

**INNOVATIONS IN THE PAYMENTS
SYSTEM, SYSTEMIC RISKS
AND CHALLENGES TO CENTRAL
BANKING IN TRINIDAD AND
TOBAGO**

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Introduction

The payments system of any monetary economy could be defined as the arrangement for making and receiving payments by parties involved in various transactions, in which monetary value is transferred through some mutually agreed on payment instrument. These instruments could range from cash, cheque, credit card, debit card, money order, traveler's cheque, pre-authorised payments, pre-paid cards and now, also through stored value cards and electronic money for retail payments. The instruments used for large value transfers include cheques and electronic funds transfers on the inter-bank market.

Virtually every economic transaction requires the use of a payments instrument that is mutually acceptable to the parties in a transaction. The acceptability of an instrument hinges on factors such as relative costs, the risks involved, institutional habit, convenience and availability. Despite its size and importance, however, the payments system has gotten relatively little research attention until recently (Rochet and Tirole 1996, Berger et al 1991, Summers 1994, Santomero and Seaton 1996, Humphrey et al 1996, Mester 2000 and BIS 1999). In fact, most models of real activity treat the risks and costs associated with payments and as negligible transactions costs. Similarly, most research on monetary and financial issues exclude the impact that changes to the payments system can have on the demand and supply of monetary and financial assets and the risks associated with these assets.

The literature in this area has now begun to analyse how changes to the payment system impact on its efficiency and safety, as well as, the impact these changes have on the real and financial sectors. In particular, the literature has looked at the most effective ways of controlling risks in large value transfer systems (Greenspan 1996, Rochet and Tirole 1996, Flannery 1996, and Summers 1996), the adoption of new payment technologies (Kane 1996) and portfolio allocation and monetary policy concerns (Humphrey et al 1996 and Santomero and Seaton 1996).

The changes and innovations that have impacted on payments systems around the

world have also begun to affect Trinidad and Tobago. In particular, improvements in technology and the maturation of electronic systems have led to the adoption of these systems by banks in an attempt to improve the services offered to their customers and bolster their competitive positions. The proliferation of credit and debit cards is the most obvious manifestation of these developments but there have been improvements in other areas as well. Specifically, many banks have now automated some of their infrastructure for inter-bank payments, one public utility now has pre-paid cards for access to its services and many institutions now prepare salary payments in electronic form for banks to credit their employees' accounts. Some of these changes only impact on the convenience and costs of different means of payment but many alter the credit risk and liquidity dynamics of agents, as well as, overall systemic risks. There have, however, been few studies on these issues in the Caribbean. Of the few available, the study prepared by the Western Hemisphere Payments and Security Clearance and Settlement Initiative, led by the World Bank on Trinidad and Tobago is the most comprehensive. There are also plans for similar reports on other countries in the region. Another report prepared by the Central Bank of Barbados in 1990 also looks at some of these issues. There is a need, however, for much more research in areas such as the changing nature of risks flowing from innovations in the payments system, how these innovations are likely to impact on the efficiency of the financial system and how they are going to impact on monetary and credit policies of the Central Bank.

In this context, this paper looks at the structure of the payments systems generally and in Trinidad and Tobago, reviews the various payments instruments used in Trinidad and Tobago and attempts to delineate the implications for systemic risks and central bank policy flowing from these changes to the payments system.

The Structure of Payments Systems

The overall payments system is comprised of a large value transfer system (LVTS) and a small value transfer system (SVTS). The former refers to large payments, usually between banks which are few in number but very large in terms of value (usually over 80%). LVTS are therefore the main arteries through which an economy's financial business is transacted. The efficiency and health of the money and capital markets depends on the efficiency of LVTS. The LVTS also has an international role to play as it serves as the settlement vehicle for cross-border transactions. It is therefore a national economy's link to the international payments

system. This exposes it to exchange rate risks and the risk of contagion from foreign exchange markets. An effective LVTS in terms of risk control is therefore essential to the health and stability of the financial sector and the economy as a whole. Moreover, a more effective LVTS improves the ability of central banks to execute monetary policy.

An efficient LVTS helps with the implementation of monetary policy by facilitating the short-term money market, which in turn provides more accurate information on monetary conditions at a particular point in time. More liquid inter-bank markets also facilitates flexibility in the conduct of monetary policy by providing a readily available market for central bank operations, as well as, providing a medium through which reserve positions can be rapidly adjusted in response to central banks interventions in that market.

LVTS can be classified according to three main characteristics, that is, (1) whether the central bank or some private association manages the system; (2) whether a gross or net settlement system is used; and (3) whether the system allows for the use of credit in executing payments.

The traditional system used in LVTS is the deferred net settlement system. In this system settlement is deferred to specific times or a time during the day. At the designated time(s) payments between banks are multilaterally netted, resulting in one net obligation for each debtor bank. Netting systems reduces the liquidity needed to settle large payments but when liquidity is needed, the practice is for liquidity to be extended by participants in the system and not the manager of the system, whether the manager is a central bank or a private sector organisation¹. Irrespective of who manages the LVTS, central banks almost always have oversight, especially since the net obligations on these systems are settled through in the reserve account of banks. Central banks would therefore want to be very confident that the risk controls in these systems are adequate.

The other model for LVTS is a gross settlement system. In some of these systems the central bank extends intraday credit (credit or loans with duration shorter than

¹ An example of a central bank manager of LVTS is BOJ.net in Japan while an example of a private sector manager of a LVTS is the CHIP system in the US.

one business day) while others do not. In the latter type of system, when funding in the paying bank is insufficient, the payment order is either returned to the paying bank (rejected) or held (queued) until there is sufficient funds to settle the claim. This type of system usually involves real-time computer processing and other controls to enable the central bank to prevent the use of intraday credit². In gross settlement systems where intraday credit is extended by the central bank, the banks are expected to clear the credit at the end of the business day and financial controls are usually in place to govern the amount of credit that is extended³.

The other part of the payments system is the small value transfer System (SVTS) which could be defined as the system that facilitates the payment needs of individuals and businessmen for ordinary transactions in the economy. These transactions can either be recurring or one-off and are usually low value, as well as high volume transactions. A SVTS must therefore have a large processing capability to support the volume of transactions, as well as, being able to meet a diverse set of payment preferences. This has led to a large variety of competing payments instruments and systems. These payments instruments include cash, cheque, travelers cheques, money orders, direct funds transfer, wire transfers, debit cards, credit cards, stored value cards and digital money⁴.

Small value or retail payments are generally classified as either cash or non-cash, with non-cash payments further divided into paper-based or electronic. Unlike cash payments, non-cash payments (which are usually transfers between financial institution) involve a complex array of rules and procedures. These non-cash payments are also settled on a deferred basis, which means that there is an implicit extension of credit (float) to the party making the payment. This changes the risks faced by counter-parties to the transaction.

Regardless of their different characteristics, however, both LVTS and SVTS are intricately linked to facilitate economic activity in a monetary economy. Inefficiency in any of these systems can create problems, not only at the level of counter-parties

²An example is the Swiss Interbank Clearing System in Switzerland.

³An example of Fedwire in the US.

⁴See BIS 1999 and Mester 2000 for a detailed review of these instruments.

to transactions but also at the macro-level, because of the implications problems in those sub-systems, especially in the LVTS, can have for systemic risks.

This is so because both LVTS and SVTS implicitly or explicitly involve the extension of credit. There is a lag between the transactions and the final settlement (when the payee receives final funds and is no longer subject to the solvency or liquidity position of the payor). The total costs of operating the payments system (LVTS and SVTS) was estimated at between 1-1.5% of GDP per annum for the US by Humphrey et al (1996). This is likely to be higher for small, under-developed financial systems because of smaller scale economies and the predominance of paper-based systems.

Trends in the Development of Payments Systems

There has also been rapid change in payments systems around the world, primarily because of technological development, financial innovations, globalisation and changes to the regulatory framework. Some of the major trends which have emerged as payments systems evolved include the increasing use of electronics and automated systems, the increasing range of payments instruments, the increased cooperation of payments service providers in developing and operating shared retail payments networks, the increasing value of cross-border payments and the entry of non-banks as payment services providers.

New information technology and its application to payments services have made electronic non-cash payment instrument more convenient and cost effective. This has created a movement away from cash and cheques to card payments and electronic direct fund transfers. Much of the new payment instruments, however, initially involve substantial capital investments in hardware and software for payment service providers (banks), who may have already made substantial investments in their established payments system. Moreover, there is little guarantee that new payments instruments will have a sustainable demand over the long-term so investments could be recouped.

The payment service providers may also have to operate both paper-based and electronic payment systems in the transition phase. These factors have hindered the introduction of and growth in demand for new payment instruments.

Regardless, however, the low cost per transaction for the new electronic payment instruments is likely to lead to the introduction of and shift in demand away from traditional instruments to those new instruments. New instruments are also likely to be more successful if they can be integrated in or be synergistic with the established payments technology.

The structuring of agreements for joint payment networks can also help to lower costs to individual payments service providers and make their success more likely. These joint networks also have the benefit of wider coverage, which is an important determinant of increased demand for new payments instruments. These joint networks are especially useful in small markets where the need for market development and wider coverage means that the issue of competition is subordinate to the need for a more comprehensive and efficient system. In these circumstances, however, closer monitoring and supervision is often used to preserve competition and ensure appropriate risk controls are in place. In some countries, regulation and supervision in terms of consumer protection legislation have helped to make these new instruments more acceptable.

Business payments are also increasingly being automated, particularly for making payments to or accepting payments from individuals. Business to business payments are also being automated. When companies make use of Electronic Data Exchange (EDI) for placing orders, stock control and invoicing, the EDI loop can be closed or made complete by automating the payments process. Payments services providers will position themselves to fill the need for electronic payment services, which will in turn add impetus to the movement away from paper-based to electronic payments systems.

In the face of all these innovations in payments system, however, cash has continued to be the most prominent means of retail payments. This could be due in part to the lowering of inflation and interest rates (the opportunity costs for holding cash), the small average value for cash transaction (which make cash a convenient payment instrument), the anonymity of cash payments and the proliferation of ATMs (which lowers the costs and increases the convenience of obtaining cash).

These developments and features have a profound impact not only on the efficiency of these systems but also on the emerging risks generated by these developments.

The changes that have shaped the structure of developed systems are now emerging in Trinidad and Tobago and we turn to this next.

The Structure of the Payments System in Trinidad and Tobago

The payments system in Trinidad and Tobago is comprised of a small value transfer system (SVTS) and a large value transfer system (LVTS), with both these parts characterised by a structure generated by the level of financial development. The payments instruments used in both the SVTS and the LVTS closely approximates that found in middle-income developing countries. We now turn to a review of payments instruments used in the system.

Payments Instruments in the SVTS

Cash: Cash, as in most countries, is still the predominant form of payments for low value transactions. In spite of the development of new payment mediums, cash is used predominantly for small value transactions. Cash in active circulation moved from \$748.5 m in 1993 to \$1,292.4m in 1999 (see Table 1 in Appendix). Total currency in circulation moved from \$858m in 1993 to \$1,756m in 1999. The currency in circulation to GDP rate was 3.05% in 1993 moving to 3,15% in 1999. Currency use therefore appears to have reached a level from which there appears to be little movement. The one exception to this occurred at the end of 1999 because of fears that the electronic banking system may not have been Y2K compliant.

Cheques: cheques are also a significant instrument used for small value transactions. The number if cheques used in 1997 was estimated to 10.1 million with a total value of \$144.2 billion. By 1999, the number of cheques used had increased to 11 million with a total value of \$237.9 billion. In 1998, legislation was promulgated which made it a criminal offence to issue a cheque knowing it could not be honored. This in effect removed the need for cheque guarantee cards, which are to be phased out at the end of 2000. The Central Banks acts as the low value cheque clearinghouse using a manual system. Cheques are settled on a deferred net settlement basis and net obligations are eliminated through debiting the central bank reserve accounts of the respective banks. There is no Automated Clearing House (ACH) for cheques in Trinidad and Tobago but most commercial banks have automated some aspects of their cheque processing operations. All banks scan images of their cheques and the electronic image is used for processing of settlements for cheques drawn on their own accounts. The information is uploaded

to the current account after verification and the accounts are automatically updated. Three of the six banks send electronic files to each other. The Central Bank also provides information on diskette to banks to facilitate their electronic reconciliation systems. Much of the infrastructure for ACH therefore already seems to be in place. In 1996, the commercial banks and the central banks established a committee to facilitate the introduction of electronic debit clearing. It was subsequently decided that this committee should pursue the setting up of a complete ACH. The committee is at present completing the business requirements for the exercise.

ATM/Debit Cards: These cards on their introduction in 1985/86 functioned only to withdraw cash, transfer funds between accounts, make deposits and pay utility bills. In 1997, the Electronic Funds Transfer Point of Sale (EFTPOS) option was introduced which appeared to increase the demand for these cards (See the huge increase in transactions between 1996 and 1997 in Table 2 in the Appendix). The introduction of a joint network (Infolink) in 1994 by 4 banks helped to widen the card payment network and served as a further boost to the demand for these cards. Many studies indicate that wider networks are an inducement to potential users (Berger et al (1996), Humphrey et al (1996)). The volume of transactions at ATMs increased from 7.7 million in 1996 to 15.8 million in 1999 (a 26.2% per annum increase). Available data also indicate that the number of machines increased from 234 in 1998 to 254 as of July 2000. EFTPOS transactions increased from 767,513 in 1997 to 3,157,207 in 1999 (a 77.8% per annum increase), while the number of machines moved from 2,933 to 6,604 in the same period (see Table 2 in the Appendix). This phenomenal growth has tremendous implications for the banks risk control systems, as well as demand for other payment media (cheques in particular).

Direct Fund Transfers: Retail funds transfers include debit and credit transfers. These transfers are often used for recurring payments such as the payment of salaries or monthly bills. Some of these payments are being done in electronic form (diskette), especially payroll credits.

Credit Cards: Credit cards are issued locally by commercial banks on behalf of VISA and Mastercard. These cards are in effect a revolving credit line with a 45 day interest free repayment period. After the 45 day period, interest occur at 2% per day on the outstanding balance. An annual fee is charged for the use of the cards. The

credit limit offered to clients is dependent on the normal credit criteria for loans. The number of credit cards in use in Trinidad and Tobago has increased dramatically since their inception. The number of credit cards increased from 49,733 in 1993 to 134,950 in 1999, an annual average increase of about 25%. The value of the credit card loans outstanding moved from \$92 million in 1993 to \$651.2 million in 1999, an annual average increase of 87% in that period.

Pre-paid Cards: At present, only one company the telecommunications Services of Trinidad and Tobago (TSTT) issues pre-paid cards. These cards can be used for local and international calls, either at specific local public telephone for local calls or via a code on any telephone for international calls. TSTT has also introduced a pre-paid cellular service in which pre-paid cards are used.

Government Payments: An average of 6,000 government cheques are cleared by the Central Bank on a daily basis, this increases to about 20,000 at the end of the month. Most government ministries have a computerised cheque writing system. However, the paper-based system where government departments send one cheque to banks with a list of people whose accounts are to be credited is still in use. Some government departments do, however, provide EFTPOS terminals so payments to government can be made electronically. There are also plans underway to introduce an electronic system for data exchange between government departments, banks and the Central Bank.

Postal Instruments: The post office issues money orders at a fee of \$3 per \$1,000. TT Post issued 10,623 internal money orders in 1998 valued at \$2 million. TT Post also cashes US and UK postal money orders. This is financed through advances forwarded to TT Post by the US and UK Postal authorities. In 1998, TT Post cashed 28,386 US money orders valued at \$20.1 million and 19,059 UK Postal orders valued at \$3 million. It also sold 2,524 UK Money orders valued at \$60,081. This is not a significant payments instrument.

Payments in the LVTS

Inter-Bank Payments: Payments valued at \$500,000 and over are classified as large-value transfers in Trinidad and Tobago and are cleared in Special Clearings at the Central Bank. These payments are part of the inter-bank market and are settled

through debits and credits to banks' reserve accounts. The cheques that are normally the subject of these Special Clearings are either drawn on a Central Bank account or a commercial bank account but both are settled through debits and credits to the banks' reserve accounts. The cheques drawn on a commercial bank could have been generated by bank to bank transactions or transactions between banks' clients. The system is paper-based (using cheques or credit notes) and settlement is done on the same day. The large value instruments also include drafts and other negotiable instruments.

There is also now a small inter-bank market in foreign exchange since the liberalisation of the foreign exchange market in 1993. Dealers are required to make a market in foreign exchange. A key feature of this market is an electronic screen where quotes and confirmed trades are displayed. The Central Bank continuously monitors market transactions and rate movements through this device.

Capital Market Payments: In the capital markets, payments are executed individually by the respective capital market institutions and their clients and there is no centralised system for the clearance and settlement of transactions from all sub-sectors in the market. For example, the Central Bank provides clearance and settlement for treasury bills and notes, the Stock Exchange does the same for corporate bonds and equities, as well as for government bonds and, mutual funds handles their own clearance and settlement. The systems for the purchases, sales, clearance and settlement in each of these sub-systems tend to be mixed with some electronic and others paper-based. The Trinidad and Tobago Stock Exchange, together with its members established a Central Securities Depository (TTCD) with a computerised bank entry system, which will facilitate the change of ownership or transaction without the need to physically exchange the securities. The TTCD is still not operational, however, its rules and procedures are being finalised. Many of the institutions involved in the market have automated the record keeping and processing of transactions, the others will have to obtain this to fit into the Central Security Depository when it comes on line. When this is done, transactions will be processed on a real-time basis.

The subsidiaries of commercial banks (finance companies and trust and mortgage companies) are registered as underwriters and securities firms and offer a wide range of services to agents in the capital market. In terms of payment services,

these companies act as agents for issuers of corporate securities in the distribution of dividends and to make payments to creditors on maturing debt instruments. They also provide payments services to other agents in the capital market such as brokers and dealers. These companies of course also have to provide payments services for their own mutual fund members.

With the new Central Depository, claims will be netted and settled by notifying the banks offering payment services to capital market agents (both to individuals and institutions) and the Central Bank. Payment would then be finalised by the changes to the relevant commercial banks' reserve accounts. Commercial banks are therefore at the centre of the payments system in the money as well as the capital market.

Cross-Border Payments System: International payments are made electronically via the SWIFT messaging system or other electronic transmission through external correspondent banks. International payments are also made by credit cards, international money orders and travelers cheque.

The central banks in CARICOM also have bilateral arrangements to settle payments between themselves. Net settlement is done on the basis of information transmitted via SWIFT or telex.

The commercial banks, through their membership and/or participation in SWIFT and through their correspondent bank relationships, are again at the centre of the national payments system and its connection to the international payments system. The use of the SWIFT network and in some instances the internet to make payments is yet another manifestation of the trend to making payments electronically, rather than using paper-based systems such as cheques.

Emerging Trends in and the Development of the Payments System in Trinidad and Tobago

There are a number of trends that have emerged in the payments system in Trinidad and Tobago. These include:

1. The increasing use of electronic systems for payments particularly credit and debit cards. This would help to reduce the risk of fraud, reduce the cost of

producing cash and cheques and would speed up final transfer of funds after transactions.

2. The increasing use of joint arrangements by commercial banks to develop national payment networks. This reduces the cost of electronic systems to individual banks and induces more use of this payment mechanism since it is more complete.

Other trends include, the continuing predominance of cash for small value transactions, and the predominance of commercial banks in the payments system.

Future plans for the improvement of the payments system include:

1. The use of an electronic funds transfer system for large value transfers. This is most likely going to be based on a SWIFT platform since most banks already use this system for cross-border payments.
2. There is already a move underway to develop an automated clearinghouse (ACH) for low value transfers.
3. The introduction of electronic funds transfer for government benefits and payments.

These developments would help to reduce credit and liquidity risks because they would speed up payment. It is also likely to make payments cheaper in the long run. Very importantly also, these development could also be used to generate information on liquidity which could help the commercial banks to manage their liquidity better and, help the Central Bank to manage overall liquidity and systemic risks. Such a pervasive use of electronic systems would, however, expose the payments system to more operational risks.

These developments have important implication for central banking in Trinidad and Tobago, since the Central bank has an important role to play in the payments system as facilitator and overseer of the system. These developments also have implications for the implementation of monetary policy, since the payments system is the vehicle through which monetary policy is transmitted and

the market in which it intervenes to execute policy.

These developments have important implications for systemic risks because they change the risk dynamic in the payments system, sometimes shifting risk but also because they tend to increase the degree of inter-connectedness in the inter-bank market, as well as the speed of transactions through these channels. This tends to increase the risk of contagion, as the number and efficiency of inter-bank channels increases the probability that problems in one area of the financial system can quickly spread to other areas (Allen and Gale 1999). This development also reduces the time in which the central bank can intervene to correct problems. For these reasons we review the implications that these developments in the payments system have for central bank policy and systemic risks in Trinidad and Tobago.

Developments in the Payments System and Implications for Central Bank Policy and Systemic Risks

Every form of payment involves some risks to one or more of the parties involved. Risks are generated principally because credit is explicitly or implicitly extended in a payments transaction and the fact that the payments involve the handling of payments instruments by different entities that can fail to perform their function before final funds are delivered. Payments system risks include a range of different risks which relate to payments instruments, communication and delivery systems, clearing and settlement arrangements and the financial system as a whole. Of specific concern to central banks, however, are the risks that affect the financial systems such as credit, liquidity and systemic risks.

Non-financial risks such as illegal activity and physical damage to the payments system infrastructure, operational risks⁵ and legal risks are also important to payments system but we concentrate on the financial risks which have direct implications for central bank policy and systemic risks. These risks⁶ impact on central banks in their roles as supervisors of financial institutions, monetary authorities and operators of the payments system.

Credit risk is the risk that the full amount may not be transferred to the payee on

⁵ The risk of automated system and electronic data exchange systems being damaged or compromised.
⁶ See BIS 1993 for definition of risks.

time because the payor is unable or unwilling to settle the obligation. Liquidity risk is the risk that funds cannot be transferred to the payee in a timely fashion because funds are invested in illiquid assets, because a market failure has made normally liquid assets illiquid or because of a problem with the infrastructure for payments such as a computer breakdown.

The last situation is sometimes referred to as operational risk and has become more important to the health of the payments system as payment methods have become more automated. The most important risk, however, is the risk that problems in one sector or institution will generate payments failure in other sectors or institutions and through contagion via the inter-bank network cause system-wide liquidity and credit problems. These problems usually emanate from the LVTS of national payments systems. This is so because the value transferred is very large (making it difficult to substitute for lost or delayed funds), because funds are transferred so quickly (making it difficult to revoke payments with a problem institution) and, in the case of systems with electronic funds transfers, widespread liquidity problems when there are operational failures.

Development in the structure of payments system has implications for the distribution of risks in the payments system and for the control of systemic risks. Developments in Trinidad and Tobago such as the increasing use of automated systems and electronic data exchange to execute payments would tend to lower the risk of theft, counterfeiting and fraud related to cash and cheques payments but increases the operational risks such as the crash of computer system and electronic data exchange systems, which can create liquidity problems.

The plans to introduce an automated clearing house (ACH) for low value payments could reduce the float extended to payors and reduce the credit risks inherent in cheque payment, by reducing the settlement lag from about 6 days at present to intraday. This short settlement time could, however, give the payments intermediaries less time to deal with possible fraud and/or mistakes on the part of payors. This also means that the transfer would be irrevocable within a day, which could increase the risks of loss to payment intermediaries and payors. The risk management system at banks would therefore have to change to accommodate the new challenges that would flow from the introduction of an ACH. This is also likely to

require at least some guidelines about the distribution of risk within the system from the Central Bank, if not formal legislation.

The proliferation of credit and debit cards in Trinidad and Tobago has taken place because these payments instruments do increase the level of convenience to consumers. At present, however, there is no legislation that limits the liability of the cardholder in case of fraud. There also does not seem to be a clear assignment of responsibility to parties in the credit transaction as it pertains to the risk and cost associated with operating the system, at least not in local legislation. At present, a preliminary draft of a Bill entitled "*The electronic Funds Crime Bill, 1999*" is being developed. Whether the eventual promulgation of this piece of legislation would address the issue above is still not clear. The fact that credit cards loans not only represent an increasingly important avenue for credit but because liabilities are often incurred in US dollars⁷ (Which brings in the added dimension of foreign exchange risks), increases the need to address these issues urgently.

The issue of risk management, especially systemic risks, assumes great importance in the case of the large value transfer system. Of particular importance in this regard is the organization of the inter-bank large value transfer system. Banks have traditionally concluded among themselves multilateral netting arrangements which settle at discrete time intervals and is designed to reduce the need for settlement balances (cash and other liquid short term assets) and to limit the amount of portfolio adjustments needed to facilitate payments settlement. Central banks on the other hand worry about the settlement lags and the implicit overdrafts associated with netting systems and many favor real-time on continuing gross settlement systems.⁸ The problem with these systems, however, is that they often require the provision of credit on the part of central banks or other settlement agencies. This in effect does not get rid of the credit risk inherent in deferred net settlement systems but shifts it to

⁷ The imposition of credit limits is an arrangement to limit the risk exposure of the bank but it still has implications for the management of banks foreign exchange and foreign exchange risks because the banks do not know in advance the level of liabilities undertaken in foreign exchange.

⁸ Greenspan (1996) for example argues for real-time gross settlement systems for both small and large transfer systems.

central banks who in turn often require collateral⁹ from banks to mitigate these risks.

An important issue for central banks and commercial bank, therefore, is how to control risks on large value transfer systems, especially systemic risk, at reasonable costs to the main stakeholders in the payments system. Other important related issues therefore include whether to have a real time gross settlement system (RTGS) or a Deferred Net Settlement system (DNS) and how to share the risks on LVTS.

In terms of the choice between RTGS and DNS systems, there is a substantial amount of disagreement over this issue (Berger et al (1996)). RTGS systems virtually eliminate settlement risks on payments and the payee does not have to wait until the end of the day to receive final funds. On the other hand, RTGS systems require that huge amounts of highly liquid resources be available at any time, to ensure that payments can be settled when they come up.

Central banks normally take responsibility to provide liquidity for payment settlements on RTGS Systems. This does not eliminate settlement risks but transfers it from the banks to central banks. Central banks who offer this facility also often require collateral from banks to mitigate these risks. DNS systems on the other hand often place much of the settlement risk on the payee, the payees bank or the clearinghouse. Even in these systems, however, the use of overdraft facilities backed by collateral is increasingly being used to limit and share risks amongst participants in LVTS. The issue of how to share the risks and costs of operating LVTS is therefore critical to an efficient and safe payments system.

In this regard, Berger et al (1996) argue that when deciding on the distribution of risks in the LVTS the authorities must weigh three main factors. Firstly, the authorities must consider the comparative advantage in evaluating, monitoring and

⁹ This is a cost to banks which shifts the cost and risks of operating the payments system to banks who often

controlling the risks of the payor. Whichever party is bearing most of the risk is likely to devote resources to collecting information on and disciplining the payor. The question here is whether market discipline, regulatory discipline or some combination of both is optimal.

Secondly, there is likely to be differences between private and public risk/loss tradeoffs. Payment intermediaries, payees and payors may undervalue systemic risks since some of the risks are borne by parties not involved in their payment transaction. This may lead to a situation where there is not enough incentive to provide market discipline or a situation where it is too difficult or expensive to monitor and discipline risks that are several counter-parties removed from their own transaction. In contrast, Rochet and Tirole (1996) argue that the current evidence of substantial interbank lending implies that banks do a considerable amount of monitoring of each other. They do concede, however, that the interbank market might fail to discipline systemic risks and, could increase systemic risks by providing a conduit for contagion.

Thirdly, the authorities must consider which of the stakeholders in the payments system has a comparative advantage in terms of bearing risks in times of crisis. A central bank seem more likely of course to be able to bear the risk of a systemic liquidity crisis because it can manufacture any necessary amount of liquidity (Berger et al 1996).

In the context of these factors, the best system seems to be an arrangement in which the central bank will oversees the system, the commercial banks (through the interbank market) provide the liquidity (credit) required for the efficient functioning of the payments system under normal conditions and the central bank would be ready to provide emergency liquidity in times of crisis. Rochet and Tirole (1996) seem to suggest that this is the best system as they suggest that market participants provide the 'normal' credit needed to operate the LVTS, with central banks standing ready to

provide liquidity in the event of a systemic crisis.

In Trinidad and Tobago, the only large value transfer system is represented by the Special Clearing facility of the Central Bank. This system is based on a deferred net settlement and is paper based, with the instruments used for settlements comprising cheques or credit slips drawn on the Central Bank reserve account of commercial banks.

The settlement risks inherent in this system is mitigated by the fact that:

1. The banks involved confirm that there are sufficient funds to settle the transaction on a transaction by transaction basis.
2. The transaction on the reserve account is 'virtually' made on the same day., and
3. There is a significant source of liquidity in the form of reserve accounts because of the maintenance of relatively high reserve requirements, which can be used for the settlement of payments.

The current system does present potential areas of risk. The fact that neither the central bank nor the commercial banks can monitor their reserve account on a real-time basis precludes same day assessment of liquidity levels in the system. This leaves room for liquidity problems to emerge if there are unusually large payment transactions that hamper the liquidity management efforts of the parties involved.

Additionally, banks can potentially clear large value transactions among themselves outside of the Special Clearing mechanism, which takes the central bank out of the information loop. This could have negative implications for liquidity management on the part of the Central Bank and on its ability to contain systemic risks. The fact that active consideration is now being given to setting up an electronic LVTS using SWIFT as a platform increases the need to address these issues now.

Another important payment system is the potential impact changes to and the

structure of the payments system can have on the Central Bank in the execution of monetary policy. According to Santomero and Seater (1996), the amount of each monetary and non-monetary asset held is not only determined by return characteristics but also by its liquidity or conversion costs needed to complete payment transactions using different payments instruments. Significant change to the payments system can in principle affect these conversion and transaction costs and possibly the demand for money and other financial instruments.¹⁰ As the payment system develops and funds are transmitted more quickly, cheaply and safely, it is likely that the demand for money would decrease other things being equal. This uncertainty in money demand has resulted in the use of monetary aggregates being less of a driver for monetary policy implementation. Partly for this reason, price variables are now preferred to quantity variables as intermediate targets in the implementation of monetary policy. This trend is likely to become entrenched as the payment system develops and new payment media become widely accepted.¹¹

On the other hand, improvements in the payment system would tend to make the monetary policy initiatives of the central bank filter more quickly through the financial system as uncertainty about settlement and settlement delays are reduced (as the payment system is the conduit system for monetary policy). This allows the central banks to be more efficient and timely in the execution of monetary policy. The net effect on central banks ability to execute monetary policy effectively is of course an empirical issue, which is beyond the scope of this paper.

Conclusion

Developments in the structure of the payments system in Trinidad and Tobago have serious implications for the management of systemic risks and the operation of monetary policy. The increase in the demand for electronic payment at the retail levels call for changes in the approach to supervision, as well as to the legislative framework in which payments institutions operate. This is necessary to protect

¹⁰ For example, transaction costs on a particular payment instrument may decrease as that payment instrument become more widely accepted (Humphrey et al 1996).

¹¹ The use of different payments media is also likely to make it much easier to move funds between transaction and savings accounts leading to a situation where the relationship between the demand for money for transaction purposes and real economic activity is weakened.

stakeholders in the system but it can also serve as an important catalyst for making new payment media more acceptable (higher demand).

The structure and potential developments in the LVTS in Trinidad and Tobago also have serious implications for systemic risks and the monitoring and control of these risks. It is likely that the continued use of a deferred net settlement system (DNS) will continue to be the best system for Trinidad and Tobago because a real-time gross settlement system requires a huge amount of liquid resources that implies huge cost to the participants in the system. It also requires huge capital investments in computer and telecommunications equipment and software. In any event, RTGS systems only seem to transfer the credit risks to central banks and other providers of intraday credit in these systems. The best way forward seems to be to maintain the current DNS system and replace its paper-based clearing and settlement systems with automated systems. The system should also allow the central bank and commercial bank to monitor intraday liquidity levels which assist the Central Bank in the containment of systemic risks and allow commercial banks to better manage their liquidity.

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APPENDIX

Table I
Payment Instruments Utilization Level Indicators

Payment Instrument	Year				
	1995	1996	1997	1998	1999
Cash (\$M)	833	910	1,063	1,020	1292
Cheque Received (\$M)	-	-	144,193	147,205	237,905
Credit Card Loans (\$M)	194.8	264.9	421.4	558.2	651.2

Source: Central Bank of Trinidad and Tobago

Table 2
Electronic Payments System Indicators

Indicator	Year				
	1996	1997	1998	1999	July 2000
No. of ATM Machines	NA	NA	234	251	254
Volume of ATM Transactions (000's)	7678.7	12,148	15,764.7	15,829.1	8,370.0
No. of EFTPOS Machines	NA	2,933	4,677	6,052	6,604
No. of EFTPOS Transactions	26,323	767,513	2,162,866	3,157,207	1,467,910
No. of Credit Cards (\$M)	89,028	109,312	126,957	134,950	NA
Value of Credit Card Loans Outstanding (\$M)	264.9	421.4	558.2	651.3	NA
Total Messages Sent on SWIFT	72,123	84,413	100,990	141,452	NA
Total Messages Received on SWIFT	88,987	87,702	105,732	147,995	NA
Total Messages Sent and Received Locally on SWIFT	156	302	395	434	NA

Source: Central Bank of Trinidad and Tobago