

# The Drivers of The Recent Payment Systems Reforms Globally\*

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## Abstract

In this paper we introduce and discuss the three drivers of recent intensive payment systems reforms globally in the last 5 years in the process of implementing safe and efficient payment systems. We define the first driver as the strong domestic demand for financial stability and better financial services. The second driver is the increasing level of international cooperation and efforts of international financial institutions. The third driver is the impact positive externalities of globalisation reflected in the ICT area. The ICT firms are providing “turnkey” payment systems solutions and ready-to-use network, namely SWIFT, for a world economy of any size to go live with a robust payment system infrastructure. When we analyse various payment systems reform cases from the world economies under different groups, we observe the impacts of these drivers strongly. Yet there are weaknesses in most of the systems worldwide, when these systems are assessed against the newly developed “best-practices” named the core principles for Systemically Important Payment Systems as developed under the aegis of BIS/CPSS. In our analysis, we also observe that these drivers are also helping for the world economies not only to implement the first generation of payment systems but also to continuously improve their systems to meet higher standards.

*JEL Classification: E59, O57.*

*Keywords: Payment Systems, Oversight, Financial Stability, IFIs, Globalisation, Core Principles, Systemically Important Payment Systems, FSAP, RTGS.*

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\* The views expressed in the paper are of the author and do not represent those of the Central Bank of the Republic of Turkey, or its staff.

## 1. Introduction

Payment systems area is emerging as a new discipline in economics and finance, which was regarded as *only* a technological infrastructure issue until recently.

The amount of academic studies and researches produced to analyse its effect on macro and micro economy is quite limited in number. Areas like the impact of payment systems on monetary policy, transmission mechanisms, and financial stability and on issues concerning regulation, innovation, pricing, and competition remain to be further investigated.

Yet there are excellent papers accessible from Federal Reserve, Bank of England, Bank of Finland, IMF and World Bank resources, among others.

Recently, we observe intensive reforms carried out by most of the world economies of any size in the process of implementing safe and efficient payment systems or improving the existing ones worldwide in the last 5 years particularly. And in fact huge resources are being spent for this process, in both advanced and developing countries. What are the drivers behind these efforts of the intensive reforms going on and their subsequent positive results?

We shall quite often mention “safe and efficient payment systems”, where safety and efficiency are accepted as public policy objectives.

We observe that there are three main drivers of these reforms:

We call the first driver “*domestic demand*”, pushed by economic agents in an economy to provide financial stability and advanced financial services. Central banks have increased their efforts for improving the effectiveness of monetary policy by implementing robust payment systems. Private sector and their customers are looking into the ways to improve the infrastructure for payments and thus accessing to better banking services and in the meantime increasing liquidity in the system. Having smoothly running payment systems is also regarded one of the basic factors of national competitiveness, we may observe this fact in central bank web sites when they describe the effectiveness of their national payment systems.

Second driver is the growing and institutionalised framework of *international cooperation* and the efforts of international financial institutions (IFIs) in this context to assist the member countries and also to enforce the establishment of “best-practices” in payment systems for a global financial stability. After the G-7 summit in Lyon in 1996 where a strategy was developed to improve payment

systems' reforms worldwide, inter alia, as one of the key elements of financial stability and international financial institutions were called for action to speed up their efforts. In 2000, under the aegis of BIS/CPSS, a report was produced to set up standards and "best-practices" in payment systems named the "Core Principles for Systemically Important Payment Systems" (we shall hereafter refer to this shortly as "core principles") and soon after IMF and WB started a process (FSAP) to assess, among other things, the payment systems in member countries against the core principles and furthermore to enforce the best-practices by also providing financial and technical assistance.

The third driver, we believe, is the existence of innovative products and services of ICT firms, which we call the impact of positive externalities of *globalisation* in this context. Some global IT firms provide product-based (in some cases, *off-the-shelf* or somewhat *turn-key*) solutions that is tailored for any type of world economy to go live with a *robust* payment system much quicker than with any bespoke developed payment system. And we should also mention SWIFT<sup>1</sup>, the world's banking and payments network, somewhat a monopoly. SWIFT provides highly reliable communications network, tailored to be used for any national or cross-border payment system's requirements. Even for the developing economies where telecommunications infrastructure may be quite poor, SWIFT's global web may provide them with the standard high security and reliability infrastructure that they need in the process of implementing national payment systems.

In this paper we shall introduce and discuss these three drivers to analyse whether these drivers have actually contributed to the increasing numbers and robustness of the payment systems worldwide. And then we shall investigate what the new challenges are for the world economies, whilst in the history of payment systems so far, most of the widespread successful implementations of payment systems globally have been accumulated in the passing 5 years, as a result of concerted efforts explained above.

In Chapter 2 of this paper, we shall introduce major concepts, current issues and recent developments of payment systems providing a context for the vitality of payment systems for an economy of any size, and as a result, why public policy

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<sup>1</sup> SWIFT is the financial industry-owned co-operative supplying secure, standardised messaging services and interface software to 7,650 financial institutions in over 200 countries. SWIFT's worldwide community includes banks, broker/dealers and investment managers, as well as their market infrastructures in payments, securities, treasury and trade.

objective is so strongly dedicated to improving payment systems' effectiveness, which is in fact *the first driver*. We shall also explore the roles of public and private sector, focusing particularly on the roles of the central banks. This chapter will conclude with an introduction of a very prominent recent report of BIS/CPSS on the "Core Principles for Systemically Important Payment Systems" that actually set the standards (these standards are also called "best-practices") for payment systems. In this context, the focus of this paper is inter-bank Large Value Payment Systems (LVPS), although payment system issues go far beyond LVPS and extent into the other related settlement systems of securities<sup>2</sup> and foreign exchange and retail payment systems, e-payments, e-money etc., which require more detailed analysis in a similar fashion in their own merit.

In Chapter 3, we shall analyse the existence and role of international cooperation in the reform process worldwide, *the second driver*. Here we will provide insight into how individual economies of the world, categorised under various groupings, are progressing towards meeting the high standards of the core principles. In this context, we analyse 21 countries in different groups by looking at the findings of IMF/WB joint initiative, FSAP reports that assess the implementation of the above-mentioned best-practices in these countries, which is the main element of international cooperation. We categorise the countries as advanced, major emerging market, EU accession, transition and developing countries. In doing this analysis, we also provide information from various resources, where available, to understand the level of international financial and technical assistance to individual countries.

In Chapter 4, we analyse the positive effects of global ICT firms to this process by providing product-based payment systems solutions and network infrastructure, which we believe are reflected in the reform process as positive externalities of *globalisation* in payment systems, i.e. the *third driver* of the reforms. Yet, as we shall discuss, this force by itself alone is not providing a total solution to meet all the criteria in the core principles, there are other challenges that need to be addressed from within the economy by organising and coordinating the domestic stakeholders on the issues like legal infrastructure, governance, transparency and

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<sup>2</sup> Indeed most often, payment systems' issues of financial stability and principles of safety and efficiency we mention in this paper are also true in case of Securities Settlement Systems (SSS) as public policy objectives. In advanced economies, payment and securities settlement systems are inter-connected and operationally integrated. They are often named together as Payment and Securities Settlement Systems (PSSS).

some others to implement a payment system that could be called as “*safe and efficient*”.

In Chapter 5, we shall conclude with a summary of the findings.

## **2. Why Payment Systems are Vital for An Economy; Public Policy Objectives and Associated Issues**

### **2.1. Payment Systems Background**

*“If, as Milton Friedman once noted, very few things in a society can happen if they are not financed by money, then the way in which money is transferred across people must be one of society’s most crucial concerns. Indeed, rules have been laid out by markets and governments in all countries and at all times to ensure that payments were effected as safely and expeditiously as feasible, given the state of technological and institutional development. Only recently, however, with the economies becoming webs of massive and rapid payment flows with very large risk potentials, governments have started to consider systematically how to oversee payment activities.”* (Bassone and Cirasino, 2001)

A payment system consists of a set of instruments, banking procedures and, typically, interbank funds transfer systems that ensure the circulation of money (BIS/CPSS-Glossary, BIS/CPSS-Red Book, 1993 and EU-Blue Book, 1999).

A typical payment system interconnects the banks and central bank, and recently mostly in real-time computer networks and enable them to exchange payments. Although it may appear to be an expensive technology issue rather than anything else at the first glance, it is equally challenging in terms of legal, operational and governance issues as there are very high values flowing through the payment systems with questions of sufficient containment of credit and liquidity risks, settlement finality, creditworthiness of settlement assets, responsibilities of players, contingency arrangements, accountability and transparency of governance, and so on. The problem may even be more complicated when we consider the direct participants of systems becoming non-banks as well besides banks that are not regulated as strictly as banks and in certain cases connection requirements of payment systems to securities settlement systems and/or cross-border connections.

Payment systems are a vital part of the economic and financial infrastructure. Their efficient functioning, allowing transactions to be completed safely and on time makes a key contribution to overall economic performance (Bank of England-Oversight, 2000).

While safe and efficient payment systems are critical to the effective functioning of the financial system and financial stability, poorly designed payment systems may be major channels by which shocks can be transmitted across domestic and international financial systems and markets (BIS/CPSS-CPSIPS, 2001).

## **2.2. How Payment Systems Evolved in the Last Three Decades**

In early 80's there were not well-established standards or knowledge of "best practices" for payment systems. There were very few implementations around the globe that could be pointed as safe and efficient when we look back with the perspective and knowledge of today. The interest of the related international institutions was not there and yet central banks were exchanging expertise and experience mainly on bi-lateral basis.

The challenge was to plan and build an efficient payment system for the conduct of monetary policy successfully and improving banking services for any economy. The safety and governance issues were not amongst the items of top priority.

It was also the time that MNCs were prioritising and emphasising the importance of well-functioning payment systems in a country when they speak about their future investment rationales, and they were encouraging world markets, including emerging markets, to implement efficient payment systems and develop cross-border connections, preferably in a STP<sup>3</sup> (Straight Through Processing) fashion, considering that that they could speed up collecting their generated funds in retail offices via domestic payment systems and then they could move their money to their overseas accounts via internationally connected payment systems.

On the other hand, the crises of the second half of the 90's in Asia and South America revealed serious flaws not only in macro economic management, but also in the structure and regulation of financial markets in both debtor and creditor countries. This brought about international policy responses in a number of areas (Trundle, 2000).

As a result of the growing interest in implementing safe and efficient payment systems globally and seminal works on payment systems namely so called "Red Books" describing G-10 countries' payment systems and then Lamfalussy Report on inter-bank netting schemes, efforts by individual countries, both in advanced and

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<sup>3</sup> STP is considered to be a fully automatic and computerised way of transaction processing, with minimal or no manual intervention.

emerging markets, increased this process of building and renewing existing systems and level of international cooperation became more systematic under the aegis of BIS/CPSS.

In 1997, an ad hoc working party on financial stability in emerging market economies was set up in response to an initiative taken at 1996 summit of G-7 at Lyon. It set out a strategy for fostering financial stability in countries experiencing rapid economic growth and undergoing substantial changes in their financial system. One of the key elements of robust financial systems was reported to be “promoting robust payment, settlement and custody arrangements” and the report indicated that “the Committee on Payment and Settlement Systems of the G-10 central banks should continue to foster the development of efficient and robust payment and settlement systems and practices” (Draghi, 1997).

Then there came the BIS/CPSS report on CPSIPS (2001) (see section 2.8), where most of the issues in the process of planning and implementing safe and efficient payment systems were addressed in detail under the consensus of central banks and banks worldwide and related international institutions.

IMFC and G-7 also highlighted the importance of assessing vulnerabilities by an approach “promoting the stability and integrity of the international monetary and financial system, as a global public good” (IMF-Communiqué, 2001).

Eventually, IMF and World Bank initiated a policy to enforce the implementation of best practices as mentioned in this report on a global base.

Therefore, *the new millennium* started to be a time in the history of payment systems where standards, best-practices and associated assessment procedures were quite clearly in place and furthermore the roles of central banks were defined and detailed. Thanks to the strong partnership of international financial institutions, central banks and private sector globally, not only advanced economies have the capability of building safe and efficient payment systems but also emerging and developing economies have the necessary guidelines to move forward in this process.

### **2.3. Payment Systems Industry**

#### **2.3.1. Central Banks**

Central banks have a leading position in payment systems, particularly because of their strong interest in financial stability, their role in providing settlement

accounts for payment system participants, and their concerns with the functioning of money markets for the implementation of monetary policy and with maintaining confidence in the domestic currency both in normal circumstances and in a crisis. The expertise they have developed through carrying out these functions means that central banks have a leading role to play in respect of *systemically important payment systems*<sup>4</sup>; in many cases they have been given explicit responsibilities in this area (BIS/CPSS-CPSIPS, 2001).

In 80's and maybe even in 90's, probably the role of central banks in payment systems, among other things, could not be very clearly defined in a standard way all throughout the world economies, though in most of the cases it was de facto the central banks that planned and implemented and even operated the major payment systems in the country. And the controversy was there as to whether central banks (public sector) or banks (private sector) had to have a leading role in payment systems.

However, starting with the new millennium, particularly after the report of BIS/CPSS on the core principles, the role of central banks are now clarified in that they are supposed to play a *very active* role in payment systems, defined by the relatively new concept "oversight" as explained below in Section 2.3.3.

Today when we look at the implementation worldwide, we see that central banks are, in most of the cases the owners and operators of the country's large value payment systems, as well as they are the regulators and overseers of the payment systems owned by themselves or by private sector. Recently most of the central banks have amended their laws to include their role in smooth functioning of payment systems

### **2.3.2. Private Sector**

When we speak of private sector in the context of payment systems, we usually refer to the banks acting in an economy. The banks have their account with central banks and they use mainly central bank accounts to transfer funds between themselves.

On the other hand, they are the providers of payment services to their retail or corporate clients. Indeed some major international banks are said to own and operate payment networks that are in some cases larger in value and volume than most of the national payment systems around the globe.

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<sup>4</sup> Systemically important payment systems (SIPS) are explained in Section 2.8.

The banks usually have some clearinghouses in a country that is set up by their own finance and management, usually under the coordination of the bankers associations. This type of systems, as being different from the central bank's owned and operated systems tend to be Deferred Net System (DNS) systems, where the priority is liquidity creation via multilateral limits and deferred settlement.

The banks are direct members of central bank systems that they prefer to use mainly for monetary policy payments.

### 2.3.3. Oversight Function

BIS/CPSS glossary (2003) defines the oversight function as “a central bank task, principally intended to promote the smooth functioning of payment systems and to protect the financial system from possible ‘domino effects’ which may occur when one or more participants in the payment system incur credit or liquidity problems. Payment systems oversight aims at a given system (e.g. a funds transfer system) rather than individual participants.”

The threats to financial sector, real economy and currency posed by risks (see section 2.5) arising from payment and securities settlement must be limited by implementing suitable measures. With this particular goal in mind, the central banks have drawn up various oversight standards (Bundesbank, 2004).

Padoa-Schioppa (2003) defines this function as “a neologism for an old central bank activity, which is the process of being reshaped in a new and more formal way”.

As an example, one of the four basic tasks of European Central Bank is “the promotion of smooth functioning of the payment systems” as depicted in BOX 1 below.

#### **BOX 1. Oversight Role of ECB**

*European Central Bank states its interest in payment systems as following:*

*“Like any central bank, the ECB, together with the Eurosystem is interested in the prudent design and management of the payment and securities clearing and settlement systems which process its currency. It pays close attention to their smooth functioning, as well as to reducing the related potential risks.*

*The smooth functioning is crucial for: a sound currency and for the conduct of monetary policy, the functioning of financial markets and the maintenance of banking and financial stability.” (ECB Website)*

Payment systems oversight function is defined as a duty of central banks to achieve objectives relating to the safety and efficiency of the payment systems by monitoring existing and planned arrangements and assessing them against objectives and policies and eventually planning and implementing necessary changes. Recently oversight function is structured to make sure that the core principles are met by the systems overseen and central bank is fulfilling its responsibilities as defined in this report.

#### **2.3.4. Oversight Function vs. Supervision Function**

Oversight function is mainly used in the context of payment systems and it is separate from but closely related to banking supervision.

Payment system oversight concentrates on the stability of the system as a whole, while the supervisors of individual banks and other financial institutions focus on the risks to specific participants. In particular, in assessing payment system risks, overseers may need to take into account the ability of individual participants to fulfil their responsibilities in the system. In monitoring the financial risks for an individual institution, the supervisors may need to take into account risks to which participants can be exposed as a result of participation in the systems and which could affect the viability of the institution. Regular exchanges of views and information between supervisors and overseers, including, where relevant, about key individual participants, can assist these complementary objectives. These exchanges can often benefit from agreements on the sharing of information (BIS/CPSS-CPSIPS, 2001).

#### **2.3.5. Competition**

As we shall discuss later payment systems industry may broadly be categorised into two market segments: wholesale payments (very large amounts but low transaction volumes) and retail payments (usually low amounts and very high transaction volumes).

What we observe today worldwide is that large value payment systems are the central bank monopolies. Have market forces failed even in advanced economies to implement the country's main large value payment systems or is it because payment system services are not sufficiently deregulated?

As Bassone and Cirasino (2001) discusses, to achieve the two-fold public policy objectives in payment systems, namely "safety and efficiency", may require

markets for payment services to be largely concentrated and eventually to be dominated by a few or even by a single provider. And then they suggest that because of this, the set of operational objectives of the overseer should be broadened to include protection of participants and users from risks of monopolistic practices.

Besides, central banks' being a monopoly in large value payment systems is mainly a consequence of central banks statutory role and of the fact that final settlement takes place in central bank money as settlement asset as we discuss in detail in Section 2.7.

On the other hand, central banks apply payment fees to their services to recover their investments and operating costs in the long run. Therefore, it could be said that the central banks charge the banks quite reasonably for payment services.

In fact, the controversy on competition in this context is rather based on the way that the commercial banks charge their customers for payment services.

In UK, the Cruickshank<sup>5</sup> report, investigating competition in UK banking services, concluded that there was a profound lack of competition in payment systems (HM Treasury, 2000 and 2001). According to the review, this was caused by the underlying economic characteristics of the industry, where *network effects*<sup>6</sup> place a natural limit on the level of competition<sup>7</sup>.

In the context of developing economies, as we shall discuss with various examples in Chapter 3, it could be said that market forces not only have failed in large value payment systems but also they have failed in implementing retail payment systems and securities settlement systems, where public sector is expected to do wise investment decisions.

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<sup>5</sup> This report was prepared after the Chancellor of the Exchequer had asked Mr. Don Cruickshank to carry out a review of the banking industry in the UK, with a particular remit to consider the levels of innovation, competition and efficiency in 1998.

<sup>6</sup> Kari Kempainen (2003) discusses that payment systems industry inherently has many characteristics in common with network industries.

<sup>7</sup> Consequently the Chancellor of Exchequer stated that "The money transmission system affects every cheque, every credit card and every debit transaction. It reaches from every local cash dispenser to every corporate inter-bank transfer. Today I am announcing that we will legislate to ensure the UK payments system is open to new competition." (Budget Speech 21 March 2000). Then a task force is created following the Chancellor's Pre-Budget report in November 2003 which said that the OFT would take on an enhanced role on payment systems for a period of four years.  
(<http://www.ofc.gov.uk/Business/Payment+systems+task+force/default.htm>)

On the other hand, an important conference<sup>8</sup> was organised jointly by ECB and BIS/CPSS in Frankfurt in 2003 in that private and public (central banks in this sense) sector authorities came together and discussed the “private and public sector challenges” in payment systems. One conclusion may be drawn safely from the papers, among other things, that the consolidation of wholesale, retail and securities settlement systems are continuing at a rapid pace globally to increase the level of efficiency and consumer satisfaction to the extent that scale and scope economies are reached in the services. Yet consolidation has almost realised in the large value payment systems, particularly in EU context and not so much in the others.

#### **2.4. Role of International Financial Institutions**

##### **Role of BIS**

Bank for International Settlements (BIS)’ “The Committee on Payment and Settlement Systems (CPSS)” (BIS/CPSS) has been serving as a forum for the central banks of the Group of Ten countries (G-10) to monitor and analyse developments in domestic payment, settlement and clearing systems as well as in cross-border and multi-currency settlement schemes. The work of the CPSS has contributed to a growing awareness of the need for sound risk management in large-value funds transfer systems. Estimates compiled by the CPSS indicate that these systems transfer the equivalent of several trillion dollars per day in CPSS countries, a large portion of which is related to the settlement of financial market transactions. These systems and their risk management arrangements have often been a focus of the Committee's discussions, and over time it has compiled substantial information on their main characteristics both in CPSS and non-CPSS countries.

Although BIS/CPSS does not officially define its works as “setting the standards” but rather defines its role as “contributing to the setting of the standards” indeed in practice what has come with the BIS/CPSS reports are globally accepted as “standards” in payment systems.

##### **Role of IMF and World Bank**

IMF and World Bank (WB) are jointly involved in payment systems area by assisting member countries in implementing the best-practices and enforcing their implementations. Particularly as part of the FSAP (Financial Sector Assessment

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<sup>8</sup> The conference papers and presentations of this event are freely accessible from ECB's Website, [http://www.ecb.int/events/conferences/html/sector\\_challenges.en.html](http://www.ecb.int/events/conferences/html/sector_challenges.en.html)

Program), IMF and WB carry out analysis to help central banks to strengthen payment systems infrastructure to minimise vulnerabilities to internal or external shocks. IMF and WB expert staff are increasingly more involved in this issue and they join the “task forces” under the aegis of BIS/CPSS to work in the preparations of payment systems reports.

## 2.5. Risks in Payment Systems

In section 2.1 we mentioned the reasons why payment systems are vital for the economy and also mentioned that their disruption could extend beyond the participants and the system and may threaten the money markets and other domestic and international financial markets.

Payment systems can be subject to a range of risks as explained below in BOX 2 (BIS/CPSS-CPSIPS, 2001).

### **BOX 2. Risks Inherent in Payment Systems**

**Credit risk:** *the risk that a party within the system will be unable fully to meet its financial obligations within the system currently or at any time in the future;*

**Liquidity risk:** *the risk that a party within the system will have insufficient funds to meet financial obligations within the system as and when expected, although it may be able to do so at some time in the future;*

**Legal risk:** *the risk that a poor legal framework or legal uncertainties will cause or exacerbate credit or liquidity risks;*

**Operational risk:** *the risk that operational factors such as technical malfunctions or operational mistakes will cause or exacerbate credit or liquidity risks; and*

**Systemic risk:** *in the context of payment systems this is the risk that the inability of one of the participants to meet its obligations, or a disruption in the system itself, could result in the inability of other system participants or of financial institutions in other parts of the financial system to meet their obligations as they become due. Such a failure could cause widespread liquidity or credit problems and, as a result, could threaten the stability of the system or of financial markets.*

Once these risks are properly analysed and assessed, appropriate and effective mechanisms must be devised to monitor, manage and control them (BIS/CPSS-CPSIPS, 2001).

In fact, a “good” payment system may be said of the one that has the most optimal control and mitigation of all these risks.

## **2.6. Classification of Payment Systems**

### **Classification by Value: Large Value vs Low Value Payment Systems**

Payment systems may firstly be classified by the amounts of funds that they are settling, whether wholesale, large inter-bank payments or retail, relatively small customer transfers.

Large Value Payment Systems (LVPS) process inter-bank money market transfers and central bank payments related to monetary policy transaction with significantly high values and the volume, i.e. the number of transactions, could be relatively small. These systems are fully electronic and automated systems connected to the banks, or in some cases non-banks as well, in real time transmission networks in advanced and emerging economies and some developing countries as well. Yet these LVPS are observed to be in forms of check clearing systems or some other types of manual processing systems in the majority of developing countries (these cases will be illustrated later in this paper by examples in Chapter 3). At least one LVPS in a country is owned and operated by central banks and they also realise the final settlement at the accounts of central bank. In developed markets we also observe LVPSs owned and operated by private sector, which are also connected to central bank LVPS for final settlement. Central bank owned LVPS are mainly modelled as Real Time Gross Settlement (RTGS) systems as we shall discuss in Section 2.6.2.

**Retail payment systems** are those where there is a large volume of customer transfers with relatively low values; these systems are mainly owned and operated by private sector. They mainly process public utility payments and direct debits, credit card transactions and checks in forms of Automated Clearing Houses (ACH).

There are quite a few cases where both large and small value payments are transferred and settled in one single payment system like Swiss SIC and Turkish TIC-RTGS systems (Heller, 2000 and Okay, 2001). Okay (2001) discusses that the idea in such a modelling can be explained as (1) even small values when added

together may turn into critically high values, implying systemic risks, (2) There may be economies of scale and scope for a central bank in expanding capacity of one system to accommodate retails, because the costs are significantly lowered and new services may be provided to the retail customers such as RTGS transfers by use of a commercial bank internet services, (3) The participants may have advantages as they have lower costs in having just one simple interface for payments and their liquidity is not divided between different systems and (4) The retail customers may benefit by the lower fees and new banking services with an safe, efficient and consolidated payment structure.

### **Classification by Settlement Type**

The processing of funds transfer involves two key elements. The first of this is type of *transfer* of information between the payer and payee banks. A funds transfer is initiated either by the transmission of a payment order or message requesting the transfer of funds to the payee. In today's modern payment systems payment messages are transmitted electronically via telecommunications networks and they are processed according to predefined rules and operating procedures. *Processing* may include procedures such as identification, reconciliation and confirmation of payment messages.

The second key element is settlement – that is actual transfer of funds between the payer's bank and the payee's bank. Settlement that is *irrevocable and irreversible* is described as *final* settlement. The settlement may be done on central bank accounts (central bank money) or on the commercial bank accounts (commercial bank money). In practice, final settlement of most of the payment systems will take place on the books of central bank (BIS/CPSS-RTGS, 1997).

Payment systems can be classified broadly into *gross settlement systems* and *net settlement systems*.

In a gross settlement system, the final settlement of funds occurs transaction by transaction, usually on a continuous or real-time basis. Systems that can effect final settlement on a continuous, transaction-by-transaction basis throughout the processing day are generally known as *Real-Time Gross Settlement (RTGS) systems*.

In a net settlement system, on the other hand, the final settlement of funds transfers occurs on a net basis according to the rules and procedures of the system at

specific designated times, these systems are *Deferred (or designated-time) Net Settlement Systems (DNS)*.

In the DNS Systems, the transmission and settlement of a payment takes place in time lags. The time lag between the reception time of the payment by the system and the time of its settlement creates one of the major risks in payment systems called "credit risk". Although the beneficiary has received the payment, the originator has not yet made the final payment in the books of the clearing system or central bank.

On the other hand, RTGS systems check the availability of funds on the originator's account before the system further process the payment message. Therefore, RTGS systems remove the possibility of credit risk. However, RTGS systems may cause another type of risk, liquidity risk. As the banks wait for incoming funds from counter-parties to proceed with pending payments, the payment system may go into a dead-lock situation causing liquidity problems. In modern payment systems this problem is overcome by advanced centralised queue mechanisms having grid-lock resolution facilities. And as it is observed with most of the RTGS systems today central bank daylight overdraft facilities greatly help to resolve the liquidity problems.

During the past ten years a number of countries have decided to introduce RTGS systems to help limit settlement risks in the inter-bank payments process. Practically all CPSS countries have RTGS systems in operation and many other countries have also introduced, or are in the process of introducing RTGS systems.

Indeed, as we shall discuss later in this paper on FSAP country cases, today's concept of safe and efficient payment systems is mainly explained by the definition of a well-designed RTGS.

### **2.7. Settlement Assets: Central Bank Money and Commercial Bank Money**

Another major issue in the field of payment systems relate to the settlement assets that a certain payment system is settling the credit and debit positions between the participants.

Money is fundamental to the functioning of market economies inasmuch as these are based on exchange and credit. Today, any widely used form of money is denominated in a given currency. By sharing a currency, the individuals of a community have in common a measure of economic value, a means to store value,

and a set of instruments and procedures to transfer this value. However, since the value of money lies in trust, there can be no absolute guarantee that confidence in the currency can be preserved over time. It may be shaken by a monetary crisis or by the malfunctioning of the payment system. As a result, maintaining trust in the currency, and thus facilitating its circulation, becomes a major public interest. The central bank is, in most countries, the institution designated to pursue this public interest (BIS/CPSS-CB Money, 2003).

BIS/CPSS-CB Money (2003) states, “in pursuit of its task, the central bank issues its own liabilities for use as money (central bank money). But the central bank is not the only issuer of money in an economy. The multiplicity both of issuers of money and of payment mechanisms is a common feature in all developed economies. Commercial banks are the other primary issuers, their liabilities (i.e. commercial bank money) representing in fact most of the stock of money. A healthy, competitive commercial banking market is seen as an essential element of an efficient and effective economy and thus central bank and commercial bank money coexist in a modern economy”.

Then how can commercial bank money be regarded as safe settlement asset in payment systems? According to BIS/CPSS-CB Money (2003), “confidence in commercial bank money lies in the ability of commercial banks to convert their sight liabilities into the money of another commercial bank and/or into central bank money upon demand of their clients. In turn, confidence in central bank money rests in the ability of the central bank to maintain the value of the stock of currency as a whole (i.e. not only of the small portion it issues directly), or its inverse, to maintain price stability”.

BIS/CPSS-CB Money (2003) mentions that there are two forms of central bank money: Banknotes and deposit money; banknotes, the most visible symbol of a currency, play a widespread role in retail payments. On the other hand, central bank deposit money plays a crucial role as the settlement asset in payment systems that transfer substantial values of funds each day and where there is significant potential systemic risk. In fact, central banks recognise that the ability to make payments safely and efficiently is crucial to the functioning of the financial system, both domestic and global and that sound and efficient payment mechanisms enhance the allocation of resources, facilitate growth and improve social welfare.

As we shall discuss below in Section 2.8, one of the best practices in payment systems has been defined as *“Assets used for settlement should preferably be a claim on the central bank; where other assets (commercial bank money) are used, they should carry little or no credit risk”*.

### **2.8. Newly Developed Standards or “Best-Practices” in Payment Systems: “Core Principles For Systemically Important Payment Systems”**

Recognising the importance of well-functioning payment systems for financial stability in 1990s, international financial institutions pushed the process forward to define and eventually enforce the implementation of standards. In 1998, a Task Force composed of payment system experts of G10 and nonG10 central banks, IMF and WB was set up under the aegis of BIS/CPSS to write a report on the international standards and best practices in the area of payment systems.

The Task Force identified, first, two public policy objectives as “safety and efficiency” for the so-called “systemically important payment systems (SIPS)” and then 10 core principles and 4 responsibilities were set-out for SIPS.

In January 2001, BIS/CPSS published the report “Core Principles for Systemically Important Payment Systems”. The report was discussed globally by regional meetings before it was finalised. The report sets out ten core principles for SIPS and four “responsibilities” of the central banks in applying the core principles (BIS/CPSS-CPSIPS, 2001).

The core principles were actually developed to serve as guidelines to promote safety and efficiency in the design and operation of SIPS.

A payment system is “systemically important” where, if the system were insufficiently protected against risk, disruption within it could trigger or transmit further disruptions amongst participants or systemic disruptions in the financial area more widely. Systemic importance is determined mainly by the size and nature of the individual payments or their aggregate value. Systems handling specifically large-value payments would normally be considered systemically important (BIS/CPSS-CPSIPS, 2001).

The core principles are defined in BIS/CPSS report (2001) as follows:

**BOX 3. Core principles for Systemically Important Payment Systems**

*CP1. The system should have a well-founded legal basis under all relevant jurisdictions.*

*CP2. The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.*

*CP3. The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.*

*CP4. The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.*

*CP5. A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.*

*CP6. Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk.*

*CP7. The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.*

*CP8. The system should provide a means of making payments which is practical for its users and efficient for the economy.*

*CP9. The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.*

*CP10. The system's governance arrangements should be effective, accountable and transparent.*

And the role of central banks in applying the core principles are defined in BIS/CPSS report (2001) as follows:

**BOX 4. Responsibilities of the central bank in applying the core principles**

*A - The central bank should define clearly its payment system objectives and should disclose publicly its role and major policies with respect to systemically important payment systems.*

*B- The central bank should ensure that the systems it operates comply with the core principles.*

*C - The central bank should oversee compliance with the core principles by systems it does not operate and it should have the ability to carry out this oversight.*

*D - The central bank, in promoting payment system safety and efficiency through the core principles, should cooperate with other central banks and with any other relevant domestic or foreign authorities.*

The core principles may be classified under the headings of “safety” and “efficiency” as follows:

Safety: CP1: Sound legal basis, CP2: Clear understanding of financial risks, CP3: Proper management of financial risks, CP4: Prompt final settlement, CP5: Completion of settlement and CP6: Safe settlement asset.

Efficiency: CP7: Operationally secure and reliable, CP8: Practical and efficient way to make payments CP9: Fair and objective participation criteria and C10: Sound governance.

## **2.9. Two Other Closely Related Settlement Systems: Securities and FX Settlement Systems and Pan-European Payment System: TARGET**

### **Securities Settlement Systems**

Securities settlement systems (SSS) are implemented to process bonds and bills and settle the results of the transfers from a bank’s stock account into another bank’s stock account. In order to eliminate the principal risk in SSS a cash settlement system, preferably an RTGS, is required to settle the two separate legs of the transactions simultaneously, i.e. *delivery versus payment*. Today, the safest model is an RTGS system connected to an SSS in real-time delivery versus payment where two sides of the transaction are exchanged and settled simultaneously, which is also called real-time DvP Model 1.

These systems likewise influence the smooth settlement of payments in many ways. Smoothly functioning Securities settlement systems are also necessary to

enable banks to transfer securities as collateral to the payment systems quickly and efficiently. This collateral serves to increase central bank liquidity to provide intra-day credit and it can also be deployed in the framework of monetary policy operations (Bundesbank, 2004).

Under the aegis of BIS/CPSS and IOSCO recommendations were developed to promote the implementation of measures that enhance financial stability, reduce risks, increase efficiency and provide adequate safeguards for investors (BIS/CPSS-IOSCO, 2001).

### **A Global FX Settlement System: CLS (Continuous Linked Settlement)**

CLS Bank is based in New York and is an Edge Corporation bank supervised by the Federal Reserve. CLS Bank is a multi-currency bank, holding an account for each Settlement Member and an account at each eligible currency's Central Bank<sup>9</sup>, through which funds are received and paid. Technical and operational support is provided by CLS Services, an affiliate of CLS Bank (CLS Website).

CLS Services, based in London, provides operational and back-office support to CLS Bank.

With the average daily turnover in global FX transactions at almost US\$2 trillion, the FX market has long needed an effective cross-currency settlement process.

CLS is a real-time system that enables simultaneous settlement globally, irrespective of time zones. It provides an ongoing process of submitting instructions - receiving payments of specified currencies from customers; funding - settling pairs of instructions that satisfy all criteria and execution - making pay-outs in specified currencies. Settlement is final and irrevocable or funds are returned same day. Participating banks get real-time settlement information that helps them to manage liquidity more efficiently, reduce credit risks and introduce operational efficiencies.

### **The First Cross-Border Single Currency Payment System: TARGET**

In the European Union context, payment systems have been growing in importance over the past two decades. This is a result of an increase in both the volume and the value of transactions stemming from money and foreign exchange

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<sup>9</sup> As of January 2005, 15 major currencies are processed in CLS by having real-time connection to the RTGS systems of the respective countries.

markets and from financial markets in general. The introduction of the Euro in 1999 fostered their integration in the Euro area and in the European Union in general (ECB Website).

TARGET is the RTGS system for the Euro, offered by the “Eurosystem”. The Eurosystem comprises the European Central Bank (ECB) and the National Central Banks (NCBs) of those countries that have adopted the Euro. Since 1 January 1999 the ECB has been responsible for conducting monetary policy for the Euro area - the world’s largest economy after the United States. Target is used for the settlement of central bank operations, large-value Euro inter-bank transfers as well as other Euro payments. It provides real-time processing, settlement in central bank money and immediate finality (ECB Website).

TARGET was created by interconnecting national Euro real-time gross settlement (RTGS) systems and the ECB’s payment mechanism. It went live in January 1999. The launch of the single currency necessitated a real-time payment system for the Euro area: to provide the payment procedures necessary for implementing the ECB’s single monetary policy, and to promote sound and efficient payment mechanisms in Euro.

In October 2002 the Governing Council of the ECB decided on the long-term strategy for

TARGET, the new project named as: TARGET2. TARGET2 is to become a system that provides extensively harmonised services via an integrated IT infrastructure and improves cost-efficiency. It is also prepared for swift adaptation to future developments, including the enlargement of the Eurosystem.

## **2.10. The Future of Payment Systems**

Payment systems are developing at a faster speed as the computing technology and Internet capabilities are developing even faster and new user requirements are emerging.

At present, payment systems are said to face the challenge of the Internet, the new wave of Information Technology. The Internet has the potential to impact the critical aspects of payment systems: their technical architecture, their underlying business models and systems governance, as well as the relationships with customers and technology suppliers (Global Electronic Finance, 2002).

Livarinen et al. (2003) states that “a number of signs are suggesting a *kind of revolution* concerning payment services and standards for payment systems: globalisation, integration, increasing speed (complete switch to real time), consolidation, growing payment volumes and new market participants”. Livarinen et al. (2003) also discuss that globalisation of payment systems requires the regulators and supervisors of national systems to cooperate internationally to control increasingly complex international entity of payment systems.

When we look at the payment systems design and implementation process from the developed economies’ point of view, it is basically finding the right balance between regulation and innovation, regulation driven by consideration of safety and innovation driven by efficiency.

Padoa-Schioppa (2003) states that two powerful drivers push the evolution of payment systems: innovation and internationalisation.

We observe the positive effects of private sector innovations, for example, in the successful implementation and operation of the CLS system as we discussed in section 2.9.

Payment system innovations have also been driven by central banks, the regulatory authority at the same time. We also observe that central banks have been in close coordination with the private sector when they plan and implement new systems as seen in the cases of TARGET and new design works of TARGET2 as we discussed in the previous section.

Below we discuss some recent issues that may potentially affect the design of payment systems.

### **Is the Segmentation of Payment Systems Blurring?**

With the advance of technology and processing capabilities of large volumes and also growing demand of customers for better retail payment services recently, segmentations between payment systems differentiated as high value and low value is fading and blurring (Padoa-Schioppa, 2003).

Private sector practitioners indicated at the recent SIBOS Conference (2004) that today RTGS systems are processing more low value payments (Murphy, 2004) and segmentation between high and low value is becoming irrelevant (Eacott, 2004).

### **Is RTGSPlus the Future Direction in LVPS as Replacement of RTGS systems?**

RTGSPlus is the new German large value payment systems designed by Bundesbank, which started operations in 2001 and now processing the most of the total payments in TARGET in terms of value and volume. It belongs to the category of so called *hybrid* systems. It is designed to contain the safety features of an RTGS system, and to incorporate effective liquidity saving features that exist in netting systems.

### **Single Euro Payment Area**

A major project in European Union context is worth mentioning: Single Euro Payment Area (SEPA). The Eurosystem supports banking industry initiatives to establish a single Euro payments area (SEPA). The aim is to enable European citizens to make payments in the Euro area as securely, quickly and efficiently as payments within national borders. Differences between the levels of service for domestic and cross-border retail payments are to be eliminated by 2010 (ECB Website).

In 2002, 50 European banks and banking associations formed “European Payments Council (EPC)” to realise SEPA project and White Paper (EPC-White Paper, 2002) they express their vision for easy and inexpensive Euro payments in the entire Euroland.

### **E-Money**

Another issue is e-money that is a value stored electronically in a device such as chipcard or a hard drive in a computer, which is used to make payments by transferring value from one storage vehicle to another. Various card-based schemes exist in many countries but only in a few countries have they achieved significant penetration (BIS/CPSS-Retail, 2003).

Yet in the coming years private sector is expected to innovate more widespread used payment instruments by use of internet and mobile phone infrastructure, and central banks have already started to develop policy stance for this potential developments as discussed in detail in the BIS/CPSS report on policy issues for central banks in retail payments (2003).

*This chapter provided some insights into payment systems issues and their viability for the financial stability and improved financial services as a global phenomenon. At the same time, these discussions implicitly emphasised the first*

*driver of the reforms, which is the domestic demand and public policy objective for the economies of the world.*

### **3. An Evaluation of Fsap Country Reports on Payment Systems Reforms**

FSAP missions have assessed 80 systems in 60 countries by mid-2003 by evaluating the implementations against the core principles for Systemically Important Payment Systems. They have come up with major concerns in the areas of legal foundation, managing risks, governance and central banks lack of a statutory oversight role (Woltjer, 2003).

The study on the observance of standards (so called “best-practices”) as defined by the core principles, indicates the observance and non-observance of each of the core principles and four responsibilities of central banks on 80 payment systems worldwide and the findings shows that yet there are major improvements to be done globally in order to implement safe and efficient payment systems.

#### **3.1. FSAP Cases From Advanced Economies**

**UK:** NewCHAPS system with its two sub-schemes Sterling and Euro are said to be robust and almost in full compliance with the core principles and Bank of England fulfils its oversight role successfully. A few suggestions are made for further improvements. And in the second review of IMF mission, the systems are found to be full-compliance with the core principles after the improvements works have been carried out promptly by related parties (FSAP-UK, 2003 March and July).

**Germany:** Systems are found to be in full compliance with the core principles and Bundesbank fulfils oversight roles (FSAP-Germany, 2003).

**France:** The systems in France are found to be highly advanced and almost in full compliance with the core principles, while one of the two private sector systems is recommended to increase safety and efficiency. Due to lots of external linkages, the operational vulnerabilities of the systems are advised to be reduced by extra work. A deficiency is said to be low cost recovery structure of the Banque de France (BdF)’s Real Time Gross Settlement (RTGS) system, where BdF heavily subsidises the system to compete with the private sector large value system. BdF is found to be fulfilling its oversight role successfully (FSAP-France, 2004).

**Japan:** Systems in Japan are found to be in close compliance with the core principles, while some safety and efficiency suggestions are made. For one of the

DNS system recommendation calls for urgent response as there may be some systemic implications. Bank of Japan is said to be fulfilling its oversight role successfully (FSAP-Japan, 2003).

### **3.2. FSAP Cases From Major Emerging Markets**

**Singapore:** Payment systems are found to be highly advanced. No vulnerabilities are suggested and they meet the core principles criteria. A few recommendations have been made to improve efficiency. The Monetary Authority of Singapore is structuring its oversight role to be more effective.

**Hong Kong:** Payment systems environment is found to be quite advanced in Hong Kong and the core principles criteria largely met. Recommendations have been made to improve operational reliability and efficiency. The mission also noted that an important policy priority is a new law to give greater clarity and statutory foundation to payment systems oversight, including ensuring undoubted payments finality.

**Korea:** Korean RTGS is found to be largely compliant with the core principles. Recommendations are made to use the use of check clearing system, another systemically important payment system and shift these transactions to RTGS. And also some advice are given to structure Bank of Korea's oversight role effectively.

**Mexico:** Large value payments are distributed among three systems, although one of the systems has the final settlements at the Banco de Mexico (BdM). BdM's role is not very clear. Management of the risks is still the main weakness although various payment systems reforms were made since 1995. BdM needs to assure a degree of certainty for payments finality. Although the use of new technology is made to increase operational reliability, there is need to improve safety and efficiency to meet the criteria and restructure BdM's oversight role.

### **3.3. FSAP Cases from Countries in Transition**

**Russia:** The assessment report indicates that it is not possible to say that the payment systems environment in Russia is safe and secure. The report quite often makes references to the intention of Central Bank of Russia to implement an RTGS system in the near future, an intention that failed to be realised although many attempts have been made at the past. Apparently one basic problem is the large geography of Russia with many time zones and infrastructural problems. The

current payment system is working as a distributed gross settlement system made up of 78 regional systems

The report recommends Central Bank of Russia to consider implementing the core principles for the planned RTGS system. The absence of a national RTGS system was also highlighted by another recent IMF mission as a factor inhibiting the development of effective monetary management techniques. It also advises Central Bank of Russia to produce a strategy paper for the RTGS and to assign a full time project manager provided with full power to coordinate the RTGS project countrywide (FSAP-Russia, 2003).

**Ukraine:** The report mentions that the current system that is operated by National Bank of Ukraine handles all inter-bank payments including cards transactions, working semi-manually. The report finds the system “generally secure, reliable and efficient”. It also mentions that National Bank of Ukraine plans an RTGS for future but the current system will be in place by 2010 (FSAP-Ukraine, 2003)<sup>10</sup>.

**Kazakhstan:** The payment system environment is found to meet the criteria largely. Since the first assessment in 2000 National Bank of Kazakhstan acted promptly to make the improvements. A few recommendations are made for legal infrastructure. The report also mentions that payment cards are yet in their infancy, but growing.

**Kyrgyzstan:** It is mainly a paper-based environment for payments. Recommendations are made to improve safety and efficiency and shift from manual to electronic systems. Governance and oversight function needs to be structured effectively.

**Georgia<sup>11</sup>:** The assessment indicates that the overall assessment of the core principles is satisfactory from a *purely technical viewpoint*. The strengths of the payment system can be illustrated by the full compliance with the principles dealing with the understanding of financial risks and procedures for managing those risks. However, where broader issues are concerned –for example, issues related to efficiency, governance or oversight- the system is less satisfactory. National Bank

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<sup>10</sup> We think there are some contradictions in this assessment for example; although the report explains the payment transmission process for settlement as being made by e-mails, which is not a secure way, yet the system is assessed as “having a high degree of security”.

<sup>11</sup> We discuss the case of Georgia in detail as it suggests that having a technologically satisfactory system may not necessarily provide a safe and efficient PS.

of Georgia (NGB)'s responsibilities for systemic oversight is not realised and NGB focuses mainly on its role as the technical operator of the system that it owns. The report also indicates that NGB appears to have adopted a passive role and has left the development of other systems, such as inter-bank payments and checks, credit cards and securities settlement systems to individual participants. In this context, the report further warns that the core principles remains *terra incognita* for NGB and recommends that NGB's expertise in payment systems should be strengthened to assure safe and efficient development of the financial sector (FSAP-Georgia, 2001).

Georgia's RTGS project has been funded by USA, as part of "USAID to Georgia program" from the subprogram with title "A Competitive Private Financial Sector that is More Responsive to the Needs of a Market-Oriented Economy (with a budget of \$4,930,000) (USAID Georgia, Website). And with this fund the USA IT firm Montran implemented the RTGS project in 2001.

### 3.4. FSAP Cases from EU Accession Countries

**Romania:** No assessment has been made for observance of the core principles. Yet, it is mentioned that Romanian payment system reform process is undergoing a substantial changeover process, whereby an RTGS implementation is said to be realised by November 2004<sup>12</sup> (FSAP-Romania, 2003).

Romanian RTGS is developed by Montran (Montran Website) and Italian software house SIA (SIA has also developed Bank of Italy's RTGS system: BI-REL). The contract was financed entirely by PHARE, the European Union programme designed to assist applicant countries of Central Europe in their preparations for joining the EU (SIA Website).

**Bulgaria:** The assessment report states that substantial improvements are required for various systemically important payment systems in Bulgaria. Even in certain cases there are not statistics available for the operational systems.

An RTGS is planned to be operational. Report recommends that missing safety and efficiency measures are taken by Bulgarian National Bank (BNB) along with the new RTGS implementation to meet the criteria. The report also suggests establishing an ongoing governance and oversight structure (FSAP-Bulgaria, 2002).

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<sup>12</sup> As of January 2005, there is not yet any announcement that the Romanian RTGS has become operational.

In July 2001 BNB has signed a contract with Montran to build the RTGS system (BNB Website).

**Slovenia:** The payment system infrastructure in Slovenia has in recent years undergone important changes aimed at reducing risks and increasing efficiency. However, the report still finds the system in the process of transition. One very important reform is found to be phasing out the functions of the so-called Agency for Payments, an institution of the former Yugoslavian regime. In 2002, payment services are shifted from this agency to the financial sector.

In 1998 Bank of Slovenia introduced a modern RTGS system and a netting system for small value payments. Although the report touches upon fragmentation of domestic payment systems, liquidity management problems, various legal and governance problems, the systemically important payment systems in Slovenia are found to be broadly robust and particularly with the adoption of the draft law on payment services a better score is expected for compliance (FSAP-Slovenia, 2001).

The British company LogicaCMG provided the Slovenian payment systems (LogicaCMG, Website).

**Croatia:** The report indicates recently significant reforms have been implemented in Croatian payment systems infrastructure and institutional framework. Croatian National Bank (CNB)'s oversight role has been strengthened to ensure that all payment systems satisfy the evolving needs to be placed on risk mitigation, efficiency and cost and the reform strategy is designed to avoid the creation of liquidity, credit and systemic risk. Croatia went live with an RTGS system in 1999.

The report basically states that Croatian payment systems may be said to be quite safe and efficient and that the core principles are broadly observed. Recommendations are made on various legal issues including ambiguities on "zero hour rule"<sup>13</sup> and on the better organising central bank's role to better deal with the payment system risks in the systems not owned by CNB (FSAP-Croatia, 2002).

Like the case in Slovenia, transferring payment services from the inherited payments agency (coming from former Yugoslavia) to the financial system is still a reform issue (Barborosa, 2001).

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<sup>13</sup> "Zero Hour Rules" make all payment transactions of a bankrupt participant void from the start ("zero hour") of the day of bankruptcy, causing serious systemic consequences.

LogicaCMG has provided the Croatian payment systems (LogicaCMG, Website).

### 3.5. FSAP Cases from Developing Countries

**Kuwait:** Payments environment in the country is mainly cash and check based. Although the use of credit cards and internet banking is increasing the inter-bank transfers are on a bilateral basis and Central Bank of Kuwait acts as a final settlement agent. Central Bank of Kuwait started to build an RTGS system. However, it is not supported by a clearly stated strategic policy objectives and plans. On the other hand, the lack of transparency and publicly disclosed participation criteria for the existing check clearing systems may be more of a problem when the RTGS goes live.

Montran is implementing Kuwait's RTGS system (Montran, Website).

**Tunisia:** Mainly cash and checks are used. Banque Centrale de Tunisie plans to build an RTGS.

**Israel:** Current environment is not found highly safe and efficient. Central Bank's role is not clear and oversight function needs to be structured. There is a plan to build a LVPS to meet the criteria.

**Pakistan:** No assessment is yet made. Basically cash and checks are used for payments. There is not sufficient legal infrastructure for payment systems. There is a plan to build an RTGS. The FSAP mission recommended establishing the necessary legal infrastructure, membership criteria, liquidity management approach and governance along with the RTGS plan.

### 3.6. General Evaluation of FSAP Cases

IMF/WB general evaluation report on assessment experience (2002) indicates that there are weaknesses in many of the 57 systemically important payment systems (in 42 countries) that were assessed between 1999 and 2001 under FSAP (though more recent reviews exhibit that major improvements have been made by most of the reassessed countries in the following rounds of assessment).

According to this report, failure to observe the core principles arise where payment system participants are unable to manage credit, liquidity, and other risks they incur within the system arrangement, and where the system is not protected against one participant being unable to settle its obligations. Other problem areas

include: a legal framework that does not support the payment systems rules and regulations, an insecure operating system and environment. Many systems are not adequately overseen by central banks, and the governance arrangements are insufficiently transparent.

FSAP general evaluation reports don't make a distinction between developing and emerging economies, the ones that have moved to capital account liberalisation and are open markets, However, when we look at the assessments we observe that major emerging markets are more converging to advanced or EU accession countries in meeting the core principles criteria and fulfilling the responsibilities of central banks in reforming the oversight role. And it is understood that they make efforts to further improve the systems. In some cases, countries from Southeast Asia like Hong Kong, Singapore and Korea are at the level of sophistication as advanced economies (in fact, in the case studies above we grouped the cases from the major emerging countries under a separate heading).

In most of the cases the monetary authorities' responses to the FSAP assessment and recommendations were quite positive and they agreed to improve the safety and efficiency weaknesses in the payment systems and structure the oversight role effectively. They were also eager to go over the compliance assessment work again after the improvement works are performed.

When we look at the payment systems scene after 2000, we observe that EU accession countries that were formerly in the list of "transition countries" and major emerging markets from Southeast Asia like Hong Kong, Singapore and Korea are converging to the level of the advanced economies.

The other countries in transition from the former Soviet Union, exhibit different levels of convergence. Russia is, for instance, largely aware of the "best-practices" for an open economy payment systems infrastructure and spends efforts to establish a safe and efficient environment supported with a good governance and oversight despite the difficulties to manage it in a large geography with various infrastructural problems. Kazakhstan appears to have a highly improved payments environment, though modern banking products are said to be at their infancy. Kyrgyzstan does not have yet a safe and efficient payment system. The case of Georgia appears to be quite interesting. Georgia has a modern RTGS system, but reportedly the payment systems issues as a discipline is not well known and therefore governance and oversight issues remain largely unfulfilled.

The other developing countries, on the other hand, are yet largely far from meeting the criteria. Most of these countries are cash based and inter-bank payments are mainly dealt with check clearing systems, which are decided to be systemically important payment systems.

There are also some instances like Kuwait, where technologically advanced systems are planned but transparency, fair access and governance issues remain to be improved.

Main problems observed are: lack of safety and efficiency in the existing systems (mainly semi-manual check-based systems and rarely electronic and automated modern systems), lack of legal infrastructure to support payment systems rules and regulations, governance problems in general and lack of transparency, lack of strategy and policies for payment systems and related systems such as securities settlement systems and lack of central bank's oversight role.

In some cases of developing countries, although defects are clearly indicated in the reports, there is not always associated authorities' response committing to take immediate actions and start planning for some safe and efficient systems. On the other hand, the IMF/WB report (2002) states that FSAP follow-up has included technical assistance from IMF and WB in some countries.

In general, by looking at the evaluations we may conclude that there is generally an increasing awareness recently of payment systems issues on a global basis

### **3.7. Observance of Positive Effects of International Cooperation**

First of all, FSAP reports are providing very valuable information for assessing both global financial stability as "a global public good" and each individual country on payment systems infrastructures, among other things, for financial stability.

*We had defined the second driver of recent intensive reforms on global base as international cooperation. We clearly observe that international cooperation, and particularly efforts of international financial institutions, namely, IMF, WB, BIS/CPSS and central banks globally, has contributed largely to the global environment and each individual country regardless its level of economic development.*

For example, in case of Kazakhstan we see a series of FSAP reviews and in each review the assessors find the gaps being closed by continuous efforts. In case of UK, although minor recommendations had been made previously, the FSAP

mission reports that in a very short period of time improvements were made; and eventually the assessed systems are found to be in full compliance with Core Principles and Bank of England realising its oversight role fully.

Another observation is that an important awareness over the “best-practices” of payment system issues is created in most of the developing countries after the assessment process. And the authorities respond to the results of assessment by expressing their will to start planning policies and strategies such as the cases of Pakistan and Tunisia. The assessment reports also imply that in some cases inefficiencies that became daily routines are just realised by the authorities after the assessment and immediate actions are taken, like in the case of Korea, where there was a consensus after the assessment that inefficient promissory note and check transactions may be turned into RTGS transfers.

Could the improvements in payment systems globally be similar without BIS/CPSS reports and then assessment efforts and technical assistance of IMF/WB? We think, the answer is “no” as the reports exhibit clearly.

Therefore we may conclude that international cooperation has been very successful and productive in this field, yet there is a long distance to go until the weaknesses are mitigated to meet the criteria of the core principles.

FSAP assessments themselves have also contributed to individual countries as truly educational process, as well. IMF and WB mission provide all necessary documentation and methodology before assessments and individual countries prepare self-assessment reports before the actual work starts. Central banks’ payment systems experts also take part in the assessment process and eventually results are discussed with the payment systems authorities of the countries and their responses are also reflected in the reports.

Publishing these reports publicly is also a very important approach in transparency and it also helps other countries to learn from each other’s experiences.

### **3.8. Drawbacks Observed in FSAP Assessments**

When we look at the reports, however, we find out that FSAP assessments don’t always give very precise and consistent results in the individual country reports. The reports are not always in the same detail, for example while UK assessment is very detailed and comprehensive, some assessments don’t provide sufficient details

or discussions on the problematic issues. And sometimes we find some contradicting results as in the case of Ukraine where, reportedly, payment transfers directed for settlement are sent by e-mail and the assessment for CP VII (security, reliability and contingency arrangements) indicates that “the system has a high degree of security with many mutually-reinforcing and is operationally reliable”. And there is not any recommendation to improve the security and efficiency of this transmission.

Therefore, we believe that it is necessary to improve the quality of assessment methodology and process. Indeed IMF/WB Report (2002) on “FSAP Experience with the Assessment of SIPS” addresses to this issue by mentioning that assessments are usually performed just by one payment system’s expert who may not necessarily be experienced in legal and technological issues of payment systems to make the necessary recommendations. It also mentions that management of the overall assessment process, among other things, needs to be improved.

We think that organising the results of the assessments in main categories such as safety, efficiency, governance and oversight and then providing an overall assessment for each category, besides each individual Core Principle and central bank responsibility, will provide a better understanding of the assessment.

#### **4. Impact of Global Ict Externalities on The Reform Process**

##### **4.1. Backgrounds on Product-Based Solutions vs. Bespoke Implementations in RTGS Context**

A typical modern RTGS solution will have three major parts: (1) *central system*, where all the transactions are routed, processed and settled; payment queues are managed and grid-locks are resolved (2) *participants side*, where participants’ systems, in most of the cases their main transaction processing environment are connected to the central system in real-time in a secure, reliable and integrated way so that they see their positions immediately and exchange their payments with other participants (3) *RTGS network*, that connects the participants and transport their transactions securely and efficiently. As we mentioned, SWIFT is used as the network of the national payment systems. An RTGS design is required to have highest levels of reliability and availability as very large values are circulating in the system with no tolerance to message loss or duplication.

Until quite recently, if a country decided to build an RTGS system the only choice was to start developing all the specifications and computer programming codes of the system from scratch, so called “bespoke” solution.

Bespoke solutions require high levels of project management, coordination, technical and business skills. It is well known that many IT projects fail or they cannot be completed in time with given financial and human resources, causing waste of resources. And in many cases the final product may not be in compliance with the users’ requirements. In particular, when we speak in terms of RTGS systems where huge investments are involved, the project management issues of having timely and lean implementation becomes more critical for an economy, and particularly for developing countries that have less resources.

Whereas a proven product-based (or *off-the-shelf*) solution is usually expected to contain most of the desired technical and operational features already developed and built in it, though there is still a need to tailor it with respect to country-specific environment.

Today, we observe that many countries are able to go live much quicker than before with the product-based RTGS solutions.

#### **4.2. IT Firms Supplying Product-Based Payment Systems Solutions, Competition Issues and Use of SWIFT Network**

As we started to give some clues when we evaluate the FSAP country reports, there is a considerable amount of RTGS systems supplied by some IT firms as a product-based solution.

Most of these IT firms are based in advanced economies. Their experience usually starts with some developments in their own home country. When they develop sufficient expertise in an environment with the positive externalities of banking and payment systems, they start to market their products to other markets including developing countries, though we shall later discuss whether it is really sufficient by itself for another country in a different part of the world merely to rely on a “software package” to implement a safe and efficient payment system.

Mainly four IT firms, LogicaCMG, Montran, Perago and CMA, shares the market of payment systems. These vendors provide RTGS solutions, among other things, to individual economies by tailoring their products to each country-specific needs.

**LogicaCMG** (UK based IT firm) gained expertise by getting involved with UK payment systems, CHAPS. Later they built an RTGS system for another European country and taking the advantage of these experiences they made an RTGS package named CAS (Central Accounting System). This product is now being marketed globally with the highest market share of 14 central banks worldwide. LogicaCMS's CAS product are used by the central banks of Azerbaijan, Chile, Bosnia-Herzegovina, Croatia, Hungary, Ireland, Latvia, Luxembourg, Philippines, Slovenia, Sri Lanka, Trinidad-Tobago and Turkey. Logica's CAS is also used by European Central Bank for TARGET system (logicaCMG, Website).

LogicaCMG also built the Reserve Bank of India's RTGS system, which is not based on CAS.

**Montran** (US based IT firm) developed the RTGS systems of Antilles (Netherlands), Barbados, Bulgaria, Georgia, Kuwait and Romania (Montran, Website)

**Perago** (South Africa based IT firm) developed the RTGS systems of Malawi, Namibia, South Africa, Uganda, Zambia and Zimbabwe (Perago, Website).

**CMA** (US based IT firm, together with Hewlett-Packard) developed the RTGS systems of Libya, Macedonia and Serbia (CMA, Website).

Furthermore we may mention two more IT companies: Diamis (France based IT firm) developed the RTGS system of Jordan and SIA (Italy based IT firm) RTGS system of Italy.

As seen in the illustrations above, the software development market in payment systems has quite oligopolistic structure, mainly dominated by LogicaCMG and few others.

The entry barriers are already quite high due to the incumbents' reputation, market share, knowledge and expertise of the payment system's business.

We also discussed above the ongoing consolidation process of the payment systems. One may expect that this process will clearly reduce the market size and raise the entry barriers even higher for the new comers.

On the other hand, the advancement of the technology and developing global payment systems based on internet technologies and associated with all these newly emerging user requirements for more efficient and cheaper global payment services

may shake the market dominance of the existing legacy systems and create opportunities for the new comers' innovations, unless the incumbents make new investments and develop new knowledge.

The products of the existing vendors support the use of SWIFT communications network and its messaging standards for payments.

Using SWIFT network for domestic payments releases the countries from burden of developing secure and reliable high capacity and availability networks, that is very expensive. On the other hand, using the international accepted standards of SWIFT enables to develop connections to other domestic and cross-border payment systems.

#### **4.3. Is Just an Imported “Turnkey RTGS Solution” Enough for Safety and Efficiency?**

Dr. Ngalande (2003), Governor of the Reserve Bank of Malawi, at the Perago's User Group Conference in Johannesburg has mentioned the contributions of Perago to the SADC Region by providing robust RTGS software to the individual countries in the region. He also mentions the benefits of the product-based RTGS system as providing the Reserve Bank of Malawi with up to the minute liquidity position of the financial market and enabling commercial banks to be able to determine their treasury positions and make investment decisions by way of fast flow of transactions.

Could any similar level of contribution be made, say, to the prudential supervision function, another area of financial stability, by providing a product-based solution if a certain economy did not have any infrastructure in place yet? *Probably not.* Any cutting-edge supervision package would definitely help to process the information collected from the financial institutions for a “health-check” of each one of them by the supervisory authorities; yet ironically, it would not help to improve the financial positions of any individual institutions in consideration.

However, as oversight function of the payment systems is focused on *the system* in general and *systemic risk*, the sound technological infrastructure has direct contribution to the system. In other words there is a *causal link* between the technological infrastructure and safe and efficient payment systems.

Apparently, a well-designed Real Time Gross Settlement (RTGS) system, that may be bought from these vendors, would help to realise the criteria indicated by

CP7 (*being operationally secure and reliable*), which is mitigating the operational risks to start with and it will also help to reduce or mitigate the impacts of credit risk and liquidity risks, i.e. CP3 (*management of financial risks*), provided that the systems operations are supported by relevant operational measures like intra-day credits and payments scheduling. As an RTGS system by definition implies settlement finality at the accounts held by central bank and by using central bank assets for settlement; we may consider that CP4 (*prompt final settlement*), CP5 (*timely completion of daily settlements*), and CP6 (*safe settlement assets*), are met largely by implementing a well-designed RTGS system, provided that necessary steps are taken to ensure legal certainty for finality. Additionally, such a system could be expected to provide a framework for implementing the remaining core principles of safety and efficiency, namely CP1 (*sound legal basis*), CP2 (*clear understanding of financial risks*), CP8 (*practical and efficient way to make payments*), CP9 (*fair and objective participation criteria*) and C10 (*sound governance*).

However, as seen in most of the cases of the developing countries (very typically Georgia's case) (see Chapter 3), where product-based RTGS systems are implemented but yet the environments reportedly suffer from the lack of sound legal, governance and oversight structures, we observe that product-based solutions may not guarantee high levels of safety and efficiency per se.

Yet, when we compare the cases of countries where there are RTGS systems in place, with those where the payment systems' environments are dominated by paper-based transactions like inter-bank checks and manual settlements, the former ones may be said to have much safer and much more efficient payment and settlement infrastructures from financial stability point of view.

Iivaren (2004) states that there are more than 70 RTGS systems worldwide. Then we observe that global IT firms have provided nearly half of the RTGS systems as software packages.

*Finally, it could be said that the observations are in fact in alignment with our emphasise on the importance of the third driver, the positive effect of global IT firms and SWIFT network in implementing payment systems reforms, which is in generic terms "the effect of globalisation".*

## 5. Conclusion

In this paper, we discussed the recent intensive payment systems reforms observed on global basis and looked into the three main drivers of this process, namely strong domestic demand to provide financial stability and better financial services, increasing levels of international cooperation driven by IFIs and positive externalities of globalisation driven by ICT companies.

In this context, we explained the vitality of payment systems and their public policy objectives as *safety and efficiency* for an economy from various perspectives, that no doubt justifies the allocation of large resources for reforming payment systems with respect to the recently defined “*best-practices*” as an ongoing process at the present.

As clearly seen in the FSAP reports, prepared for each country assessed and general evaluation of the assessments, the three drivers we analysed have helped to implement safe and efficient payment systems on a global basis. Yet, there are still weaknesses to be addressed in the future by individual countries such as implementing a consistent payment system strategy, improving legal framework, governance (including issues like transparency and fair-access) and also structuring the central bank’s oversight function.

On the other hand, we understand that unexceptionally all of the countries assessed have positively responded in appreciating the weaknesses and performing the works to fill in the gaps. We also understand from the successive assessments made to the same country that most of them have quickly strengthened their systems in accordance with the recommendations.

One important observation in the advanced economies is that the authorities have focused on more deregulation and leaving sufficient room for private sector innovations in retail payment services, yet the large value payment systems are actually developed by the central banks’ innovations in cooperation with private sector as is the case with TARGET and RTGSPlus.

Developing countries suffer from the same structural problems such as lack of skills, qualified human resources in payment systems and governance issues, as it is often the case in any other area of financial stability and development. At the same time, we witness somewhat faster developments in the reform process of payment systems than in other areas of financial stability due to the international cooperation providing financial and technical support that are highly complemented by the

externalities created by global ICT firms providing proven product based payment systems solutions and communication networks.

In final words, the institutionalised strategy of improving financial stability globally has given its positive results in the area of payment systems in the recent years.

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Regulation and structural change in financial systems Stijn Claessens, Senior Adviser, Board of Governors of the Federal Reserve System. Discussant: Hyun Song Shin, Economic Adviser and Head of Research, Bank for International Settlements. 11 a.m. 1. guardian or operator of the payments system (I subsume, under this heading, acting as the fiscal agent for the government.); 2. supervisor and/or regulator of the nation's banks or, more broadly, its financial institutions 3. the secular drivers of global saving and investment imbalances. In a recent speech in Brussels I made a similar point regarding the interaction between monetary policy and other policies at the domestic level, such as fiscal and structural policies.<sup>27, 23</sup> See Rey (2015). Recent reports of significant and successful cyber-attacks underscore the difficulties of mitigating cyber risk. Ex ante contingency plans for cyber-attacks, information sharing, monitoring, a focus on incorporating cyber-security in the early design of systems, and financial and technology literacy could help to lower the probability of cyber events that have adverse effects on financial stability. 4. Innovations in cross-border lending, trading and payment transactions, including via smart contracts, raise questions about the cross-jurisdictional compatibility of national legal frameworks. 5. Any of these three drivers alone could have material implications for the structure of the financial system.<sup>24</sup> In this context, there are a number of aspects of market structure that merit consideration systems reforms globally in the last 5 years in the process of implementing safe and efficient payment systems. We define the first driver as the strong domestic demand for financial stability and better financial services. The second driver is the increasing level of international cooperation and efforts of international financial institutions. The third driver is the impact positive externalities of globalisation reflected in the ICT area. The ICT firms are providing "turnkey" payment systems solutions and ready-to-use network, namely SWIFT, for a world economy of any size to go live with a