements.

[5] It is the obligation to make this payment that, in essence, distinguishes a close-out agreement from the "single stream of payments" concept described in paragraph 5.5.

5.8 Since netting by close-out only operates upon the occurrence of a defined event, it can have no impact upon the number of payment messages passing between the participating banks and their correspondents in their normal trading relationships. Equally, it has no impact on liquidity risk or credit risk in respect of the counterparty's correspondent bank for the currency in question; nor on any intra-day timing difficulties which might affect the normal settlement process.

5.9 In addition to netting under contractual arrangements, parties may enjoy ***legal rights of set-off*** vis-à-vis immediate counterparties to defined financial obligations. These rights come into play in calculating amounts due between parties in the event of default, typically including bankruptcy, and have the effect, if applicable, of netting amounts due on eligible obligations. The existence and enforceability of these rights, however, are subject to a significant degree of uncertainty, since they are typically determined under local law, through litigation, bankruptcy and other legal proceedings. In addition, the existence and scope of such rights will vary from country to country. Thus, although rights of set-off have the potential to reduce certain gross credit exposures between counterparties to net amounts, the dependence on such rights is likely to be subject to greater uncertainty, and therefore credit risk, than dependence on legally enforceable netting contracts.

6. The institutional forms of netting studied, and their risks

6.1 The Working Party studied a number of existing and proposed interbank netting arrangements for both foreign exchange obligations and currency payments. Consistent with the legal forms of netting discussed above, the risk characteristics of the arrangements studied can be divided into four distinct institutional forms, or types, which differ with respect to their bilateral or multilateral nature, the legal character of the net amounts due, and the existence of a central counterparty. These forms are: bilateral position netting, bilateral netting by novation, multilateral position netting, and multilateral netting by novation and substitution. Interbank communications systems can be considered as constituting an institutional arrangement that is either separate from the netting process, or a part of the netting process.

6.2 An additional arrangement, which could be called "no netting", provides a benchmark against which to assess credit and liquidity risks of the various netting systems. In the case of no netting, it is assumed that gross obligations remain outstanding until they are due and discharged by settlement. The ***same*** assumption is made with respect to both foreign exchange obligations and payments.[6]

[6] Some would argue that the case of "no netting" for payment instructions is the situation in which instantaneous settlement and discharge of payments is possible over interbank payments systems operated by central banks, and for

6.3 Various informal foreign exchange netting arrangements have traditionally been employed in certain financial centres. These arrangements, which have usually resulted from efforts to reduce the numbers of payments to be made between counterparties, have included ***bilateral position netting***. For example, on the value date of a group of foreign exchange contracts, pairs of counterparty banks may calculate net amounts due to each other, and settle the contracts bilaterally with payments for net amounts. The legal implications of these arrangements, however, have typically been unclear, so there is considerable uncertainty about legal liability to pay gross or net amounts in the event of a counterparty experiencing financial difficulties. A widely held assumption is that parties remain responsible for gross amounts in the event of such difficulties.

6.4 Position netting can provide economic efficiencies relative to arrangements involving no netting for pairs of counterparties that exchange sizable numbers of obligations, including payments. Settling net positions clearly reduces the number of settlement payments to be made between counterparties, and thus may reduce costs if the price of the netting service does not overwhelm savings from reduced numbers of payments. There may be other efficiencies. For example, reduced numbers of payments, reductions in errors, and stricter adherence to settlement deadlines may all produce savings by reducing the need to maintain costly balances, or obtain credit, to meet settlement obligations.

6.5 In theory, credit risks are unchanged by position netting relative to the case of no netting since the gross obligations underlying the netted amount are not extinguished. Any netting of gross obligations under local laws of set-off would seem to be equally applicable to the cases of no netting and position netting, although no legal analysis has been seen to this effect.

6.6 In practice, there is a danger that netted amounts will be treated as if they represented the actual credit exposure between pairs of counterparties for the purposes of establishing dealing and other credit lines. If this is done, counterparties run the risk of having very large gross exposures, even though net exposures appear to be within prudent bounds. Credit risk for the financial system as a whole could also increase as a consequence.

6.7 Under normal conditions liquidity risk is clearly reduced for counterparties through position netting. This is because the netting calculation allows settlement payments due from a counterparty to be used to offset, or settle, payments due to the counterparty. This contrasts with the case of no netting in which individual settlement payments must be exchanged for a large number of gross obligations, and various kinds of delays and disruptions in making any of the settlement payments can adversely

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some purposes this is a useful assumption. In this report, however, it is assumed that gross payments and netted payments are to be settled at the same time. This assumption allows the report to focus on the effects of netting ***per se*** on risk, holding constant the time of settlement and discharge. Reducing the time until discharge of an unsettled payment would normally be expected to reduce the intemporal credit risk arising from the unsettled payment itself.

affect the liquidity position of a counterparty. Moreover, the interruption of these planned settlement payments can affect directly the liquidity position of correspondent banks, and indirectly the position of third parties. It must be emphasised that these liquidity risks are usually managed adequately in the money and credit markets, although at a price to those involved that may make netting financially attractive.

6.8 Services offering ***bilateral netting by novation*** may be limited to the provision of model netting contracts, or may also provide communications links and accounting facilities that allow participants to match and confirm transactions and to record novated net amounts.

6.9 Arrangements employing bilateral netting by novation appear to offer similar efficiencies to bilateral position netting, although the costs of developing and negotiating the netting arrangements are not inconsiderable. Beyond these narrow efficiencies, arrangements for bilateral netting by novation can provide significant reductions in credit risk compared with position netting or no netting. Credit exposure may be reduced from a gross to a net amount. Future amounts due from a counterparty in a variety of currencies may be reduced to a "single stream of net payments" in one currency, or in some cases, as in those triggering close-out provisions, to a single net amount due in one currency. (The "single stream of payments" and close-out concepts are discussed briefly in paragraphs 5.5 and 5.7 above.)[7] The accomplishment of this reduction in exposure, however, depends entirely on the legal enforceability of the novated net contract as having superseded the original gross contracts so that they cannot be selectively revived by a receiver of a closed counterparty. Netting by novation also generally reduces liquidity risk, compared with bilateral position netting, since net amounts due cannot be "unwound" into individual obligations on a gross basis.

6.10 Vendor-provided ***proprietary communications systems or networks*** can be used to facilitate netting between subscribers to the network. A number of large correspondent banks maintain their own networks and offer services to their bank customers. There are also important co-operative and non-bank-run systems for international interbank communications. These networks could easily offer to tabulate gross and net amounts due between pairs of subscribers, for relevant currencies and value dates, with this information being provided to the subscribers so as to facilitate reconciliations and bilateral net settlements; these facilities could also be supplied on a multilateral basis.

6.11 These networks may not themselves formalise any netting arrangements. They may, however, offer participants a strong operational and commercial incentive to adopt bilateral position netting, possibly without a full understanding of the underlying issues, as discussed in paragraphs 6.3 to 6.7 above.

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[7] The reduction in counterparty credit risk should not be regarded as coming at the expense of other creditors to a particular institution, as long as parties intend to deal with each other on a net basis and this is well known in financial markets.

6.12 Another form of netting is that for ***multilateral position netting***. This is typically found in a multilateral system, with special communications and accounting arrangements. "Clearing accounts" may be provided to participants by a clearing or settlement agent, who may hold balances for or provide credit to the participants, in order to facilitate settlements. The employment of a single central clearing account is also a logical possibility, as are other arrangements for accommodating settlements. The essence of multilateral netting is that net amounts due to or due from each participant vis-à-vis the clearing group as a whole, for value on a given day, are calculated and then settled by transfers of monetary balances from net debtors to net creditors. However, as in the bilateral case, the settlement liability of participants is not limited to net amounts when the group undertakes multilateral position netting.

6.13 If insoluble settlement difficulties arise because a net debtor bank cannot fund its outpayments, the rules of the system often require or permit the "unwinding" of payments to and from the participant(s) having difficulties, in order to arrive at multilateral net positions for the remaining participants that can ultimately be settled on the working day following the originally scheduled settlement. It is because of this possibility of "unwinding" that such a system has typically to be considered an arrangement for multilateral position netting. Moreover, in such circumstances, the status of gross payment instructions and net positions under various relevant national laws is not entirely clear.

6.14 In the abstract case of multilateral position netting, all gross financial obligations (such as foreign exchange contracts) or payment instructions remain outstanding until settlement is final. The calculation of multilateral positions serves only to advise participants of what is due from or due to the clearing group as a whole. From one perspective, the credit risk in multilateral position netting is the same as in the case of no netting, since all gross obligations remain outstanding. From another perspective, however, there are strong operational and commercial pressures for participants in such multilateral systems to begin to act as if their bilateral net positions, or even their multilateral net positions, were the measure of their credit exposure ***even though this would not be the case***. Such unfounded reliance has the potential to increase the true credit risk borne by an individual participant, as well as the credit risks borne by others in the payment system and in the financial markets generally, and therefore may increase systemic risk.

6.15 Liquidity risk is an especially difficult problem in multilateral position netting systems. The manner of calculating each participant's multilateral net settlement obligation shows why this is so. The basic calculation for a given participant starts with the bilateral net amounts due to or due from each other participant. These bilateral positions, positive or negative, are then netted to produce a single multilateral net amount due to or due from the group. If one participant is unable to settle its position, these systems typically provide for the recalculation of multilateral positions, through an unwinding of payments or obligations. When this is done, bilateral "net credits" due from a defaulting

participant to others are no longer available to offset bilateral "net debit" positions in the multilateral netting. Those who were due funds on net from a defaulting participant are likely to find that their multilateral net settlement obligation, and thus their need for liquid funds, has increased dramatically. This in turn may seriously affect the financial position of these participants. Thus the liquidity risks for participants in multilateral position netting systems can be significant in the event of defaults.

6.16 More general liquidity problems may also arise, most likely as a result of operational difficulties. For example, the institution which acts as the "settlement agent" for a multilateral position netting system may be unwilling or unable to initiate the daily settlement payments to the net creditor participants until it has received all the amounts due from the net debtor participants. Any delay in effecting payment by a single net debtor could lead to problems for all net creditors, possibly affecting their settlements due in other markets or systems.

6.17 Systemic liquidity risk can be particularly significant in the event of defaults. As noted above, after the recalculation of multilateral net positions, each (remaining) participant may owe more or receive less. Participants in the payment or netting system that have not even dealt with a defaulting participant may have an increase in liquidity needs if participants with whom they have dealt face liquidity strains as a result of a settlement failure. Moreover, with certain clearing arrangements there are potential cross-market liquidity effects. Either greater payments or smaller receipts resulting from a recalculated settlement can absorb liquid funds needed for settlements in other currencies or markets in the same time zone, or possibly in later time zones. All of these types of effects give rise to concerns about economic "externalities" in multilateral systems, that is, effects on "third parties", within or without multilateral arrangements, that may have their financial position unexpectedly altered by a default even though they have had only limited dealings, or indeed no dealings at all, with a defaulting institution.

6.18 An example of ***multilateral netting by novation and substitution*** would, for the purpose of discussion, be provided by a hypothetical foreign exchange clearing house or clearing corporation. National clearing houses might be established that would permit participants to achieve a legally effective multilateral netting of all their foreign exchange contracts with other participants. For a contract submitted by a pair of participants, the clearing house would be substituted as the counterparty to each, and the obligations between the participants would be discharged. Further, the clearing house would maintain a running novated net position for relevant currencies and value dates vis-à-vis each participant. This process would result, for a given set of contracts to be netted, in a pattern of net amounts due to the clearing house from each participant, or vice versa, that are equivalent to the multilateral net position of each participant vis-à-vis the netting group as a whole.

6.19 The clearing house, as a central counterparty, would explicitly take both credit and liquidity risk. At the same time, members would have counterparty credit and liquidity risk with respect to the

clearing house, not to their trade counterparties. Thus the clearing house would have to manage its credit exposure to each participating counterparty as well as liquidity risks associated with settlements. To facilitate risk management, the obligations of individual participants might be collateralised, so that the clearing house might be able to reject contracts submitted for netting if insufficient collateral had been posted. Margin calls could also be a possibility. The size of collateral requirements and the basis for their calculation across currencies, the sharing of risks in the event defaults exceed posted collateral, and the eligibility criteria for collateral would all need to be worked out. The procedures for multi-currency settlements would also require careful attention.

6.20 The key to reductions in credit risks in clearing house arrangements, relative to arrangements with no netting or with bilateral netting by novation, would be the set of agreements covering the multilateral netting by novation and substitution. If these agreements were invalid, then resulting credit risks could he even larger than in cases of no netting, since participants might not know, and might thus be unable to control, their ultimate exposures.

6.21 Assuming the legal enforceability of the multilateral arrangements, there could be reductions in credit risk compared to a system of bilateral netting by novation. The reduction in risk for an individual participant would occur because the multilateral netting would allow bilateral net debit positions, vis-à-vis others, to offset bilateral net credit positions in the same currency, thus reducing net credit exposure. However, for participants without any bilateral net debit positions, credit exposure would be unchanged by the cross-participant netting.

6.22 One of the troubling aspects of clearing house arrangements would be any reliance on collateral to secure net amounts due. The taking of large amounts of high-quality collateral, for example, could reduce the risks of settlement failures to negligible levels, and thus similarly reduce the riskiness of settlement claims on a clearing house. For financial market participants as a whole, however, credit risk would not necessarily be reduced beyond the level implied by the multilateral netting of obligations. Furthermore, reductions in the riskiness of claims on a clearing house could come at the expense of the unsecured creditors of participants. By posting a proportion of its high-quality assets as collateral for clearing house debts, the assets available to a participating bank’s unsecured creditors, including its depositors, in the event of its insolvency could be reduced. In ideal circumstances these creditors would react by raising the cost of credit to a participant in order to compensate for any implied increase in risk. However, it is not clear that such market mechanisms would work adequately, particularly if the amounts of collateral posted were not disclosed to creditors; and in any case it could be harder for participants to assess the creditworthiness of the clearing house than that of their individual counterparties in the markets.

6.23 The effect of multilateral netting by novation and substitution on liquidity risk is ambiguous relative to the case of bilateral netting by novation. The net amounts due on a given value date are

reduced, or at most unchanged for some participants, relative to the bilateral netting case. This reduces liquidity risk for individual participants, for the clearing group as a whole, and probably for financial markets generally. On the other hand, clearing house arrangements require a centralisation of settlement payments: all settlement payments are between the clearing house and individual participants. In this case the inability of one participant to settle a position can create shortfalls of cash in one or more currencies that are needed for settlement. The liquidity risk to other participants from such events, even assuming no ultimate credit risks exist, then depends on the ability of the clearing house to raise the cash needed to complete settlements.[8] Thus the multilateral character of a clearing house would provide no assurance that liquidity risks will be less than in the case of bilateral netting by novation. It is conceivable that liquidity risks could actually be greater. Similar conclusions hold with respect to systemic liquidity risk.

6.24 The membership and capital structure of a clearing house would also raise important risk issues. Once a multilateral clearing house had been established, there could be important incentives to expand membership in order to realise greater economies in netting and to lower average unit transaction costs. Increasing membership, however, could lower the average creditworthiness of participants. This, in turn, could affect the credit-standing and liquidity of the clearing house and also the quality of any loss-sharing arrangements among participants. Such developments might lead naturally to the consideration by the clearing house of special risk control mechanisms, in addition to the posting of collateral.

6.25 The amount of capital a clearing house would need to support its obligations is a difficult question, particularly if significant amounts of collateral were pledged to it. This is particularly relevant to the need to mobilise liquidity through its own resources, in order to complete the daily settlement. Because of its role as counterparty to all transactions, the creditworthiness and overall financial strength of a clearing house would have to be high before its use by banks would make sense as a replacement for existing interbank counterparty exposures.

6.26 The more general concern raised by clearing house mechanisms relates to the nature of the clearing house itself. As a financial institution, it would have claims on and liabilities to its participants, but it might perhaps not be a bank, under the laws of its country of incorporation. Indeed, in some countries it might not need to be subject to any form of authorisation or regulation, although its prudent and efficient operation would be crucial to the integrity of the foreign exchange (and possibly other) markets, while in other countries it could be subject to two or more regulators working according to different rules and objectives.

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[8] The clearing house might need to borrow on its own account, intra-day or overnight, perhaps under pre-established credit lines; but there could be pressure on the clearing house to use collateral posted by its participants against credit risks to be mobilised for liquidity purposes.

6.27 It may be convenient to conclude the discussion of the various netting arrangements by ***summarising their respective risk aspects***, while always assuming their legal enforceability. They are compared with the benchmark "no netting" case. For obligations clearing systems (e.g. foreign exchange contract netting) the case of no netting refers to the situation in which gross obligations remain outstanding until they are due and discharged by settlement. For payment systems the case of no netting refers to the situation in which individual (gross) payments remain outstanding until they are settled and discharged.

(i) Bilateral position netting reduces liquidity risks to counterparties, and perhaps others such as correspondent banks, relative to the case of no netting; but it leaves counterparty credit risk unchanged, or may induce increases in risk if net exposures are treated as if they were true exposures.

(ii) Bilateral netting by novation reduces both liquidity and credit risks to counterparties, and possibly to the financial system (other things being equal), relative to the case of no netting and to the case of bilateral position netting.

(iii) Multilateral position netting may reduce liquidity risks relative to the cases of no netting and bilateral netting, under certain circumstances; if significant defaults occur, liquidity risks may be higher; credit risks are the same as, or may be larger than, in the case of no netting; credit risks are greater than in the case of bilateral netting by novation.

(iv) Multilateral netting by novation and substitution has the potential to reduce liquidity risks more than any other institutional form, but this depends critically on the financial condition of any central counterparty to the netting; if the liquidity of a central counterparty is weak, the liquidity risks of this institutional form may be greater than in the case of bilateral netting by novation; the credit risks of this institutional form are generally less than in other forms that have been considered, subject again to the identity and condition of any central counterparty.

7. A global perspective on liquidity risk

7.1 The establishment of offshore payment clearing arrangements represents an important modification of the post-war configuration in which each country has maintained the major clearing systems for its own currency. The establishment of foreign exchange and other clearing house arrangements would extend the use of institutionalised and centralised netting facilities even further into major interbank markets. Thus there is a need to review the global structure of settlement for offshore payment systems and prospective obligations netting arrangements, and to focus on global problems of liquidity risk. The Payments Group has identified four specific issues for consideration:

(i) the ***impact of netting***, per se, on the liquidity risks of participants, in both bilateral and multilateral arrangements, and of their correspondents;

(ii) the role of the settlement agent in multilateral systems, and the ***allocation of liquidity risks between the settlement agent and the participants***;

(iii) the ***cross-border implications of liquidity risk in offshore clearing arrangements***, particularly the cross-border allocation of risks between the settlement agent and the participants;

(iv) the ***impact of centralised multi-currency clearing house arrangements*** on general market liquidity risk.

7.2 The ***impact of netting arrangements*** is generally to reduce liquidity risks for correspondent banks and others involved in the payment process. However, as noted above, an important distinction must be drawn between netting arrangements based on legally enforceable netting by novation and those based on simple position netting. Both kinds of netting reduce liquidity risks under normal circumstances in which liquidity shortfalls can be successfully managed without "unwinding" payments, or obligations, included in a netting. Liquidity risk is reduced because the amounts due for settlement are reduced through the netting. Only systems of netting by novation, however, work to reduce liquidity risks in circumstances that could otherwise lead to an "unwinding" of netted amounts.[9] In such circumstances an "unwinding" of payments in position netting may have the potential to create greater liquidity problems, and thus greater risks, than clearing arrangements with no netting.

7.3 A more technical analysis of the impact of netting on the cash, or liquidity, position of correspondent banks in ***ordinary circumstances*** is as follows. Without netting, one correspondent bank may receive payment instructions from customer banks during the day to deliver funds to the account of a second correspondent bank. The second correspondent may likewise receive instructions to deliver funds to the account of the first. In practice, both correspondents are uncertain about the existence, time of arrival and amounts of these offsetting payments, which are sources of risk to their final cash ("liquidity" or "reserve") position each day. Bilateral netting, and to a greater extent multilateral netting, in effect, ensure that offsetting payments are made simultaneously, thus eliminating a source of liquidity risk to the individual correspondent banks.

7.4 A similar analysis holds for pairs or groups of banks that settle payments or obligations directly over interbank payment and settlement systems. Pairs of banks, for example, may know the schedule of payments each owes the other on a given day. However, there may be uncertainty as to the intra-day timing of payments, possibility of errors, likelihood of computer failures, and the like. The effect of netting is to reduce the impact of these sources of risk on the liquidity position of banks, other things being equal. Groups of banks that settle payments or obligations over these interbank systems are in a similar position to the correspondent banks. For the group as a whole there may be significant numbers of offsetting payment instructions. Each individual bank, however, is usually uncertain about the existence, timing and magnitude of these payments. Again, multilateral netting reduces the impact of this uncertainty on the cash positions of banks.

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[9] An important caveat is that certain set-off rights under local law may result in some bilateral netting of obligations in events of default, which might reduce somewhat the liquidity risks of gross obligations (see paragraph 5.9 above).

7.5 Netting of obligations may be expected to have some long-term monetary implications through effects on variables such as bank demands for cash and credit. Netting reduces the amount of intra-day and overnight central bank balances, central bank credit or private bank credit needed to make the settlement payments for a given set of obligations over the ultimate interbank payment systems in a given country. Reduced uncertainty as to the cash position of banks might also be expected to reduce both the intra-day and overnight demand for cash. In a ***global context***, moreover, multi-currency (obligations) netting systems may simultaneously affect bank demands for cash in a number of countries. Such effects, and their ultimate magnitude, however, are extremely difficult to project.

7.6 The ***role of a settlement agent*** for a multilateral netting arrangement is, at a minimum, to receive settlement payments from net debtors in the netting, or clearing, and to make disbursements to net creditors. A settlement agent may also have other banking functions, such as providing credit to finance settlements and holding collateral to secure settlement obligations. Normally, a settlement agent will also monitor the development of the settlement for operational and financial difficulties. In some respects the settlement agent may become the de facto regulator of a multilateral netting arrangement, particularly if it is responsible for setting the terms of access to the arrangement, and determining the acceptability of individual contracts for netting.

7.7 The ***allocation of liquidity risks*** between a settlement agent and participants in a multilateral clearing arrangement depends upon the banking functions given to the settlement agent. At one extreme the settlement agent may take no liquidity risk. This, in effect, allocates the liquidity risks of settlement to the participants in the system. At the other extreme a settlement agent could bear all of the liquidity risks of settlement. For example, the "agent" could disburse settlement payments to net creditors ***before*** receiving amounts due from net debtors in a clearing, thus temporarily financing a settlement. This allocates all liquidity risk to the "agent". Overall, it is important to recognise that liquidity risks in netting arrangements are borne by someone, and that there is a need to analyse and manage these risks properly.

7.8 Offshore systems create some unique problems for the management of liquidity difficulties, if they arise, by virtue of time-zone differences. Such problems also affect the size and allocation of liquidity risk. For example, at settlement times for an offshore system it will be night or early morning in other countries. The senior managers of international banks that participate in offshore systems may not be available to engage in consultations or make the decisions needed to solve liquidity problems, and to complete settlements in a timely manner. Similarly, the appropriate central bank personnel in some countries may not be readily available. These and related problems may imply that the market for the currency in question may lack sufficient depth, at that particular time, to enable any liquidity requirements to be mobilised in the market-place.

7.9 In addition, when a clearing system located offshore has participants from a number of countries, authorities from at least three categories of countries may have interests in developments affecting it, including the host country for the system, any countries in which participant banks in it have their headquarters, and possibly the country that issues the currency cleared on the system.

7.10 Offshore arrangements may also have specific ***cross-border implications for liquidity risk***. There can be a problem of dependency of settlements if settlements for an offshore system are made using a net settlement system in the country that issues the settlement currency ("country of issue"). If liquidity problems delay settlements for the system in the country of issue, then settlements for the offshore system can also be delayed. Much less likely in practice, but logically possible, is the risk that delays in entering ***some*** of the settlement payments from the offshore system could create liquidity strains or settlement delays in the country of issue.

7.11 Further, the mechanisms adopted for settling offshore systems may have direct implications for the allocation of liquidity risks concentrated in an offshore clearing system. For example, if settlements for the offshore system are made through correspondent banks or privately operated payment systems in the country of issue, liquidity risk may fall in the first instance on the private banking system in that country. If central banks offer cross-border settlement services to offshore systems, liquidity risk may be shifted onto the central banks. However, if the central bank, or a correspondent bank, in a host country for an offshore system offers settlement, liquidity risk may implicitly be assumed by the host country.

7.12 The prospect that large-scale ***centralised multi-currency clearing houses*** might be developed for the traditional foreign exchange market adds poignancy to the questions about the international structure of settlements, and liquidity risk, that are already being raised by currency futures and options clearing systems. Presumably a clearing house in each country would clear contracts in major international currencies, and other currencies as well. The participants would probably include international banks from a number of countries, including the host country.[10] The settlements for even one foreign exchange clearing house would be likely to require carefully timed settlements in the country of issue for ***each*** currency handled by the clearing house.

7.13 The clearing house would be regarded as a settlement agent for the clearing arrangement, if it were required to both collect and disburse settlement payments. Moreover, because the clearing house would be the central counterparty to foreign exchange contracts, it would bear significant liquidity risks in the first instance.

[10] There is also a possibility that securities firms from countries without universal banking laws and even some multinational industrial firms would want to join a foreign exchange "clearing house".

7.14 Thus any proposal to handle the settlement of foreign exchange obligations through a clearing house would raise at least three important liquidity issues. First, the development of new large-scale central financial institutions would raise questions about the implicit financial relationship between central banks and such institutions. The concentration of liquidity risks, formerly borne by a large group of correspondent banks, in one institution on which international banks and markets would depend would make clearing houses too important to the functioning of financial markets to permit failures.

7.15 Second, clearing house arrangements would face cross-currency liquidity risks even when the clearing credits due to a participant in one currency fully offset the clearing debits due from that participant in another currency. If the participant were to default, a fully margined or collateralised clearing house might be protected against credit risk. However, the clearing house could experience a temporary liquidity problem if credits in one currency could not be rapidly liquidated to satisfy the timely settlement of obligations in another currency.

7.16 Third, there is the classic problem posed by the Herstatt case. For example, a clearing house might choose to settle each currency as soon as possible on a given value date. This would lead to a sequence of settlements moving from one time-zone to the next, following the sun. Under this approach it is clear that the establishment of clearing houses would not necessarily eliminate the liquidity effects of closing a bank while one side of its foreign exchange contracts remains unsettled. In all, this analysis points towards the need for careful multi-currency liquidity and collateral management by both prospective clearing houses and their participants.

7.17 If a clearing house were to administer settlements through accounts at a separate financial institution, as would be likely, then a designated "settlement agent" would be involved. A possibility is that one or more correspondent banks would act as settlement agent(s) in each currency. Defaults by such banks would pose serious liquidity and other risks to the clearing house, and thus to all its participants. If the timing of settlements required all payments to a clearing house to be made, in all currencies, before disbursements, settlements could be at risk for extended periods. These periods would be shorter in the case of sequential currency-by-currency settlements.

7.18 Some have suggested that central banks might act as settlement agents for clearing houses, in preference to commercial banks. Such a suggestion raises a number of important questions that would require detailed analysis. For example, would central banks need to open accounts for a clearing house, or possibly a participant, that had no physical presence in the country of the central bank? Would central banks have to extend their hours of operations to accommodate clearing house settlements, and what would be the effect on domestic money markets of any extended hours of operation? Would there be implied commitments of financial support for the clearing house? Would a central bank need to hold collateral pledged to a clearing house by participants? Could any such

collateral be mobilised to provide support for settlements in other currencies, involving other central banks?

7.19 The alternative approach, that commercial banks should act as the settlement agents for clearing houses, also raises some important issues for the supervisors and central banks of the banks and currencies concerned. As discussed above, it could concentrate liquidity risk on those banks; this in turn could have implications for those banks' payments through their domestic payment systems, particularly if the clearing house arrangement has any potential to unwind its participants' daily net positions.

7.20 Consider finally the implications of a series of foreign exchange clearing houses in different countries. It would be natural to link such clearing houses in some fashion, so as to handle cross-border foreign exchange transactions, and thus to obtain further benefits from netting. The system liquidity risks from such linkages, however, would need to be carefully assessed. If one clearing house in an interlinked system experienced a liquidity problem, there would clearly be a potential for the whole linked system to experience a problem.

7.21 In summary, there would appear to be a trade-off in terms of liquidity risk if centralised clearing houses are established. On the one hand, the netting of obligations would reduce liquidity risk for the participants in the clearing house, and possibly for financial markets generally. On the other hand, the centralisation of settlements could make liquidity problems more serious if they were to occur. In assessing the liquidity risks of any clearing house proposals, both factors in the trade-off would need to be kept in view.

Annex

Glossary of terms

Clearing system

A mechanism for the calculation of mutual positions within a group of participants with a view to facilitating the settlement of their mutual obligations on a net basis.

(Note: the phrase “clearing system” is sometimes used to describe a process of multilateral netting by novation and the settlement of the consequential payments. It is not used in that way in this report.)

Confirmation matching

The process of ensuring that the negotiated terms reported by the parties to a contract are identical.

Credit risk

The risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter.

Final settlement

Settlement of the obligations between two parties by irrevocable transfer of credit across their accounts at a defined settlement institution. (Note: Where such transfers are made by irrevocable credit to accounts on the books of a central bank, the transfer could be described as reflecting both a “final settlement”, in the legal sense of effecting a discharge of obligations, as well as an “ultimate settlement” in the economic sense that it is effected in central bank liabilities.)

Liquidity risk

The risk that settlement of an obligation will be made not on the due date, but on some unspecified date thereafter.

Netting by close-out

An arrangement to settle all contracted but not yet due liabilities to and claims on a bank by one single payment, immediately upon the occurrence of one of a list of defined events (such as the appointment of a liquidator to that bank).

Netting by novation

The replacement of two existing contracts between two parties for delivery, of a specified currency on the same date by one single net contract for that date, such that the original contracts are satisfied and discharged. (Also referred to as obligation netting.)

Netting provider

The institution calculating the net positions of members of a clearing system.

Novation

Satisfaction and discharge of an obligation by adjustment or alteration of existing mutual obligations.

Novation and substitution

The process of amending a contract between two parties, so that a third party is interposed as an intermediary creditor/debtor between the two parties; the amended contract is then novated (see Netting by novation), so that the original contract between the two parties is satisfied and discharged.

Obligation

A contractual duty to deliver (or receive) a defined asset (foreign currency, securities, etc.) on an agreed date.

Payment

The satisfaction and discharge of an obligation by the debtor's (irrevocable) provision of an unconditional claim on a third party acceptable to the creditor.

Payment instruction

An order or message requesting the transfer of credit (claim on a third party) to the order of the creditor.

Position netting

The netting of payment instructions in respect of obligations between two or more parties, but which neither satisfies nor discharges those original obligations (also referred to as ***payment*** netting).

Settlement

Completion of a payment (or the discharge of an obligation) between two parties. (Frequently used, in contexts to refer to the payment or discharge of wholesale transactions or a series of prior existing transactions. See Final settlement.)

Settlement agent

The institution initiating the final settlement of a clearing, on behalf of all the participants (perhaps also having other functions).

Settlement risk

The risk that a party will default on one or more clearing obligations to its counterparties or to a settlement agent.

Systemic risk

The risk that the inability of one institution within a payments system, as in the financial markets generally, to meet its obligations when due will cause other participants or financial firms to be unable to meet their obligations when due.