

6 Performance and Soundness of Financial Market Infrastructures

The country's Financial Market Infrastructures (FMIs) remained efficient and resilient during CY18. Pakistan Real-Time Interbank Settlement Mechanism (PRISM) continued to handle larger volume and values of transactions, with an increasing share of third party fund transfers. On the retail segment front, consumers showed a growing preference for digital modes of transactions owing to the convenience it offers. Automated Teller Machine (ATM) downtime has continued to decrease, signaling lower operational risk in retail segment. Keeping in view the risks related to unregulated use of virtual currencies, SBP prohibited banks to deal in them. Further, comprehensive guidelines were issued during the year to ensure that the retail payments segment of the country remains resilient to cyber-attacks. Moreover, the securities clearing and settlement institutions of the country continued to enhance their risk management regime to ensure that financial markets continue to function in an efficient manner.

Financial Markets Infrastructures (FMIs) are critical components of financial system of a country. They comprise of important institutions, instruments and channels, which facilitate the process of financial intermediation by processing and recording the flow of funds and securities. Hence, the overall stability of the financial system is critically dependent upon their efficiency and resilience.

FMIs broadly cover the Payment Systems, Central Securities Depositories (CSD), Securities Settlement Systems (SSS), Central Counter Parties (CCPs) and trade repositories.²³⁰ Pakistan's major FMIs include large value payment system (LVPS) i.e. Pakistan Real-Time Interbank Settlement Mechanism (PRISM); one inter-bank switch (1-Link); one clearing house of paper-based instruments (NIFT); one corporate securities settlement company (NCCPL); and one corporate securities depository (CDC). The capital market infrastructures is regulated by SECP.

6.1 Payment Systems²³¹

Payment Systems Landscape and Performance

Under its Vision 2020, SBP has set the "Development of Modern and Robust Payment Systems" as one of its key strategic objectives. Hence, it is continuously working towards the modernization of country's payment systems and simultaneously enhancing its regulatory and supervisory regime to ensure their efficiency and resilience.

Based on the quantum of values transacted, the country's payment system is divided into *Large Value Payment Systems (LVPS)* and *Retail Value Payment Systems (RVPS)*. Pakistan's LVPS, i.e. PRISM is used for wholesale transactions of both funds and government securities among its participants. Moreover, it is now increasingly being used for third party fund transfers. On the other hand, RVPS is composed of various paper-based and electronic channels used for retail transactions. Both PRISM and RVPS have shown a consistent increase in volume and value (**Table 6.1**).

²³⁰ An FMI is defined as a multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions. Committee on Payment and Settlement Systems of BIS, (2012), "Principles for Financial Market Infrastructures".

²³¹ By virtue of the powers entrusted to it, SBP plays the role of regulator, operator and facilitator of Pakistan's payment systems. Article 3 of the Payment Systems and Electronic Funds Transfer Act (PSEFT), 2007, endows upon SBP the power to regulate the country's payment systems to ensure their soundness, possible emergence of systemic risk and interests of the general public.

Table 6.1: Profile of payment system mechanisms

Mechanism	CY14	CY15	CY16	CY17	CY18
(Volume in thousands and Value in PKR trillion)					
PRISM					
Volume	681.4	852.9	985.4	1,384.9	2,210.1
Value	156.6	224.5	238.1	336.9	375.1
Retail Payments					
Volume	800,426.8	857,383.3	962,610.7	1,161,655.1	1,281,618.5
Value	158.2	165.5	170.8	192.6	198.7
Paper based					
Volume	365,371.2	349,882.1	392,499.5	463,602.6	464,839.8
Value	123.2	129.2	134.1	152.0	145.0
E-Banking					
Volume	435,055.6	507,501.3	570,111.2	698,052.5	816,778.7
Value	35.0	36.4	36.8	40.6	53.7

Source: SBP

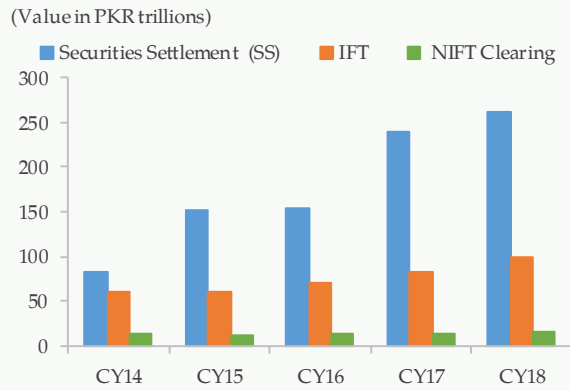
PRISM remains efficient and resilient...

In line with the trend of CY17, PRISM has witnessed consistent growth in both volume and values. In aggregate, during the reviewed period, it has settled 65.37 percent of the total value of all payments, amounting to around 11 times of GDP.

The daily average volume of settled transactions has shown significant growth over the past year to reach 9,209 (CY17: 5,770), while daily average value has increased to PKR 1,563 billion (CY17: PKR 1,404 billion).

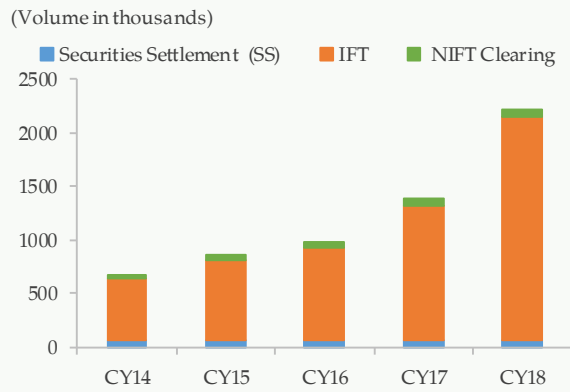
Overall, during CY18, volume and value of transactions settled through it grew by 59.58 percent and 11.34 percent, respectively. Encouragingly, the lion's share of growth in volume and value came from Inter-bank Funds Transfers (IFT). It registered a growth of 65.68 percent in volume and 19.33 percent in value (Chart 6.1 and 6.2).

Chart 6.1: Value of PRISM transactions



Source: SBP

Chart 6.2: Volume of PRISM transactions



Source: SBP

Within IFT, bulk of the growth has come from third party customer transfers. The trend of IFT is in line with the previous two years and is a result of continued efforts by SBP to popularize the use of RTGS system by banking consumers. In this regard, SBP has implemented straight-through processing via PRISM in 2016, whereby the core banking system of banks and PRISM system have been integrated to improve efficiency and minimize errors in payment processing.²³² Furthermore, SBP has allowed banks to use PRISM free-of-charge for same-day settlement of domestic transfers of home remittances to their beneficiaries. Consequently, use of PRISM for home remittances have seen a 63.56 percent rise in volume and 61.84 percent in value during CY18. This has

²³² PSD Circular No. 2 of 2016;

<http://www.sbp.org.pk/psd/2016/C2.htm>

garnered the trust of the banks and the banking consumers in the country's RTGS system.

Over the past decade, PRISM has undergone significant developments with respect to its operations. New features such as 3rd party fund transfers, straight through processing, interbank fund transfer of home remittances, membership of clearinghouses, CDNS, NCCPL etc. have been added to its functionality. Moreover, PRISM system was upgraded in CY17, which included enhancement in its features such as revised criteria for intra-day liquidity facility, improvement in reconciliation process and increased efficiency in managing funds and securities balance. To cater to these developments, SBP has issued new PRISM operating rules in March 2018, which incorporated these changes. Apart from this, the new rules have been aligned with Principles for Financial Market Infrastructures (PFMIs) issued by Bank for International Settlements, incorporating participation access criteria, settlement and finality, efficiency and effectiveness etc.²³³

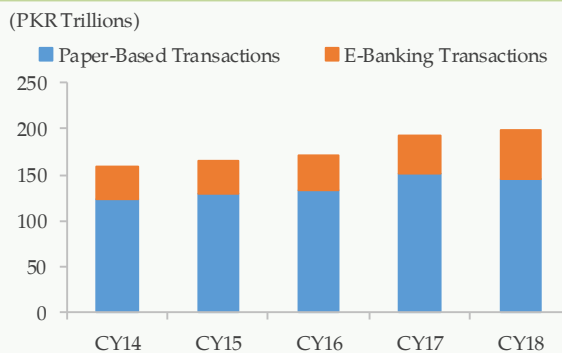
Keeping in view the increasing risk of cyber-attacks, SBP has taken adequate measures to ensure that PRISM remains resilient. PRISM participants access the system through a private network, which is further safeguarded through dynamic multipoint network level encryption and a certification authorization system for generation of digital signatures and identity verification to cater to the risk of unauthorized access. Moreover, next generation firewalls for application and network filtering, robust malware protection and intrusion detection and prevention systems are implemented to mitigate the risk of cyber breaches. Further, to ensure that the PRISM system remains resilient to any system disruptions, SBP has maintained separate, well-functioning business continuity and disaster recovery sites which are tested frequently.

²³³ Payment Systems Review FY18

Retail Value Payment Systems post continued growth...

Comprising of paper-based and electronic modes of transactions, the retail payment systems of the country has also posted robust growth in volume and value of electronic transactions. The overall volume of transactions has surged by 10.33 percent whereas the value of transactions has increased by 3.17 percent (**Chart 6.3**).

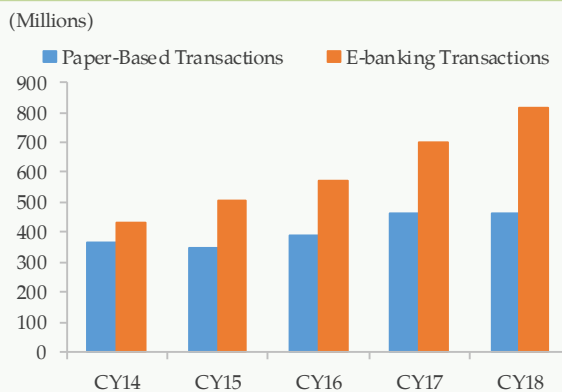
Chart 6.3: Value profile of retail payments



Source: SBP

Within retail payments, the volume-wise share of paper-based transactions declined from 39.92 percent to 36.27 percent, which reflects the growing trend of e-banking transactions (**Chart 6.4**). In terms of value transacted, paper-based modes still hold a major share in retail payments, accounting for 72.99 percent of value transacted.

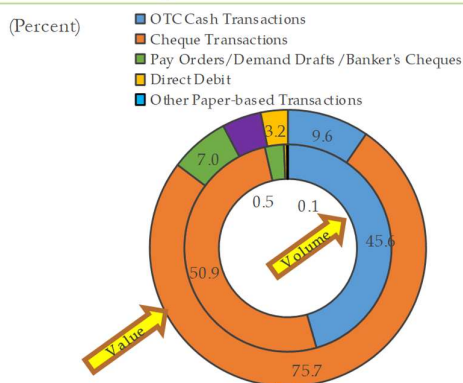
Chart 6.4: Volume profile of retail payments



Source: SBP

Within the paper based transactions, Cheques remain the most popular instrument as they accounted for 50.85 percent of total volume and 75.70 percent of total value transacted (**Chart 6.5**).

Chart 6.5: Volume and value wise share of paper-based retail transactions during CY18



Source: PSD, SBP

Within cheque based transactions, major share of volume pertained to cash withdrawals amounting to 50.56 percent of total cheque transactions. However, the share of value remained low at 10.71 percent (**Table 6.2**). This points out to the possibility that banking consumers are using cheques for withdrawals of smaller amounts to avoid the cost of withholding tax on banking transactions, particularly by non-filers.

Table 6.2: Chequing transactions in CY18

Type	Number (Million)	Amount (PKR billion)	Volume share (Percent)	Value Share
Cash Withdrawals	168.0	15,700.0	50.6	10.7
Transfers	112.8	102,515.7	33.9	69.9
Clearing	51.5	28,349.0	15.5	19.3

Source: SBP

Non-cheque based transactions remain low in value

Non-cheque based transactions, which primarily reflect over-the-counter (OTC) cash transactions accounted for only 9.58 percent of the total paper-based value transacted. As banks offer ease of services such as utility bill payments and interbank funds transfers through their digital platforms, consumers

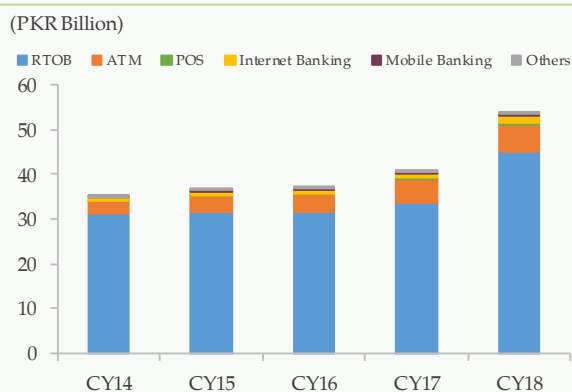
are increasingly using these electronic channels against OTC transactions.

Electronic modes of transaction show healthy growth...

Electronic modes of transaction have been a major contributor to growth in retail payments during CY18. In line with the development in previous year, e-banking channels have shown robust growth in both volume and amount transacted. Overall, the volume of e-banking transactions has registered a growth of 17.01 percent, whereas the value of these transactions has increased by 32.33 percent to reach at PKR 53.67 trillion. The share of electronic transactions, within retail transactions, has increased to 27.01 percent in CY18 compared to 21.04 percent in CY17. This is a manifestation of the shifting trend towards these digital modes that offer greater convenience and efficiency of payments to consumers.

Among e-banking transactions, Real Time Online Banking Transactions accounted for 84.20 percent of the value transacted followed by ATM transactions, which amounted to 11.29 percent (**Chart 6.6**). With respect to volume of transactions, ATM transactions account for a major share (61.94 percent) (**Chart 6.7**).

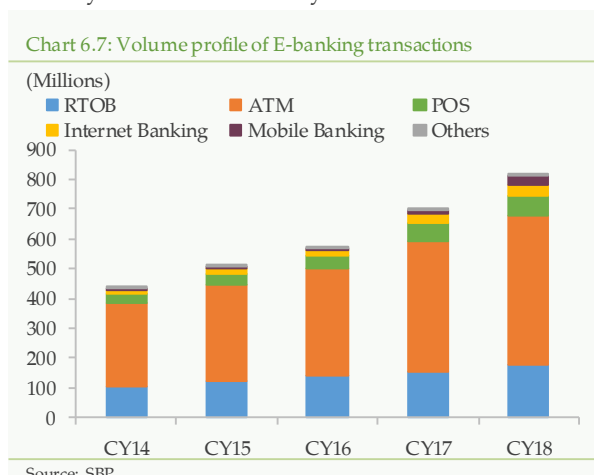
Chart 6.6: Value profile of E-banking transactions



Source: SBP

Encouragingly, the share of alternate delivery channels (ADCs), particularly mobile and internet banking has been growing, albeit gradually. In terms

of growth, internet banking posted a healthy growth of 33.23 percent in volume and 39.25 percent in value. In aggregate, PKR 2.1 trillion were transacted through internet banking, mobile banking and point-of-sale (POS) channels during CY18 as compared to PKR 1.6 trillion last year. This is reflective of the growing trust of banking consumers on alternate delivery channels offered by the banks.



Increasing investment in e-banking infrastructure...

Cognizant of the increasing adoption of e-banking channels, commercial and microfinance banks are increasing their investments in ADCs to tap into the growth potential as seen by an increase in online branches and ATMs. Furthermore, similar increase is visible in the number of credit and debit cards issued by banks (Table 6.3).

Table 6.3: E-banking infrastructure

Description	CY14	CY15	CY16	CY17	CY18
	Number				
Online Branches	11,149	12,442	13,926	14,610	15,346
ATMs	9,018	10,736	12,352	13,409	14,361
POS	34,945	50,072	52,062	52,506	49,621
	Number in Thousands ('000)				
Total Payment Cards	25,994	32,744	36,202	39,361	41,708
of which:					
Credit Cards	1,332	1,394	1,209	1,374	1,522
Debit Cards*	23,727	26,489	17,470	19,848	23,303
ATM Only Cards	935	4,861	6,806	8,385	8,805
Social Welfare Cards	-	-	10,358	9,501	7,848
Pre-paid Cards	-	-	359	253	230

Source: SBP

*Prior to CY16, Debit cards also included social welfare and pre-paid cards.

Paypak adoption continues in CY18...

In pursuance of SBP Vision 2020 and National Financial Inclusion Strategy (NFIS), 1-Link, with the approval of SBP, has launched the country's first domestic payment scheme in 2016, with the aim to provide a low-cost, efficient and secure payment solution.²³⁴ Since its launch, Paypak has made significant inroads in the payments landscape of the country, which is evident by its increasing adoption. A total of 18 banks (14 commercial banks and 4 microfinance banks) have issued around 1.12 million cards as of December, 2018 as compared to 0.75 million cards at the end of CY17.

SBP has issued comprehensive guidelines for retail payments in the wake of rising cyber-attacks...

Rise in threats of cyber-attacks is a global phenomenon. World Economic Forum's Global Risks Report, 2019 also mentions cyber-attacks as one of the top 10 risks in terms of both likelihood and impact. As more and more customers start adopting electronic modes, electronic channels have become a target for cyber-criminals. Results of the 3rd wave of the SBP's Systemic Risk Survey also points out that the respondents have rated cyber security risk as one of the top 10 risks for the financial sector (See Box 1).

In the wake of increasing threats of cyber-attacks, SBP has issued a comprehensive circular on security of digital payments to safeguard banks and their customers from potential losses. The circular includes measures such as extensive vulnerability assessment and penetration testing of banks' technological infrastructure to identify potential weaknesses in their ADCs and payment systems. Furthermore, it has been made mandatory for banks to provide free of cost SMS and email alerts with respect to both domestic and international digital transactions to their customers, serving as a detective control in case of a cyber-attack or fraud. Further, the

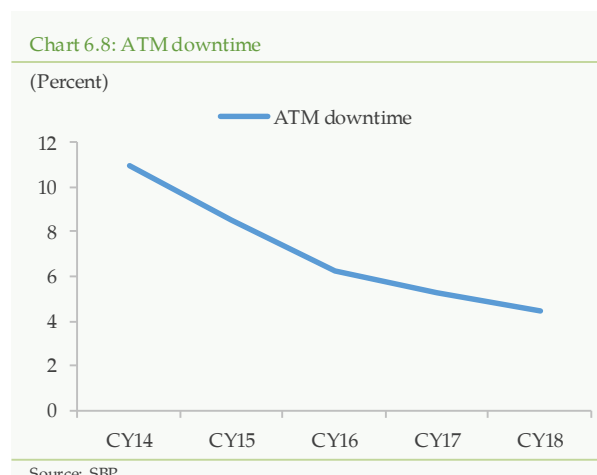
²³⁴ The scheme is operated by 1-Link.

circular entails deployment of real-time fraud monitoring tools and alert mechanisms by banks for the detection of fraudulent activities and dissemination of education to customers regarding types of online banking frauds²³⁵

In order to mitigate the risk of payment-card related frauds such as skimming, SBP has already instructed the banks to issue secure cards which are compliant with Europay, Mastercard and Visa (EMV) Standard and replace all the existing cards with chip-and-PIN payment cards by December, 2019²³⁶

ATM downtime reduces further...

ATMs possess the highest share in volume of e-banking transactions and is a medium, which is designed to be available round the clock. Hence, they are critically important infrastructures and any disruption in their working due to banks' system failure, poor connectivity, power outages and inadequate cash replenishment may lead to operational as well as reputational risk for the banks. Owing to improved surveillance and concerted efforts of SBP, the downtime of ATMs has reduced further during CY18, indicating improved efficiency (Chart 6.8).



²³⁵ PSD Circular No. 9 of 2018;

<http://www.sbp.org.pk/psd/2018/C9.htm>

²³⁶ PSD Circular No. 5 of 2016;

Settlement and liquidity risks in retail payments are managed effectively...

Since Pakistan's retail payment segment works on Deferred Net Settlement (DNS) basis i.e. T+1 basis, it entails creation of overnight credit risk before a transaction is settled the next day. Various safeguards are in place both by banks and SBP. Banks have imposed per day transfer limits for both retail and corporate customers. On the other hand, SBP has imposed cash reserve and statutory liquidity requirements on banks to ensure that sufficient liquidity is available in their accounts with SBP BSC to cover the settlement amount. Moreover, since the transactions are settled in PRISM, the availability of intra-day liquidity facility (ILF) assuages the liquidity risk as well.

Branchless Banking, shows continued growth...

Branchless banking is another key element of the retail payments landscape of Pakistan. It serves as a catalyst for financial inclusion and has tremendous potential to expand the outreach of financial services to the financially excluded populace. Continuing its growth trend, number of branchless banking accounts, deposits and number of transactions have registered robust growth during CY18 (Table 6.4). To cater to customer due diligence (CDD) risk related to branchless banking transactions, SBP has put in place extensive requirements such as verification of customer particulars from NADRA, biometric verification, transaction and maximum balance limits.²³⁷

<https://www.sbp.org.pk/psd/2016/C5.htm>

²³⁷ BPRD circular No. 9 of 2016;

<https://www.sbp.org.pk/bprd/2016/C9.htm>

Table 6.4: Key Highlights of branchless banking

Description	CY17	CY18	Growth (percent)
No. of Agents	405,671.0	425,199.0	4.8
No. of Accounts (thousands)	37,260.2	47,164.8	26.6
Deposits as on period end (PKR million)	21,139.0	23,678.0	12.0
No. of Transactions during the period (millions)	647.6	955.0	47.5
Average No. of Transactions per Day (thousands)	1,877.9	2,652.9	41.3
Value of Transactions during period (PKR billion)	2,804.0	3,659.1	30.5
Average Size of Transactions (PKR)	4,317.3	3,831.3	(11.3)

Source: SBP

SBP continues to promote innovations while managing risks...

SBP is encouraging Payment System Operators (PSOs) / Payment System Providers (PSPs) such as payment aggregators, electronic wallets and e-commerce gateways, which will add value to the payments landscape of the country. Such non-banking technology-based firms provide various services such as clearing, routing, switch services and electronic facilitation of payments, thus providing efficiency and convenience to customers. In this regard, SBP has issued detailed Rules for Payment System Operators and Payment Service providers.²³⁸ These regulations are aimed at encouraging their growth, managing risks, and bringing them into the regulatory ambit.

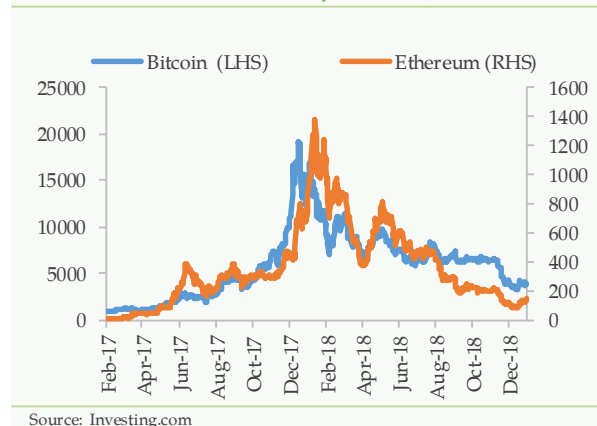
CY18 has also witnessed a growing interest in virtual currencies around the globe and in Pakistan, followed by regulatory actions in various jurisdictions. These virtual currencies saw huge bouts of volatility in their value during the reviewed period. Keeping in view the growing regulatory concerns, escalating price volatility and supervisory actions around the globe, SBP has advised all

²³⁸ PSD Circular No. 3 of 2014; <http://www.sbp.org.pk/psd/2014/C3.htm>

Banks/MFBs/DFIs/PSOs/PSPs against dealing in them.²³⁹ It is pertinent to mention that SBP has been proactive in monitoring and managing the risks associated with the use of virtual currencies as evident from the fact that SBP and SECP had also previously issued a joint Public Warning, in September, 2016, cautioning the public about using Bitcoin and other virtual currencies.

Some of the risks that virtual currencies may pose include: a) significant price volatility associated with speculative activity, which may prove to be harmful for the uninformed investors; (Chart 6.9) b) failure/closure of virtual currency exchanges/businesses due to any reason including action by law enforcement agencies; and c) hacking/security compromises of crypto currency exchanges and wallet businesses as a number of instances were recorded around the world where huge amount of funds have been lost due to the exchange/wallet operations being hacked/compromised. However, SBP remains open to technological innovations (including distributed ledger technology) which can enhance the efficiency of financial services. It continues to explore possible uses of technologies while keeping in view integrity, stability and consumer protection concerns of the financial sector.

Chart 6.9: Virtual currencies- daily data (USD)



Source: Investing.com

²³⁹ BPRD Circular No. 3 of 2018; <http://www.sbp.org.pk/bprd/2018/C3.htm>

Managing Systemically Important Payment Systems (SIPS)...

Payment systems are at the core of a financial system. Owing to their importance, any disruption in processes or flaw in their design can result in emergence of systemic risk. In view of this, SBP has already improved the oversight of some of the payment systems such as NIFT and 1-Link. Under the Payment Systems Designation Framework issued by SBP, it is finalizing the designation, which will allow it to perform closer supervision of SIPS.²⁴⁰

6.2 FMIs other than Payment Systems

NCCPL aligns its risk management regime with its role as CCP...

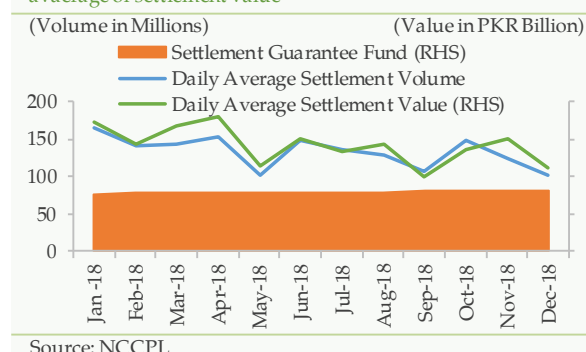
NCCPL has become a systemically important FMI, keeping in view its assumption of the role of Central Counter Party (CCP) in May 2016. Dealing with the settlement of trades in the capital markets, it took various measures to enhance the efficacy of its operations and strengthen its risk management regime.

It became a special participant of PRISM in January 2018 enabling the efficient settlement of NCSS transactions. Instead of settlement through multiple settlement banks, the transactions are now settled via PRISM in the form of multilateral net settlement batches (MNSBs), thus reducing the operational risk. Furthermore, multilateral netting also mitigates the liquidity risk posed to the broker clearing members (BCMs).

In order to placate the settlement risk arising due to potential default of any member, NCCPL maintains a Settlement Guarantee Fund (SGF). The fund was valued at PKR 2.75 billion at its inception and witnessed a gradual accretion of 6.0 percent over the current year to reach at PKR 3.28 billion in December, 2018. However, the daily average

settlement value for the year stood at PKR 5.7 billion, which is greater than the value of fund (**Chart 6.10**). Although the margins provided by clearing members are the first line of defense against default risk, SGF provides a buffer against emergence of systemic issues in the capital market.

Chart 6.10: Comparison of settlement guarantee fund with daily average of settlement value



In view of its role as a CCP, NCCPL has augmented its risk management regime during CY18. Initially, the risk management system of PSX was employed by NCCPL. Effective from 30th July, 2018, NCCPL has implemented its own in-house risk management system. Besides having similar features, the new system would enable NCCPL to efficiently supervise the risk profile of clearing members and employ adequate safeguards against the emergence of settlement risk, if any.

Custodial risk remains low...

CDC is another key FMI, which acts as the central securities depository (CSD) of the country. It manages and operates the Central Depository System (CDS), which is an electronic book-entry system used to record and maintain securities and register their transfers. Hence, it performs a two-pronged function i.e. the facilitation of trade in securities and management of the custodial risk associated with it.

²⁴⁰ PSD Circular No. 2 of 2017;

<https://www.sbp.org.pk/psd/2017/C2.htm>

CDC continues to hold the trust of the general public as evident by the increasing number of investor accounts, which stood at 53,896 at the end of CY18. The CDS handled a total of 138 billion shares with a market capitalization of PKR 4.7 trillion at the end of the reviewed period.²⁴¹

In terms of facilitating the market, CDC has undertaken numerous measures, which include establishment of the Centralized e-IPO system, MAAccess-CDC Access Mobile Application-that offers the investors convenience of managing their accounts through mobile phones and an eDividend repository in line with provisions of Companies Act, 2017.²⁴²

Being an electronic book-entry system makes CDS vulnerable to IT security risk. To ensure the safety of investor's assets, CDC has put in place sufficient safeguards. This is evinced by the fact that it is an ISO 27001 certified company, ensuring that it has adequate controls in place to ensure information security. Moreover, it has also obtained ISO 22301 and ISAE 3402 certifications, which deal with business continuity management and internal controls. Further, CDC has partnered with 1Link to add the feature of IBAN validation and title fetching mechanism in CDS to ensure synchronization of account titles, thus reducing the operational risk.

Increasing interconnectedness and cybersecurity issues needs joint supervisory attention...

With each year the country's FMIs depict a growing level of interconnectedness. On the one hand it results in efficiency gains in terms of their usage and increasing expediency to consumers, whereas on the other hand, it can potentially pose a higher level of systemic risk. Coupled with this, the global emergence of cyber-security risk may pose a challenge to the smooth and efficient working of these FMIs. Going forward, managing these risks

will require further strengthening of entity-level risk management regimes along with regulatory coordination between SBP and SECP. In this regard, Council of Regulators (CoR), a forum for regulatory collaboration, is already actively working.

²⁴¹ CDC Newsletter, Oct-Dec, 2018

²⁴² CDC Newsletters, Jan-Dec, 2017