Research Paper

Stress-Testing Liquidity Risk in the Namibia Interbank Settlement System (NISS)

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ABSTRACT

This study applied the BoF-PSS3 Simulator tool to investigate the impact of collateral deterioration at severity levels 30%, 50% and 70% on the NISS participants' ability to fulfil payment obligations and further determine the pre, during, and post COVID effects on the NISS participants liquidity. The study used NISS data for the period 2018-2022 for the months, April, and June. The results show that the share of unsettled payment transactions increases with the severity cuts, which suggests the significance of collateral in the settlement of payment obligations by the NISS participants. The results further indicate that the least unsettled payment transactions were observed in the pre-COVID period, while the most unsettled payment transactions were noted during and after the pandemic. In terms of the scenarios performed, the study found that retail payment transactions were impacted the most in terms of volumes, while from a value perspective, gross payment transactions were highly impacted. Notwithstanding the shocks imposed on the participants' collateral and the COVID effects, the participants maintained adequate liquidity to honour their payment obligations, which mirrored the benchmark results that showed that 98% of the total value settled in the NISS without collateral usage. Moreover, no significant shocks were observed in the Namibian market that adversely affected both the Bank and government securities that were pledged in the NISS during the COVID period. This paper recommends ongoing stress testing of liquidity risk in the NISS at different periods and severity levels. Furthermore, future studies should consider the total liquidity buffers available to participants and how they might be impacted by adverse market shocks.

CONTENTS

Disclaimer:

1. INTRODUCTION

Stress testing is important to evaluate the performance of the Namibia Interbank Settlement System (NISS) under plausible severe scenarios. The NISS is held to high-risk management standards in line with international best practices such as the Principles for Financial Market Infrastructures (PFMI), among others. In this regard, the Bank is required to frequently perform stress simulations to ensure that the NISS remains efficient, resilient, and effective under stressful conditions and market shocks. The NISS as a real time gross settlement (RTGS) system is not vulnerable to liquidity risk[1], however, liquidity risk exists within the system due to the interconnectedness among system participants. Liquidity risk can emanate from a lack of incoming payments or a reduction in the value of eligible collateral pledged albeit an increase in a participant's liquidity needs to fulfil its payment obligations. The Bank provides the NISS participants with credit facilities as an additional liquidity source to ensure the settlement of payment obligations. The pivotal role that collateral plays as a liquidity source in ensuring settlement finality in the NISS necessitates the need to stress the available collateral pledged by the participants.

Using the Bank of Finland Payment and Settlement Systems Simulator (BoF- PSS3 Simulator), this paper investigates the impact of reducing the value of collateral pledged by participants in the NISS at severity levels of 30%, 50% and 70% on their ability and capacity to fulfil their payment obligations and further determine the pre, during and post COVID effects. In reality, the value of pledged collateral can deteriorate due to financial market shocks that have an adverse effect on the market prices of pledged securities. According to Papsforf et al (2017), sudden decreases in asset prices such as collateral values would shrink intraday credit lines for system participants and therefore reduce the available payment capacity of participants, which is defined as the sum of settlement balances and intraday credit lines.

The rest of the paper is as follows; section 2 provides an overview of how collateral is setup in the NISS. Section 3 provides a synopsis of literature and section 4 explains the methodology and data used to setup and run the scenarios while section 5 analyses the results. Section 6 provides an in-depth discussion of the results and their implications, section 7 concludes, and section 8 provides recommendations.

[1] The Bank for International Settlements (BIS) defines Liquidity risk as the risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future.

2. OVERVIEW OF COLLATERAL IN THE NISS

Participants pledge eligible securities as collateral in the NISS based on their forecasted liquidity needs. The participants' liquidity needs should ideally correspond to the sum of payments which they have to settle in the NISS on a given business day. Eligible securities that can be pledged as collateral in the NISS as per the Bank's Operational Notice are Bank of Namibia Bills (BoN Bills)[2], Government Treasury Bills (TBs)[3] and Internal Registered Stocks (Bonds)[4]. Securities pledged by the participants as collateral in the NISS are divisible which implies that when a participant borrows from the Bank through either intraday or overnight, the entire security value is not used up to secure the repo, but only the value of the security equivalent to the amount borrowed is marked to secure the repo until it is repaid.[5] This clarification is important because the severity levels in the scenario are applied to the total collateral amount and not to individual securities that are pledged. Credit in the NISS is extended automatically provided that the participants have eligible collateral pledged and can access credit up to the market value of their collateral, less a haircut[6]. A participant cannot pledge a security that is maturing within 2 days as the NISS is configured to automatically ensure that the security is unavailable to secure a repo 2 days before the maturity date. While this process is not configured in the Simulator, securities that have matured do not form part of the simulation scenarios.

Since the inception of the NISS in 2002, collateral pledging was voluntary and participants that experienced large payment obligations would pledge collateral to effectively synchronize their incoming and outgoing payments. During the period 2019 and 2021, the Bank, however, recorded several retail batch default incidents due to defaulting participants not having collateral in the NISS to secure funding to meet payment obligations. This necessitated the Bank to mandate the pledging of collateral in the NISS to mitigate settlement, default, and liquidity risks.

Table 1 provides a snapshot of the participants' collateral pledging pattern for the period under review. It should be noted that not pledging collateral in a particular month is not an indication that a participant did not have collateral already pledged.

[2] The BoN Bills are issued by the Bank to assist the participants to comply with statutory liquid assets requirements, in the event of a shortfall in short-term liquid assets.
[3] The TBs are short-term debt obligations of the government.
[4] The Bonds are long-term fixed interest-bearing government bond.
[5] For example, if a participant with collateral valued at N$200 million borrows an intraday repo amounting to N$50 million, the value of collateral used to secure this repo is N$50 million, thus the remaining N$150 million collateral value is still available for the participant to secure a new repo should the participant require additional repo.
[6] A haircut refers to the lower-than-market value placed on an asset being used as collateral for a loan.

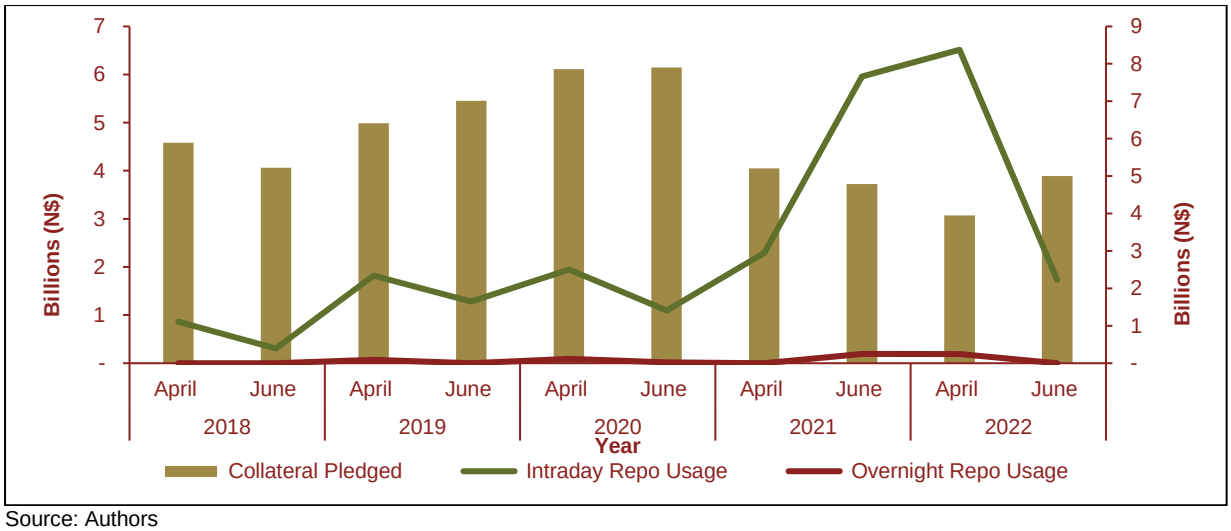
Table 1: Participant collateral pledging pattern

Months	Participants							
	Bank 1	Bank 2	Bank 3	Bank 4	Bank 5	Bank 6	Bank 7	Bank 8
Apr-18	✓	✗	✓	✗	✓	✓	✗	✓
Jun-18	✓	✗	✓	✗	✓	✗	✗	✓
Apr-19	✓	✗	✓	✗	✓	✗	✗	✓
Jun-19	✓	✗	✓	✗	✓	✗	✗	✓
Apr-20	✓	✓	✓	✗	✓	✓	✗	✓
Jun-20	✓	✓	✓	✗	✓	✓	✗	✓
Apr-21	✓	✓	✓	✗	✓	✗	✗	✓
Jun-21	✓	✓	✓	✗	✓	✓	✗	✓
Apr-22	✓	✓	✓	✓	✓	✓	✓	✓
Jun-22	✓	✓	✓	✓	✓	✓	✓	✓

Legend: ✓ has collateral pledged and ✗ has no collateral pledged

Figure 1 illustrates the overall collateral balance at the end of each month, as well as the total monthly usage of the NISS credit facilities over the selected period. Throughout the review period spanning from 2018-2022, participants collectively pledged a total collateral amount of N$46 billion. The NISS participants utilised about 2.9% from the N$46 billion collateral pledged, which is equivalent to N$31.3 billion to settle payment obligations. As shown in Figure 1, the highest collateral pledged were noted in April 2020 (N$6.10 billion) and June 2020 (N$6.14 billion), which is during the pre-COVID period, while the lowest collateral pledged was recorded in April 2022 (N$3.0 billion), which is considered as the post COVID period. Equally, the participants utilised collateral the most during June 2021 (N$7.9 billion) and April 2022 (N$8.6 billion) due to high payment obligations. Participants in the NISS prefer to use the intraday credit facility which is free of charge as opposed to the overnight credit facility which has a repayment rate of repo rate plus 50 basis points. Furthermore, the collateral pledged functions as a stock variable, meaning that the credit extension value can exceed the value of the collateral initially pledged. This occurs because the NISS participants regularly utilize the same collateral pledged throughout the month to access the credit facilities.

Figure 1: Overall collateral pledged and utilised



Source: Authors

3. LITERATURE REVIEW

Central banks are at the forefront of employing simulation techniques to fully comprehend and quantify vulnerabilities within the financial system. For instance, Arjani (2006) used the BoF Simulator to examine the trade-off between settlement delay and intraday liquidity in Canada's Large Value Transfer System (LVTS). The results revealed that increased usage of the LVTS central queue[7], reduced settlement delay associated with each level of intraday liquidity considered, relative to a standard queuing arrangement. Similarly, Papsdorf et al (2017) assessed the resilience of the Trans-European Automated Real-time Gross Settlement Express Transfer System (TARGET2) using scenarios based on extreme shocks to the value of collateral at different levels, particularly 30%, 50% and 70%. The study assessed impacts for the years 2008-2013 using the BoF Simulator and the results revealed that the TARGET2 participants remained resilient under the 3 stress scenarios. Literature on the subject matter provides the Bank with good basis to measure the resilience of NISS from liquidity risk.

4. METHODOLOGY AND DATA

This study adopts a similar approach to that of Papsdorf et al (2017) by subjecting collateral pledged to different severity levels, however, it deviates in terms of the selected review period and assumptions. While the review period in Papsdorf et al (2017) was based on unconventional monetary policy[8] in the Euro Area during the time, this study aims to assess collateral sufficiency prior, during and post the COVID pandemic. The assumption is that collateral usage and dependency during these periods would differ given the impact that COVID had on business operations and payment flows. Further subjecting collateral to stress during, after, and before the pandemic would assist in determining the significance of pledging collateral in the NISS. The collateral deterioration scenarios reduce the value of collateral pledged by the participants which in turn reduces the funds available to participants to settle payment obligations. The aim is to determine whether participants would still be able to settle their payment obligations with reduced collateral while relying more heavily on their settlement balances and incoming payments.

The BOF Simulator tool was used to run benchmark and scenario simulations. This was done by first running the benchmark without deteriorating the collateral, and thereafter running the scenarios with collateral deteriorated to compare the results. Data preparation was two-fold, firstly, the input data was retrieved from the NISS, and secondly, the beginning of day collateral balances were modified in the scenarios through the application of the severity cuts of 30% (baseline scenario), 50% (intermediate scenario) and 70% (severe scenario) similar to Papsdorf

[7] Central queue contains a complex queue-release algorithm.
[8] Unconventional monetary policy occurs when tools other than changing a policy interest rate are used.

et al (2017).Although the severity cuts seem to be aggressive[9] ,these scenarios are supported by principle 7 of the PFMI that requires an FMI to maintain sufficient liquid resources under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions. As such, the assumption is that the NISS participants' collateral in the NISS is vulnerable to unfavourable financial market conditions, such as political unrest, geopolitical spillovers effects from external financial markets, negative credit ratings, drastic changes in interest rates[10], operational outages due to loss of essential services, natural disasters, and cyber-attacks among other. The collateral deterioration scenarios were applied to all the participants, excluding the Bank of Namibia, which does not require collateral since settlement is done in central bank money.

The data used in this study was obtained from the NISS and consists of participants data, transactional data[11], beginning of day settlement balances[12], and beginning of day credit balances[13]. The study covers all 9 NISS participants data for the period 2018-2022 for the months, April, and June. In addition, the study considers 2018-2019 as the pre COVID years, 2020-2021 as the base years for COVID and 2022 as the post COVID year. The month of April was selected based on the entry of the last participant, while the month of May was not considered due to the many public holidays in the month, hence June was selected. The data covers 24 business days[14] for the month of April and 26 business days for the month of June across the entire period, except for June 2019 which comprises of 25 business days. The results generated from the simulation and stress test scenarios as well as the credit facility determined outside of the Simulator is herein referred to as Output Data. The selected output data in this paper consists of unsettled payment transactions by volume and value, unsettled payment transactions per category (gross and bulk) by volume and value, collateral usage, negative end-of-day balances, number of participants with unsettled payment transactions and the credit facility usage.

[9] Historical haircut margins could not be applied to determine the baseline scenarios for the stress test as this would not have significant shock on the settlement of obligations once the collateral value is reduced by small margins.

[11] Transactional data is the volumes and values of gross and retail bulk payment transactions.
[12] Beginning of day balance is the daily opening settlement account balance.
[13] Beginning of day credit balance is the collateral value at the start of the day and this excludes the Bank.
[14] Business days entails Mondays to Saturdays, excluding Sundays and Public holidays.

5. RESULTS

5.1 Unsettled payment transactions[15]

PANEL A: Unsettled payment transactions by volume and value

Figure 2: Unsettled payment transactions by volume

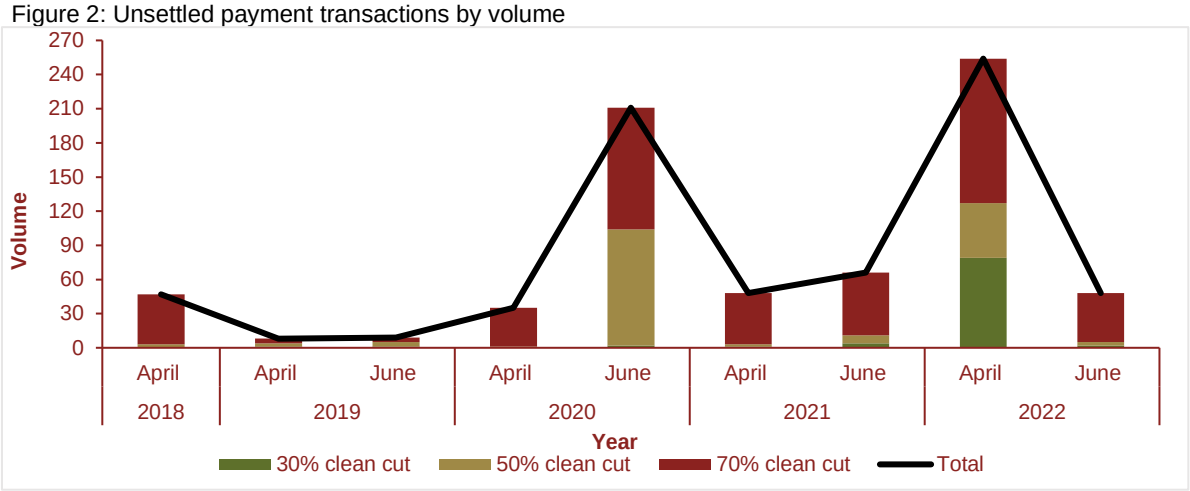
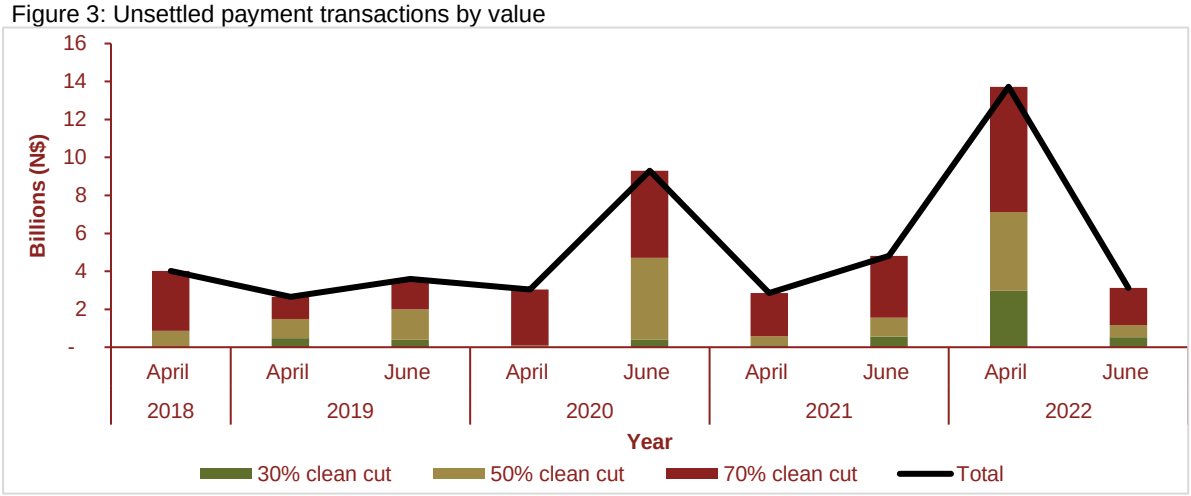


Figure 3: Unsettled payment transactions by value



Source: Authors

Panel A depicts the unsettled payment transactions in terms of volumes and values due to the collateral deterioration scenarios. As shown in Figures 2 and 3, the highest unsettled volumes and values due to the scenarios were observed during the COVID period in June 2020 at the 50% and 70% cuts and after the COVID period in April 2022 at the 30% and 70% cuts amounting to 102 (N$4.2 billion) and 107 (N$4.5 billion), 79 (N$2.9 billion) and 127 (N$6.6 billion), respectively. The share of unsettled payment transactions in volumes and values increases with the severity of collateral deterioration, albeit fluctuating relatively across the period analysed exhibiting a non-linear trend. The results further indicate that the scenarios did not significantly affect the settlement of payments during the pre-COVID period with only the most extreme scenario leading to minimal unsettled payments. Appendix 1 outlines the above results in a tabular format for ease of comparison.

[15] There were no unsettled payments in volumes and values observed during the month of June 2019.

5.2. Unsettled payment transactions by category

PANEL B: Unsettled payment transactions by categories for volume and value

Figure 4: Volumes of unsettled payment transactions by category

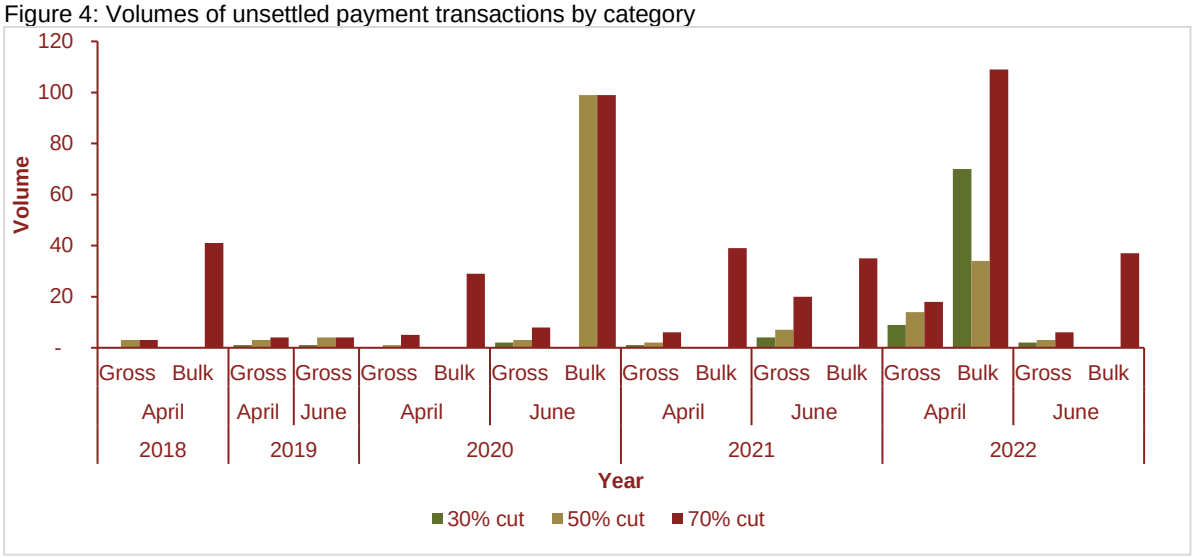
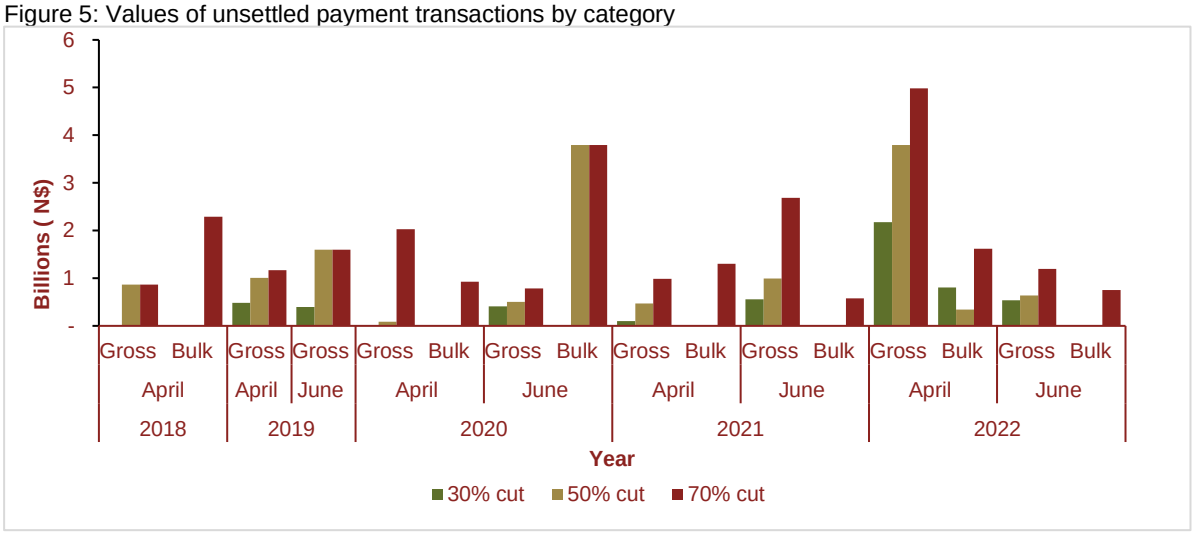


Figure 5: Values of unsettled payment transactions by category



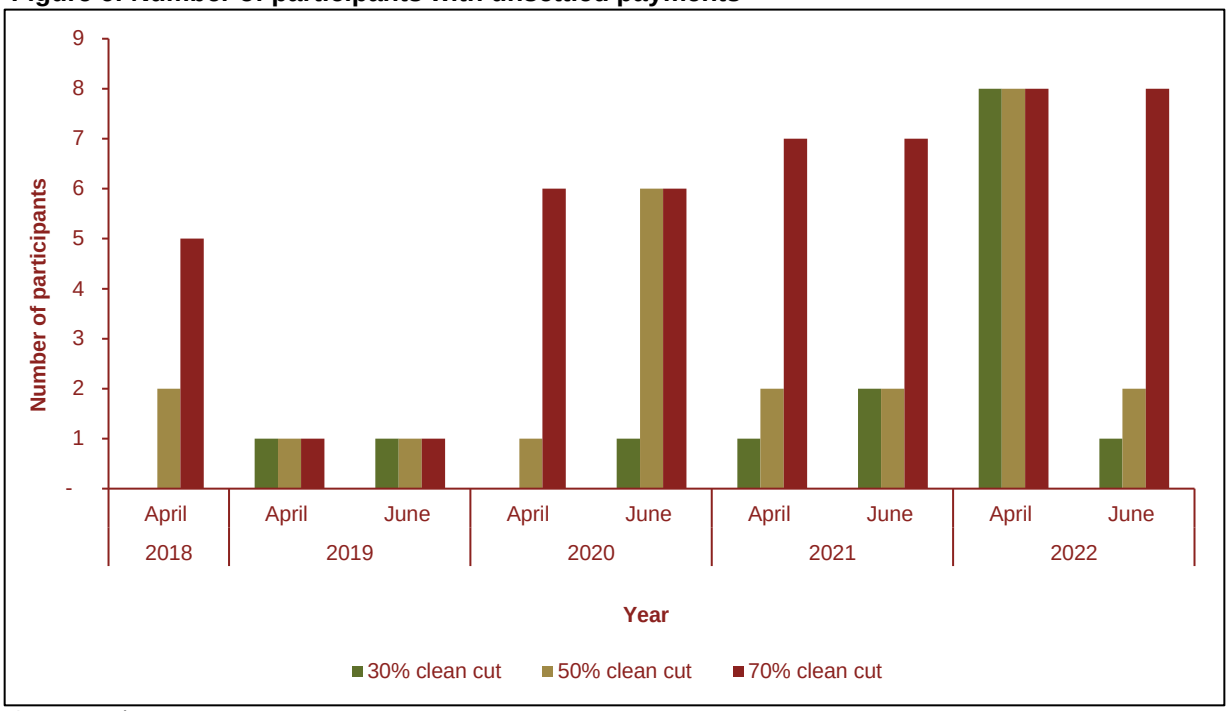
Source: Authors

Unsettled payment transactions by category with respect to gross and bulk payments arising from the scenarios are depicted in Panel B. Gross payments refer to single payments among participants in the NISS while bulk payments refer to the Card and electronic funds transfer (EFT) retail payment streams from the Automated Clearing House, NamClear. Figure 4 shows that the highest number of unsettled payments were bulk payments during and post the pandemic. In June 2020, 99 bulk payment transactions valued at N$3.7 billion were unsettled when collateral was reduced by both 50% and 70% severity cuts. In addition, April 2022 noted 70 and 109 unsettled bulk payment transactions at the 30% and 70% cuts valued at N$802.9 million and N$1.6 billion, respectively. The scenarios had minimal impact on both gross and bulk payments during 2018 and 2019 indicating that participants did not to a large extent rely on collateral to settle payment obligations before the pandemic. Figure 5 shows that the collateral deterioration scenarios mostly impacted the value of gross payments (high value

payments) than bulk payment transactions (low values payments). The value of unsettled gross payment transactions in April 2022 kept increasing as the value of collateral dropped due to the scenarios. In this regard, the value of unsettled gross payments rose by N$2.1 billion at 30% cut, N$3.7 billion at 50% cut and N$4.9 billion at 70% cut. The results are consistent with the fact that majority of the payments in the benchmark scenario required collateral to settle during April 2022, therefore applying the scenarios asserts more pressure on settlement balances to settle payment obligations (see Appendix 1 for the granular results in a tabular format).

5.3 Participants with unsettled payment transactions[16]

Figure 6: Number of participants with unsettled payments



Source: Authors

Figure 6 shows the number of participants that were unable to settle both gross and bulk payments due to the scenarios. Majority of the NISS participants were unable to settle their obligations at 50% and 70% severity cuts, except for April 2022 where 8 participants experienced unsettled payment obligations due to all 3 severity cuts. Figure 6 further indicates that the 70% severity cut had a significant impact on majority of the participants during the review period which effect was mainly on bulk payments in comparison to gross payments due to the interdependencies of participants within a batch. In this regard, even if only 1 participant is experiencing insufficient funds due to either scenario, other participants within the batch will also be affected leading to a high number of participants with unsettled payments.

[16] There were no NISS participants with unsettled payments during the month of June 2019.

5.4 Negative end-of-day balances[17]

PANEL C: Negative end-of-day balances by volumes and values

Figure 7: Volume of participants with negative end-of-day balances

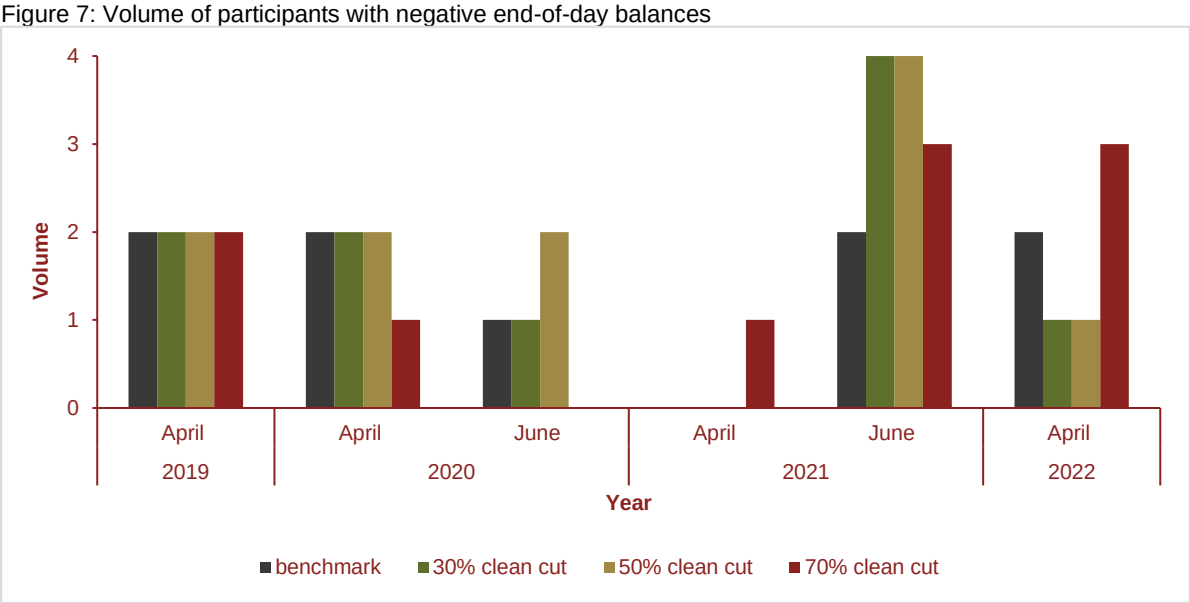
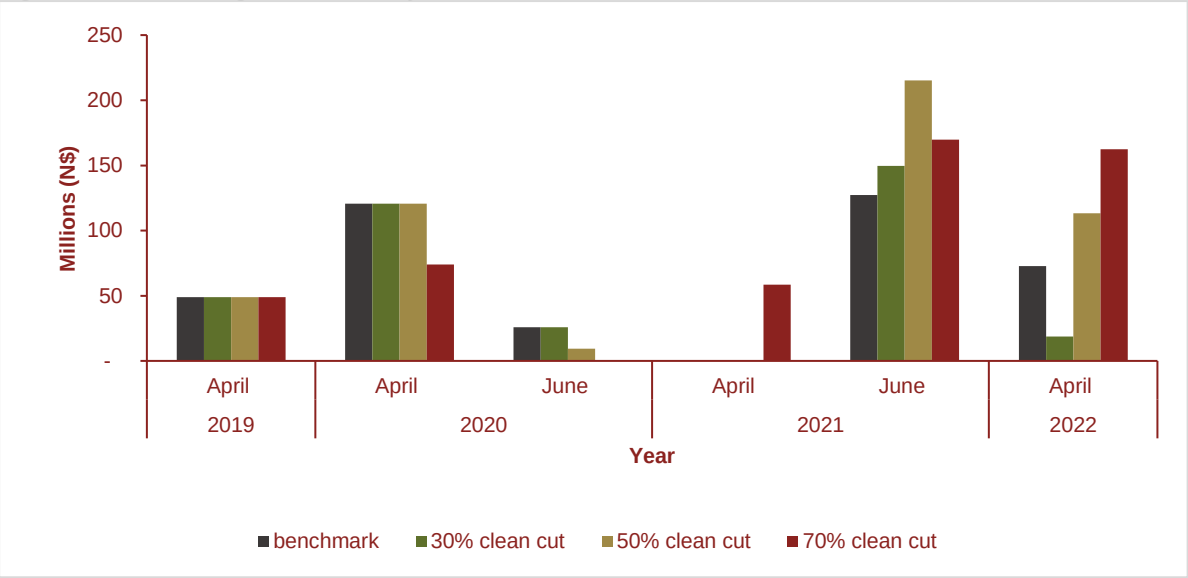


Figure 8: Values of negative end-of-day balances



Source: Authors

Panel C presents the number of participants with negative end-of-day balances by volume and value at the benchmark and severity levels. The fluctuation in the number of participants closing the day with a negative end-of-day balance (Figure 7) and associated values (Figure 8), is a result of the increased cuts which deteriorated the participants available liquidity to settle their payment obligations. The highest number of participants (4) exhibiting negative end-of-day balances at the 30% (N$149.5 million) and 50% (N$215.1 million) cuts was noted during the pandemic (June 2021), while at a 70% cut only 3 participants had negative end-of-

[17] There were no NISS participants with negative end of day balances for the year 2018 and June 2022.

day balances collectively valued at N$169.8 million. The decline in the number of participants at the various severity levels during April 2020, June 2021 and April 2022 was because of a reduction in the settlement obligations for the day as result of unsettled payment transactions, which means that the available liquidity (credit limit and settlement account balance) would settle less payment transactions than the actual, because of the cuts resulting in positive end-of-day balances.[18]

5.5 Collateral usage

PANEL D: Collateral usage by volumes and values

Figure 9: Transactions settled with collateral by volume

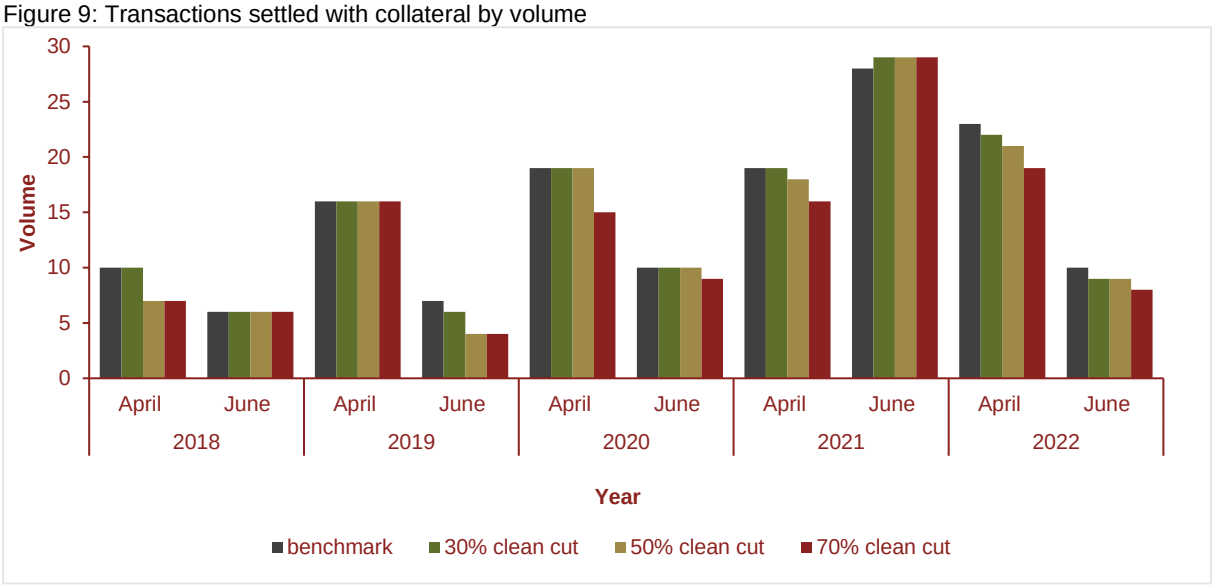
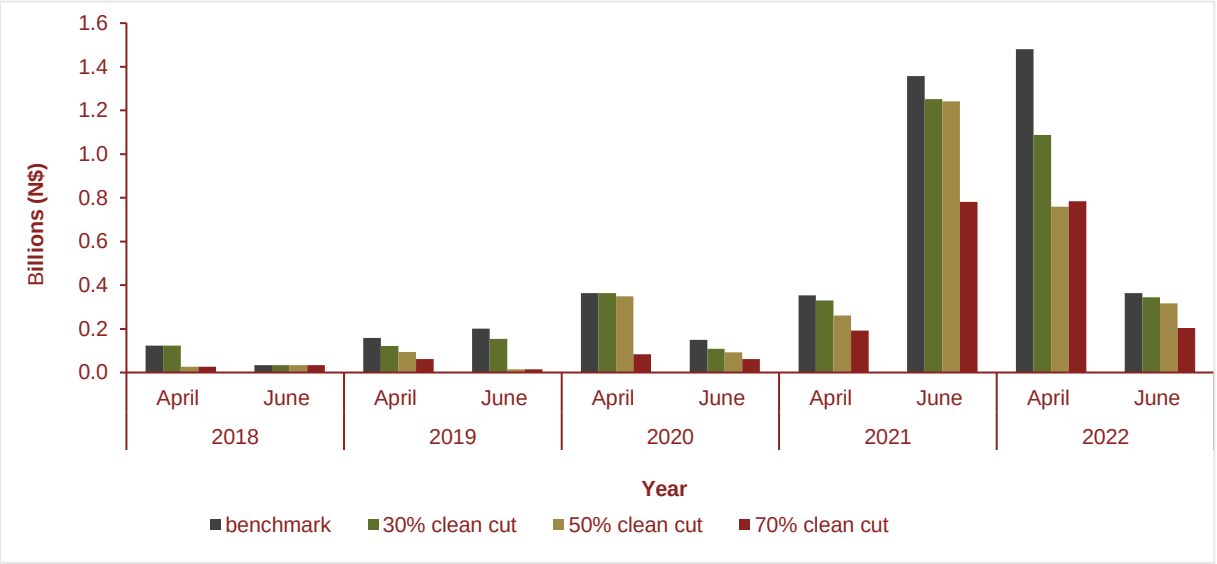


Figure 10: Transactions settled with collateral by value



Source: Authors

[18] The positive end-of-day balance is due to unsettled payment transactions.

Payment transactions settled using collateral in the benchmark and scenarios for the period under review are presented in Panel D. Figure 9 shows the number of transactions that required collateral to settle during the benchmark compared to the scenario severity levels. In April 2018 for instance, 10 transactions required collateral to settle, however, when the scenarios were introduced, only 7 transactions could settle at 50% and 70% severity levels which means that 3 transactions that required collateral could not settle due to these severity cuts. Figure 9 further indicates that majority of the transactions which required collateral were settled during the scenarios even at a 70% cut, but in June 2021, an extra transaction was settled using collateral compared to the benchmark. This can be explained by timing between when the transaction was submitted versus the time collateral was pledged.

While NISS participants maintain high levels of collateral, the share of transactions settled with collateral remained very low. The ratio of transactions settled using collateral in relation to total transaction settled was on average 0.24% and 0.55% for volumes and values, respectively for the benchmark. The highest transactions that required collateral to settle were recorded in June 2021 and April 2022 with the settlement value ratio of 1.4% and 1.5%, respectively. From a value perspective, the highest payment transactions settled using collateral in the benchmark scenario were recorded in April 2022 valued at N$1.4 billion and June 2021 valued at N$1.3 billion (Figure 10). When the cuts were introduced, the value of transactions settled with collateral at the 30% and 50% cuts reduced by 26.5% and 30.2% respectively, however, increased by 3.2% at a 70% cut during April 2022. The increase in collateral usage at a 70% cut is attributed to reduced liquidity available for settlement purposes. Lastly, the least transactions settled with collateral by volume and value were observed before the pandemic (during June 2018) as per the benchmark and the scenarios.

6. DISCUSSION

The pattern of unsettled volumes and values is consistent with the collateral deterioration scenarios across the review period. This means that the share of unsettled payment transactions by volume and value, increases when collateral is reduced with the severity cuts. This is despite the fact that during the review period, participants pledged N$46 billion for collateral but only used credit of 2.9% of the total amount to settle payment obligations. Overall, the results indicate that majority of the transactions were able to settle at the 30% severity cut which is an indication that participants maintained sufficient settlement balances to meet payment obligations. From a volume's perspective, retail payment transactions are impacted the most by the severity cuts, while gross payment transactions are mainly impacted from a value standpoint. This is consistent with the transaction patterns in the NISS in that retail payment transactions are high volume (low value) while gross payment transactions are low volume (high value). Moreover, from the result it is also evident that few participants experienced

unsettled transactions at the 30% severity cut. The reality is that even with the high value of collateral pledged, it is not equally distributed among participants, and while bulk payments create interlinkages among participants, a market shock that deteriorates collateral could lead to liquidity and settlement risks to all the participants in the NISS. The results are somewhat in line with those of Papsdorf et al (2017) where the authors found that the more severe the scenario, the greater the negative implication in terms of unsettled transactions, affected participants, and negative end-of-day balances.

The results further indicate that collateral usage behaviour varied before, during and after the COVID period specified for the scenarios. The period during and post the pandemic experienced the highest unsettled payment transactions as a result of the scenarios. It appears from the results that before the pandemic, collateral was sufficient and not somewhat needed as much to settle payment obligations, despite the drop in value of collateral caused by the scenarios. This indicates that participants were mainly relying on their settlement balances inclusive of incoming payments to settle payment obligations. During the pandemic however, participants would have experienced a rise in unsettled payments both in volume and value and particularly in bulk payments if a market shock led to the deterioration of collateral pledged by participants. After the pandemic subsided, participants continued to rely on collateral to settle payment obligations especially in April 2022 where 1.5% of the total value of transactions required collateral to settle. Additionally, during April 2022, the volume of retail payments and value of gross payments were impacted the most by the scenarios which indicates the importance of collateral to both bulk and gross payments in the NISS. Despite the shocks levied on collateral and the COVID effects, it is evident that the participants maintained sufficient liquidity to honour their payment obligations as the participants could settle over 85% of their payment obligations at a 70% cut.

The interbank payment system forms the backbone of the financial system, hence safety and efficiency are of great importance to the entire economy. The pivotal role that collateral plays in the settlement of payment obligations is evident from the stress simulation results. It is, therefore, imperative for participants to have collateral pledged to ensure accessibility to the Bank's credit facilities to bridge liquidity shortages for settlement purposes and contribute towards safeguarding financial stability. Pledging sufficient collateral will further mitigate settlement, default and concentration risks that exists between the participants particularly from a retail payments perspective. It is essential for the participants to have sufficient funds NISS to supports and facilitates the implementation of effective monetary policy in the financial system by providing a vehicle to move money among agents in line with the Bank's Monetary Policy Framework.

7. CONCLUSION

This study used the BoF-PSS3 Simulator tool to investigate the impact of collateral deterioration on NISS participants' ability to fulfil payment obligations and further determine the pre, during, and post COVID effects on the participants liquidity. The study revealed that the share of unsettled payment transactions increases with the severity cuts, which suggests the significance of collateral in the settlement of payment obligations by the participants. The results further indicate that the least unsettled payment transactions were observed in the pre COVID period, while the most unsettled payment transactions were noted during and after the pandemic as a result of high settlement obligations amidst reduced liquidity as a result of the cuts. In terms of the scenarios performed, the study found that retail payment transactions were impacted the most in terms of volumes, while from a value perspective, gross payment transactions are highly impacted. Notwithstanding the shocks imposed on the participants' collateral for the review period and the COVID effects, which led to a decline in the Bank's repo rates thereby adversely affecting the settlement account interest rate, the participants maintained adequate liquidity to honour their payment obligations. This in line with the benchmark results that showed that 98% of the total value settled in NISS during the review period was without collateral usage. In addition, during the COVID period no significant shocks were observed in the Namibian market that adversely affected both the Bank and government securities that were pledged in the NISS.

The Settlement System Operator mandates the pledging of collateral in the NISS. Participants in the NISS can pledge collateral at their discretion as no minimum collateral threshold has been established. The collateral deterioration scenarios further revealed that having collateral pledged does not necessarily imply that the participants would not default, thus it is imperative for the participants to assess their settlement obligations in line with their liquidity management principles to establish a minimum collateral amount to be pledged. This will enable participants to proactively manage their liquidity by monitoring their minimum collateral levels.

Few assumptions were applied and ought to be noted for this study. Firstly, the study assumes that participants are limited to their settlement account balances, incoming payments and available collateral pledged. This is, however, not a complete reflection of the participants' overall liquidity. The stress scenarios do not consider the additional liquidity sources that the participants have outside the NISS which could be used to facilitate payment obligations during stress conditions, suggesting that the impact of the results might be less or mild in reality. Lastly, the scope of collateral pledged in the NISS is limited to the eligible securities defined in the Bank's Operational Notice, thus the study does not account for other securities prescribed in the Lender of Last Resort Policy.

8. RECOMMENDATIONS

Given the above results and reflections, the paper does not propose any immediate policy interventions, however, frequent, and comprehensive liquidity simulations are highly recommended. The paper recommends on going stress testing of liquidity risk in the NISS at different periods and severity levels. Additionally, future studies should consider the total liquidity buffers available to participants and how they might be impacted by extreme market shocks. It is further recommended for the Settlement System Operator to consider urging the participants to conduct liquidity assessments to determine plausible minimum collateral thresholds in line with their settlement obligations.

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APPENDIX 1: NISS SIMULATION RESULTS

Table 2: Unsettled payment transactions by volume and value (N$)

Year	Month	30% clean cut		50% clean cut		70% clean cut	
		Volume	Value	Volume	Value	Volume	Value
2018	April	-	-	3	863,253,716	44	3,154,894,470
	April	1	479,939,488	3	1,004,850,119	4	1,171,111,909
2019	June	1	398,627,364	4	1,597,688,428	4	1,597,688,428
	April	-	-	1	90,000,000	34	2,951,933,201
2020	June	2	407,406,638	102	4,297,767,264	107	4,584,562,280
	April	1	100,077,808	2	469,768,680	45	2,287,412,072
2021	June	4	555,542,466	7	993,092,043	55	3,266,011,383
	April	79	2,978,268,341	48	4,136,905,307	127	6,607,767,155
2022	June	2	533,842,117	3	638,660,610	43	1,950,756,692

Table 3: Unsettled payment transactions by category (volume and value (N$))

Year	Month	Category	30% cut		50% cut		70% cut	
			Volume	Value	Volume	Value	Volume	Value
		Gross	-		3	863,253,716	3	863,253,716
2018	April	Bulk	-		-		41	2,291,640,754
	April	Gross	1	479,939,488	3	1,004,850,119	4	1,171,111,909
2019	June	Gross	1	398,627,364	4	1,597,688,428	4	1,597,688,428
		Gross	-	-	1	90,000,000	5	2,027,102,846
	April	Bulk	-	-	-	-	29	924,830,355
		Gross	2	407,406,638	3	500,873,881	8	787,668,897
2020	June	Bulk	-	-	99	3,796,893,383	99	3,796,893,383
		Gross	1	100,077,808	2	469,768,680	6	984,571,480
	April	Bulk	-	-	-	-	39	1,302,840,592
		Gross	4	555,542,466	7	993,092,043	20	2,685,760,409
2021	June	Bulk	-	-	-	-	35	580,250,974
		gross	9	2,175,335,474	14	3,795,717,981	18	4,986,459,010
	April	Bulk	70	802,932,867	34	341,187,326	109	1,621,308,145
		Gross	2	533,842,117	3	638,660,610	6	1,198,022,404
2022	June	Bulk	-	-	-	-	37	752,734,287