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Net Send Limits in the Lynx Payment System: Usage and Implications

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Abstract

The net send limit (NSL) tool allows financial institutions in the Lynx payment system to control their intraday payment outflow levels. While other liquidity management tools and strategies in Lynx have been studied extensively, no prior research has been conducted on how system participants use NSLs. We analyze data on Lynx NSLs, payments and settlement times and find that participants adopt a “set it and forget it” approach to scheduling NSLs. As well, participants have distinct intraday “loosening” and “tightening” behaviours with different timing and impacts on payment delays. We discuss two potential reasons for this behaviour: signalling to counterparties and rational inattention.

Topics: Financial institutions; Payment clearing and settlement systems; Recent economic and financial developments
JEL codes: C10, D82, E42, E58, G21, G41

Résumé

Les limites d’envoi nettes permettent aux institutions financières qui participent au système de paiement Lynx de contrôler leurs paiements intrajournaliers sortants. D’autres outils et stratégies de gestion des liquidités dans Lynx ont fait l’objet d’études approfondies, mais il n’existait pas de recherches portant sur la façon dont les participants au système utilisent ces limites. Nous analysons les données sur les limites d’envoi nettes, les paiements et les heures de règlement dans Lynx, et constatons que les participants adoptent une approche passive une fois ces limites programmées. Ceux-ci ont par ailleurs des comportements distincts au regard des ajustements intrajournaliers (« assouplissement » et « resserrement » des limites), qui sont effectués à des moments différents et produisent des effets divers sur les délais de paiement. Nous exposons deux explications possibles de ces comportements : la volonté de fournir des indications aux contreparties et le traitement sélectif de l’information (« inattention rationnelle »).

Sujets : Institutions financières; Systèmes de compensation et de règlement des paiements; Évolution économique et financière récente
Codes JEL : C10, D82, E42, E58, G21, G41

Introduction

Every day, financial institutions (FIs) in Canada use the Lynx payment system to transfer billions of dollars to each other. These payments include large interbank transfers, as well as customer wire payments and the settlement obligations created from the Canadian retail payments ecosystem. Lynx uses a real-time gross settlement (RTGS) model, eliminating credit risk between FIs because payments are settled in real-time. This settlement model requires participants to have liquidity that is at least equal to the value of the payment, meaning participants need more liquidity than in a deferred net settlement system (Tsuchiya 2013).

The liquidity requirements in an RTGS presents a trade-off for Lynx participants. They can send payments sooner by using available intraday liquidity within a given window of time or delay payments until more liquidity is available from incoming payments (Bech and Garratt 2003). Lynx participants have three sources of intraday liquidity:

- collateralized loans from the Bank of Canada
- interest-bearing settlement balances held at the Bank
- intraday incoming payments from other Lynx participants

The first two sources are available to participants at the start of the Lynx cycle date, although participants can get more liquidity by pledging more intraday collateral to the Bank. In contrast, using incoming payments to fund outgoing payments—also known as liquidity recycling (Becher, Galbiati and Tudela, 2008)—is more time contingent because the payment activity of counterparties fluctuates throughout the cycle date.

To promote liquidity efficiency and reduce liquidity needs, Lynx's operator, Payments Canada, has developed a variety of liquidity-saving features, including:

- system features, such as mechanisms, configurations and rules ingrained within Lynx that promote liquidity efficiency at a system level
- liquidity saving tools that participants use to manage their respective intraday liquidity flows

Rivadeneyra and Zhang (2020) and Garratt, Lu and Tian (2023) have explored the impacts many of these features and tools have on liquidity efficiency. However, one liquidity management tool in Lynx whose use and impacts has not yet been studied is the net send limit (NSL).

An NSL allows an FI participating in Lynx to limit the value of payments it is willing to send during the same cycle date to an individual counterparty relative to how much it receives from that counterparty. In effect, NSLs set upper limits on bilateral net outflows[1].

Participants can use the Lynx dashboard to monitor their NSLs, including seeing how close they are to limits with counterparties. Lynx notifies participants when a payment would exceed—or breach—an NSL but does not inform the counterparty expecting to receive the payment. A counterparty with a limit set against it isn't told of an NSL nor the extent of payments affected by the limit. Any communication about an NSL is at the discretion of the participant that sets it.

Using Lynx data from Payments Canada on NSLs, payments and settlements, we produce summary statistics about the use of NSLs and measure their impact on payment flows and liquidity efficiency. We look at NSLs and payments between 2022–24.

We find significant heterogeneity in how Lynx participants use NSLs. Most NSLs are implemented in a "set it and forget it" approach, with scheduled limits that are rarely adjusted. However, we also find that some NSLs are becoming more stringent and more impactful in terms of payment delays over time since Lynx and its NSL function were introduced in 2021. We discuss two possible explanations for the NSL usage behaviour we observe among Lynx participants:

- signalling to counterparties
- rational inattention in managing payment liquidity

The statistics we analyze, as well as the communication and notification dynamics in the Lynx system, support the rational inattention hypothesis. Instead of using NSLs to influence the behaviour of counterparties—which depends on a participant communicating with a counterparty— participants are using NSLs to coordinate intraday liquidity flows without actively managing the timing of each payment.

We argue that the evidence shows that NSLs allow a Lynx participant to focus its attention on a critical threshold for bilateral outflows. When the outflow approaches this threshold, a participant must choose to either:

- raise its limit to allow further liquidity outflow
- communicate with its counterparty to ensure payment coordination and reciprocity

[1] NSLs differ from the Bilateral Credit Limits tool that existed in Canada's Large Value Transfer System (LVTS), which preceded Lynx. Unlike LVTS, Lynx is a fully collateralized system free of credit risk. That means a bilateral credit limits tool isn't needed to limit counterparty credit risk exposures. Instead, NSLs limit intraday liquidity exposures.

Existing literature on bilateral limits and liquidity management within wholesale payment systems

Participants in RTGS systems face a well-documented trade-off between the cost of acquiring liquidity to fund outgoing payments and the cost of delaying payments (Angelini 1998). NSLs help to balance this trade-off by offering Lynx participants a way to manage their intraday liquidity outflows. Using a stylized model, Becher, Galbiati and Tudela (2008) posit that NSLs could act as a disciplinary mechanism, incentivizing participants to submit payments sooner by creating expectations of additional costs associated with delaying payments.

The Eurosystem's RTGS system has a tool, called a bilateral limit, that is very similar to NSLs and is used for intraday liquidity management. Heijmans and Heuver (2014) find that the use of this tool to manage the liquidity-delay trade-off can harm liquidity efficiency bilaterally. For example, during the 2008–09 global financial crisis, some banks were facing financial stress and made payments sooner in the morning to signal to counterparties that they could fulfil their obligations. However, this led to stressed participants draining their available liquidity sooner in the cycle day, making them dependent on receiving payments from other participants throughout the day. Meanwhile, counterparties, concerned with managing their intraday liquidity risks and stressed participants' ability to pay, set tighter bilateral limits. This led to stressed participants being in worse liquidity positions despite their attempts to signal their ability to pay. Based on simulations using data from the European large-value payment system, Diehl and Müller (2014) show that NSLs could improve liquidity efficiency because of greater netting in liquidity savings mechanisms, resulting from payments remaining in the queue due to NSLs.

Based on discussions with European banks, Abbink et al. (2017) find that many banks used sophisticated in-house tools to manage intraday bilateral liquidity instead of the centralized bilateral limit tool.

More recent research has explored the relationship between the trade-off mentioned previously and intraday risk management tools in Canada's wholesale payment system. Bewaji (2024) analyzed bilateral credit limits in LVTS—which, like NSLs, are an intraday risk management tool. The author finds that participants are willing to reduce limits on their counterparties by the cost of the settlement delays they cause. Bewaji speculates that similar dynamics may exist in Lynx with NSLs. However, the intraday trade-offs differ in the fully pre-funded Lynx system due to a lack of material counterparty credit risk. The payments in LVTS he assessed were not fully collateralized, so bilateral limits were used to manage both liquidity risk and credit risk.

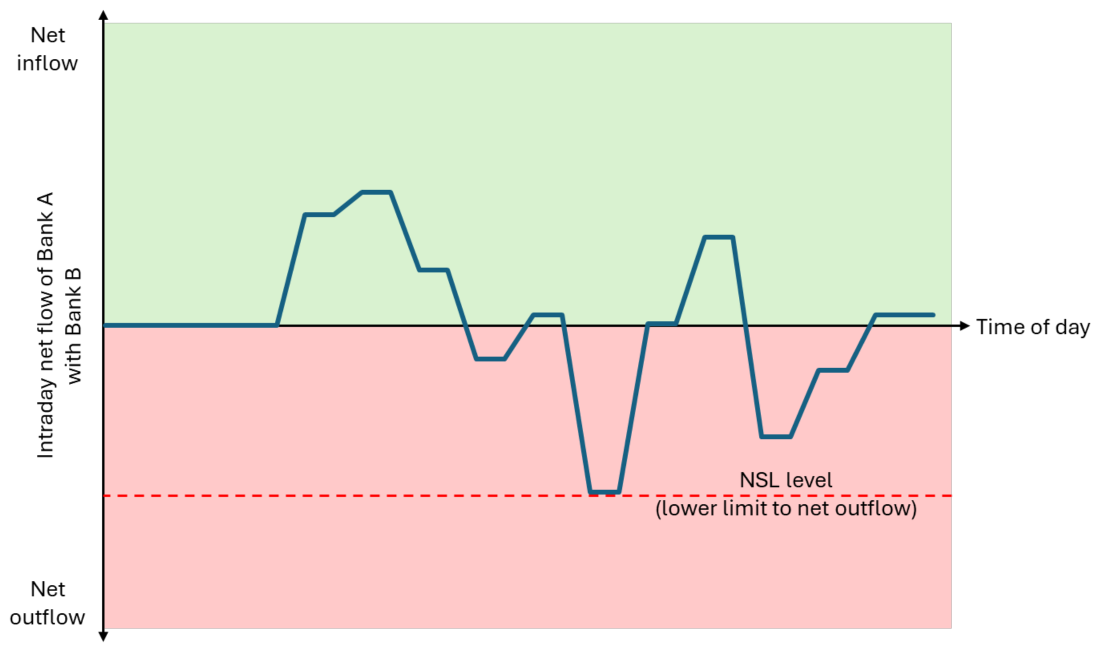
Our paper is the first to analyze NSLs in Lynx. By reviewing summary statistics and discussing potential drivers of NSL usage, we aim to lay the foundation for future analysis of this tool, its use and its impacts.

How NSLs work in Lynx

NSLs are available in the main settlement mechanism in Lynx, the Liquidity Savings Mechanism (LSM). Over 99% of the value and volume of Lynx transactions are settled in LSM.

Figure 1 illustrates how NSLs work conceptually by displaying the intraday bilateral net liquidity flow of Bank A against Bank B from Bank A's perspective. The bilateral net flow increases when Bank A receives payments from Bank B (inflow) and decreases when Bank A sends payments to Bank B (outflow). The NSL, marked in a red dashed line, acts as a lower limit to the bilateral net liquidity flow: Bank A cannot send payments that would decrease the bilateral net liquidity flow beyond this level. Hence, NSLs are self-imposed limits.

Figure 1: Changes to a participant's intraday bilateral net flow in Lynx



Participants can set different limits for different counterparties. Throughout this paper, we call the participant that sets the NSL the *setter* and the participant with an NSL against it the *contra*. NSLs prevent the setter from sending payments with dollar amounts that would cause its bilateral net outflow with a given contra to exceed the imposed limit. NSLs remain effective until overwritten by another NSL or the end of the cycle date.

Payments submitted to the LSM that would exceed the level in an NSL are removed from the queue—or diarized—and temporarily warehoused in a repository called the Conditional Release Mechanism (CRM). These payments remain in the CRM until the bilateral net flow between the setter and contra falls to a level allowing the payment to be settled without breaching the NSL. If this level is not reached before the end of the cycle, diarized payment instructions are effectively discarded by the system.

NSL usage in Lynx

An active NSL always exists between each pair of Lynx participants because of the system's design. When participants do not manually enter an NSL, the system sets the NSL at a default level so high that, in practice, it does not limit participants' payment flows. We exclude these NSLs in our analysis, focusing instead on NSLs that any of the Lynx participants enter manually. Only 7 participants have manually entered at least one NSL in the system over the studied period. Of these participants, 6 regularly set reciprocal NSLs among each other and all other non-setter participants. The 7th has set occasional NSLs against 3 other participants, 2 of whom do not set NSLs.

Categorizing NSL usage

In total, 68,179 NSLs were manually set in Lynx between 2022 and 2024, which represent 31.3% of all NSLs in the data set, including default NSLs. We identify two main categories of NSLs:

- **Scheduled NSLs** are registered one day before the effective cycle date.
- **Same-day NSLs** are registered on the same day as their effective cycle date.

Scheduled NSLs

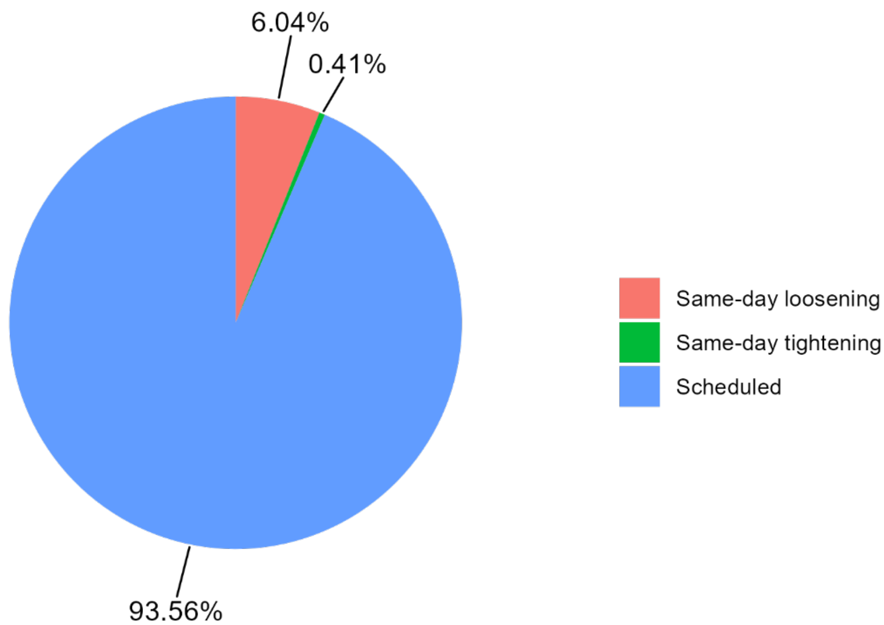
These NSLs make up 94% of all NSLs that are set manually. Of these scheduled NSLs, 67% remained in place for the entire day (i.e., Lynx Settlement Window 1 between 00:30 ET and 18:00 ET), in what we describe as a "set it and forget it" approach. The remaining 33% are superseded by a lower or higher NSL imposed against a contra during the day. Most setters kept the same scheduled NSL levels from day to day against each contra over the studied period.

Same-day NSLs

This category accounts for only 6% of NSLs imposed by Lynx participants. Participants typically make these NSLs effective immediately but can also schedule them for a later point during the same cycle date.

Same-day NSLs can be seen as a setter adjusting a faucet on its payment outflow, which can be either *loosened* to a higher value or *tightened* to a lower value. The vast majority of same-day NSLs, 94%, are loosened, while only 6% are tightened (**Chart 1**).

Chart 1: Breakdown of types of net send limits in the sample period, 2022–24



Note: NSL is Net Send Limit. *Loosening* is when a participant raises the value of an NSL; *tightening* is when a participant reduces the value of an NSL.

Sources: Payments Canada and Bank of Canada calculations

Stringency of NSLs

We define NSL stringency as how tight or loose an NSL is relative to the intraday net payment flows between a setter and contra. We standardize NSL stringency levels to compare them across setters and assess overall system stringency levels in Lynx.

Stringency of NSLs

We standardize NSLs with the maximum intraday bilateral net outflow from the 30 days prior to the effective cycle date from the setter's perspective. For the remainder of the paper, we refer to this as the recent net outflow maximums.

One important consideration is that the NSLs themselves can impact recent net outflow maximums because NSLs act as an upper limit to the outflow. To avoid standardizing NSLs on a distribution that is itself conditioned by NSLs, we assume that transactions are settled as they are registered within the LSM to calculate the daily recent net outflow maximum. This simplifying assumption essentially ignores any bilateral or multilateral liquidity constraints, such as NSLs, which could delay payments and impact outflow. We exclude observations where there was no activity from a setter toward a contra over 30-day periods.

We standardize NSLs with the following equation:

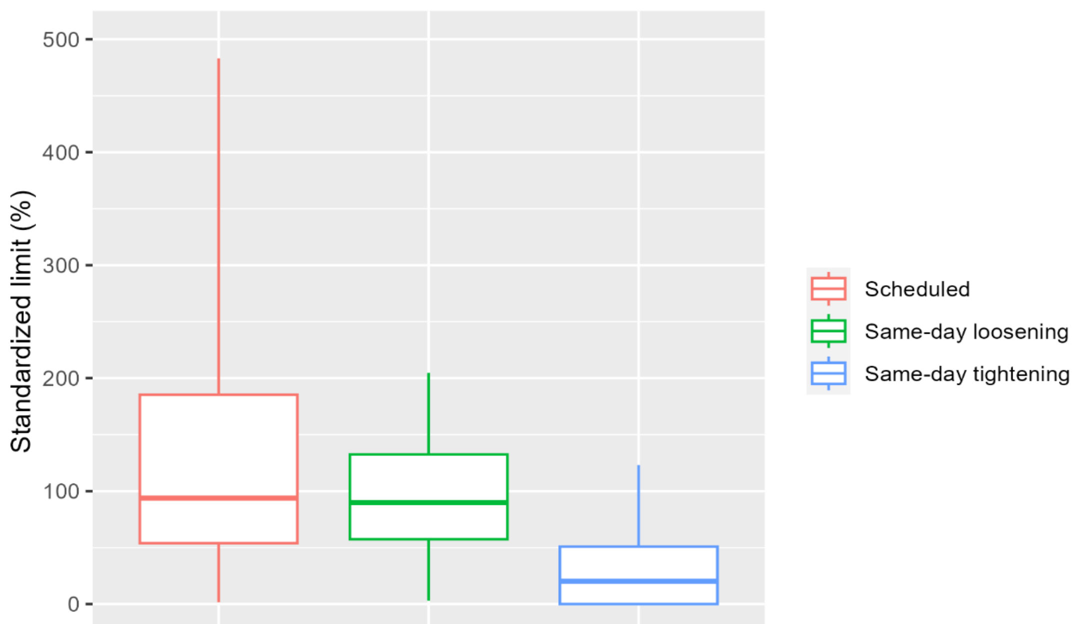
$$NSL_{A\to B,std,t} = \frac{NSL_{A\to B,abs,t}}{\max_{i\in\{t-30,\dots,t-1\}} F_{A\to B,i}},$$

where $\text{NSL}_{A\to B,std,t}$ is the standardized NSL imposed by a setter (A) on contra (B) for cycle date *t*; $\text{NSL}_{A\to B,abs,t}$ is the absolute NSL level imposed by setter (A) on contra (B) effective for cycle date *t*; and *F* is the maximum intraday bilateral net outflow from setter (A) on contra (B) for cycle date *i*.

Under this approach, a smaller value of standardized NSL indicates a more stringent NSL. **Chart 2** displays the range of standardized NSLs set against each regular payments counterparty for each type of NSL.[2, 3]

Chart 2: Standardized stringency levels by type of net send limit

NSL dollar amounts as a percentage of recent outflow maximums with a given counterparty



Note: NSL is Net Send Limit. Observation period is 2022–24. *Loosening* is when a participant raises the value of an NSL; *tightening* is when a participant reduces the value of an NSL.

Sources: Payments Canada and Bank of Canada calculations

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[2] We exclude setter-contra pairs with minimal payment activity, meaning they have periods of one month or longer without exchanging a single payment during the lookback window. We also exclude all data points where the Bank is the contra. Extreme values in the standardized limit metric can arise when the denominator is low, producing heavy-tailed distributions. To ensure that the distributions of all three limit types are visually comparable while retaining all observations, we applied one-sided winsorization at the 90th percentile. This moderates extreme outliers without excluding data points, allowing central tendencies and relative differences to be clearly depicted.

[3] NSLs loosened to the default value have been excluded from this analysis because we consider them a removal of an NSL, rather than an intraday adjustment to a different NSL level.

Variations in stringency *within* each type of NSL reflects the different preferences of participants around extending intraday liquidity to their counterparties. For this reason, stringency ranges and levels can vary significantly between different pairs of setters and contras.

Variations in stringency *between* each type of NSL reflect the different use cases for each type. Scheduled NSLs and same-day NSLs that are loosened have similar medians, with 94% of recent outflow maximum and 90% respectively. However, the stringencies of scheduled NSLs are longer-tailed on the higher end with a 90th percentile of 483% compared with 205% for same-day loosening NSLs. Participants often use same-day NSLs to loosen limits in response to or in anticipation of an NSL breach that the participant would like to end or avoid. Less stringent scheduled NSLs, which have a higher percentage of recent outflow maximums than same-day NSLs, are less likely to be breached. As well, they do not need same-day adjustments, which explains the short-tailed distribution of same-day NSLs used to loosen limits.

In contrast, same-day NSLs whose limits are tightened have a median stringency value of 20% of recent outflow maximums. This indicates that participants setting these limits are less willing to extend liquidity to the contra than in the recent past. Same-day NSLs used to tighten limits have a lower quartile and a minimum stringency value of 0% because participants tend to set same-day tightening NSLs with an absolute level of $0. These zero-NSLs effectively freeze outgoing payments to a counterparty until a setter is in a net inflow position (i.e., having received more payment value than it has sent).

Payments that breach NSLs

NSL breaches occur when a payment submitted to the LSM would, if settled, cause the bilateral position between the sender and receiver to exceed the NSL. In that situation, the payment is warehoused in the CRM.

Descriptive statistics on NSL breaches

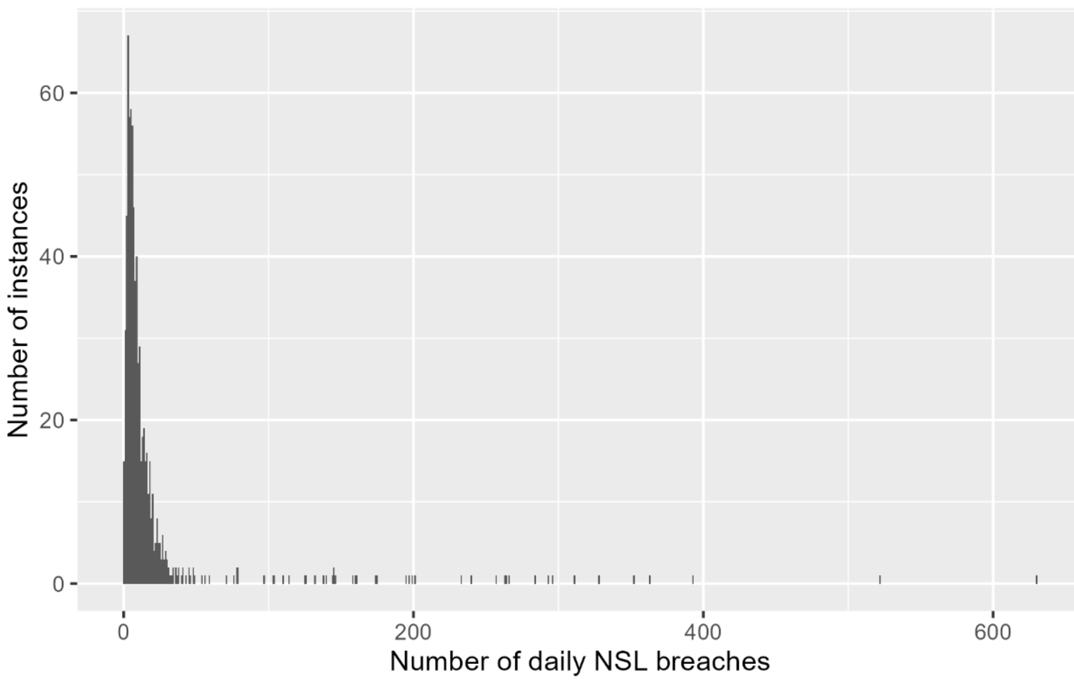
NSL breaches are common occurrences: at least one breach occurred on 98% of days in the sample. In most cases, the total number of daily breaches remained somewhat low, not exceeding 30 in 90% of the days in the sample (**Chart 3**). However, there were several instances where the number of breaches was much higher. The number of daily breaches exceeded 100 once every 20 days and peaked at 630 on December 2, 2024.

To estimate this information, we create the following condition for classifying a diarized payment due to an NSL breach:

$$If \left\{F_{ij,t} - P_{ij,t} < -NSL_{ij,t}\right\} \rightarrow NSL\ Breach,$$

where $F_{ij,t}$ is the bilateral net flow between Participant *i* and Participant *j* at time *t*, and where a negative value is interpreted as a net outflow for Participant *i*; $P_{ij,t}$ is the diarized payment sent from Participant *i* to Participant *j* at time *t*; and $NSL_{ij,t}$ is the net send limit set by Participant *i* against Participant *j* effective at time *t*.

Chart 3: Number of daily breaches of net send limits

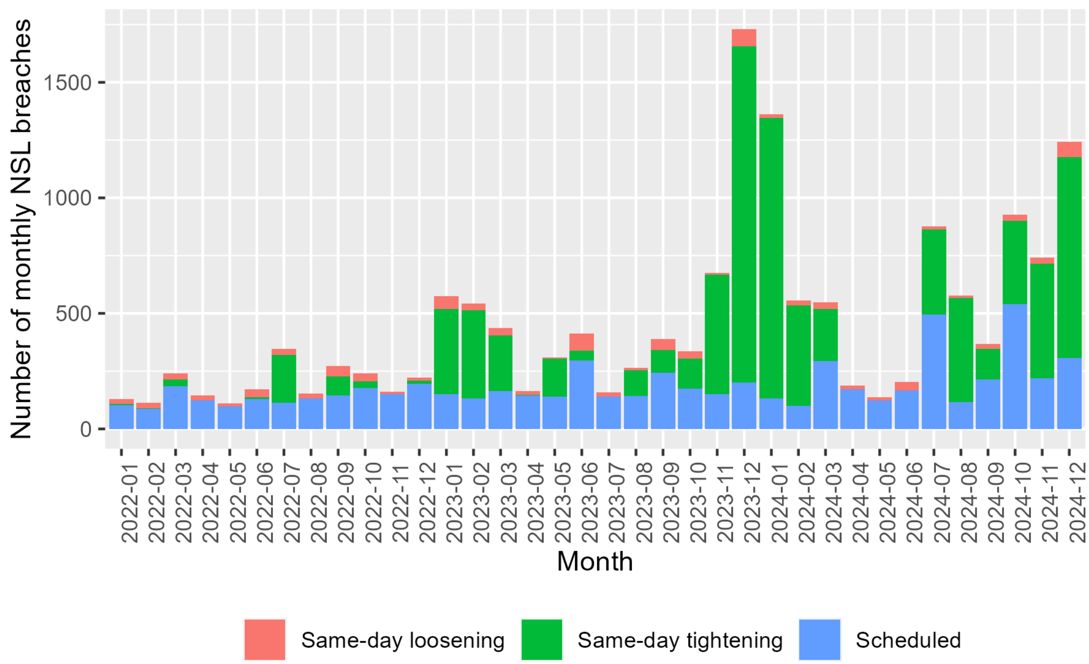


Sources: Payments Canada and Bank of Canada calculations.

NSL type, stringency and breaches

Same-day NSLs that were tightened were responsible for over 53% of all breaches (**Chart 4**), despite accounting for less than 0.5% of the total number of NSLs imposed over the lookback period. Meanwhile, a small share of breaches—only 6%—happened only after setters loosened NSLs. This much smaller share of breaches is an intuitive finding given that setters likely raise limits to end breaches or avoid them altogether. Scheduled NSLs were responsible for the remaining 41% of NSL breaches.

Chart 4: Monthly breaches by type of net send limit



Sources: Payments Canada and Bank of Canada calculations

As **Chart 4** shows, the distribution of NSL breaches has trended upward over the lookback period. And since November 2023, the number of monthly breaches has shown significant volatility, being marked by pronounced peaks. Setters tightening NSLs were largely responsible for both the spikes and upward trend, even though the absolute number of NSLs was stable over the lookback period. This suggests that the increased stringency of same-day NSLs is responsible for the increase in the number of breaches.

End of the breaches

During one out of five NSL breaches, the setter loosened the limit by using a same-day NSL with a higher value. Only nine payments were discarded because the breach was never resolved before the end of Lynx Window 1, the first payment schedule window during the Lynx cycle date.

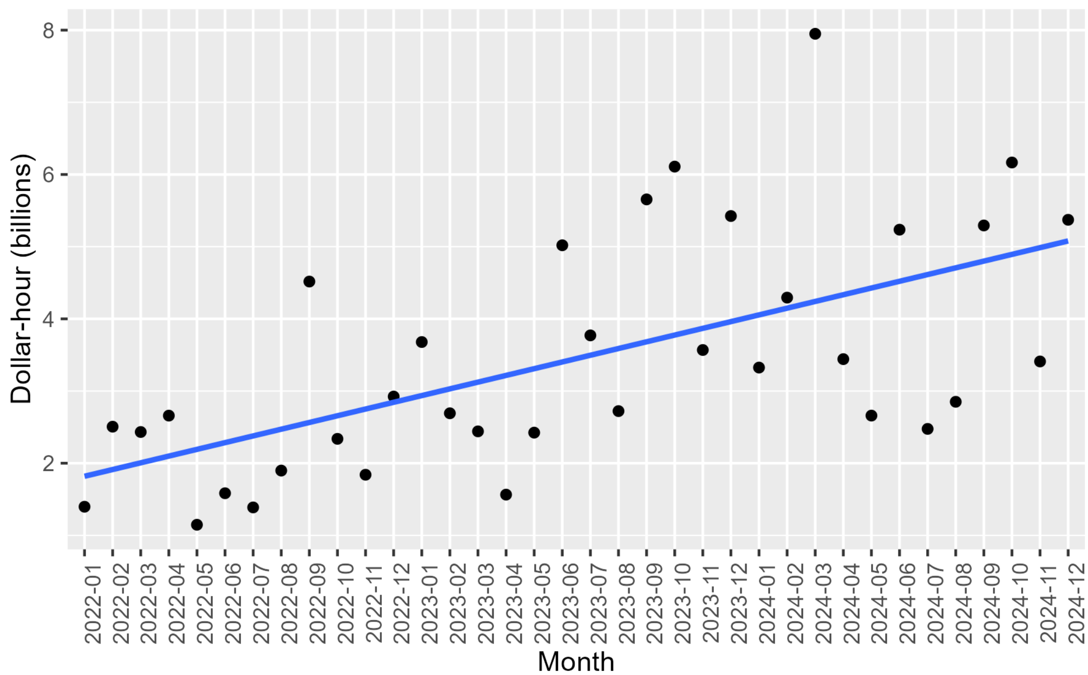
Delays from breaches: dollar-hour metric

We incorporate the value of the delayed payments to better assess their impacts on liquidity. We create a dollar-hour metric multiplying the amount of diarized time by the payment amount. One dollar-hour corresponds to $1 being delayed for one hour, which is equivalent, for example, to $2 being delayed for 30 minutes.

The mean daily dollar-hour delay per month was 3.46 billion during the lookback window, peaking at 33.11 billion on August 31, 2023

The average daily dollar-hour per month exhibits a statistically significant upward trend over time with a slope of 0.093 ($t = 4.39$, one-tailed $p = 0.0001$) (**Chart 5**). This indicates that the average daily dollar-hour metric increased each month by an average of 93 million dollar-hours, meaning that breach-related delays have increased since the launch of Lynx.

Chart 5: Average daily dollar-hour delay per month caused by Net Send Limit breaches



Note: Dollar-hour is the result of multiplying the amount of diarized time by the payment amount. One dollar-hour corresponds to $1 being delayed for one hour. The blue line plots a linear regression of dollar-hour over time.

Sources: Payments Canada and Bank of Canada calculations

Timing of NSLs

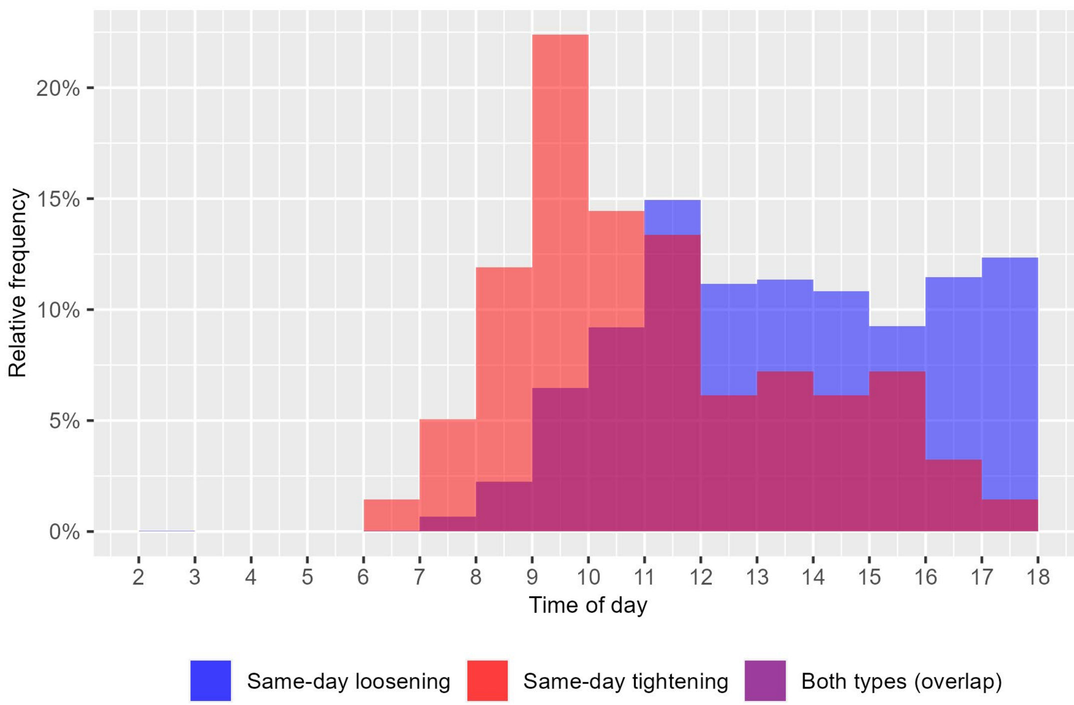
Scheduled NSLs

Scheduled NSLs are registered between 19:00 and 19:45 on the evening before they become effective at 00:30 the next day.

Same-day NSLs

Same-day NSLs are registered and become effective between 00:30 and 18:00 when the LSM operates. We find no significant difference between when same-day NSLs are registered and when they become effective, indicating they are typically set to become effective right away rather than for a later point in the day.

Chart 6: Registrations of same-day net send limits by time of day



Note: The data displayed are an average computed over the lookback period of 2022–24. The relative frequency indicates the proportion of the total number of daily same-day NSL that were set at any given hour of day for each type of same-day NSL.

Sources: Payments Canada and Bank of Canada calculations

Generally, same-day NSLs are tightened earlier in the day, with a mean registration time of 11:11. They are used the most between 08:00 and 12:00, peaking between 09:00 and 10:00 when more than 22.5% are registered. Registrations are then stable until 16:00 and taper off until the LSM closes (**Chart 6**).

In contrast, same-day NSLs are loosened later in the day, with a mean registration time of 13:23. Their usage starts at 07:00 and picks up until 11:00, after which their usage becomes somewhat stable—between 10% and 15% of all loosening events are registered every hour—until the LSM closes.

Only 21% of same-day NSL loosening events happened *during* a breach. Participants instead tend to proactively raise limits before a scheduled NSL is breached. Despite being used on average later than same-day tightening NSLs, same-day loosening NSLs start being registered quite early in the day. This indicates that participants prefer to avoid the costs (to themselves or their counterparties) of payment delays resulting from NSL breaches. Similarly, we do not observe a significant peak in same-day loosening events toward the end of the cycle between 17:00 and 18:00, indicating that participants are not trying to release payments that breach limits to ensure settlement before the end of the cycle. Rather, participants are proactively loosening the faucet earlier in the day.

Another consideration is that Lynx participants in LSM must settle minimum proportions of their daily outbound volume and value by 10:00, 13:00 and 16:30. We do not observe any spikes in same-day loosening events in the hours preceding each of these thresholds—another indication that participants using same-day NSLs generally prefer to proactively resolve breaches.

Discussion: NSLs are a tool for attention rationing rather than for signalling

Signalling

It may seem intuitive to see NSLs as a signalling tool because they were designed to better coordinate payments by encouraging participants to submit payments sooner (Bank of Canada and Payments Canada 2022; Becher, Galbiati and Tudela 2008; Diehl and Müller 2014). This assumes that contras know about an NSL against them and learn about breaches, which can only happen if Lynx participants deliberately communicate with each other about NSLs and breaches. Lynx does not automatically inform contras about an NSL against them, nor does it notify them about breaches. Furthermore, participants are not aware of the value or volume of diarized payments from other participants that are sitting in the CRM instead of being transferred to them. With no direct knowledge of diarized payments, contras will not necessarily be incentivized to accelerate payments toward a setter. In other words, NSLs alone—without accompanying communicative actions—cannot be used as a signalling tool to improve coordination among participants. Rather, any signalling depends on setters deliberately communicating with contras.

Signalling and communications between participants are likely lower today than when the NSL tool was developed. When monetary policy operated on a corridor system—and before large settlement balances were created during the COVID-19 pandemic—cash managers at participant institutions in the LVTS would coordinate among each other to flatten their short or long positions in the system at the end of each cycle date. The Bank's monetary policy now operates on a floor system, where the Bank provides sufficient settlement balances to meet the liquidity demands of Lynx participants. This means cash managers may not need to coordinate their positions as actively. Discussions with staff from the Bank's Financial Markets Division, who regularly meet with cash managers, support this interpretation. Similar impacts can be seen in the long-term declines in interbank money market activity after the creation of large settlement balances in other RTGS systems (Borio 2023). This decline in interbank activity may also affect intraday coordination of payments, including the use of tools like NSLs. Any potential relationship between the use of intraday liquidity management tools in an RTGS and the availability of settlement balances is an area that we leave to be explored in future research.

Attention rationing

In our view, the data support the notion that NSLs are a tool for attention rationing. We see the "set it and forget it" approach that Lynx participants adopt when using NSLs as an example of rationally inattentive behaviour. This concept, first developed by Christopher Sims (1998, 2003), says that economic agents have finite capacity to process information. Therefore, they choose which information to process, subject to the cost of processing that information.

Lynx participants can be seen as rationally inattentive toward managing their intraday payment flows. Participants could manually manage their individual payments to maintain liquidity tolerance levels and ensure sufficient reciprocity among counterparties. However, because this would be highly costly in terms of attention, some Lynx participants opt to automate this process by using NSLs. In this context, NSLs ration attention by allowing participants to submit payments to Lynx without having to devote attention to actively managing their outflows to counterparties on a payment-by-payment basis. Instead, participants can set thresholds (NSLs) that the system automatically prevents from being exceeded.

As we noted before, Lynx does not notify the contra of NSLs or breaches. However, Lynx does notify the setter. Once an NSL is breached, Lynx alerts the setter that payments have been diarized. NSL breaches—or near-breaches since participants can monitor their bilateral capacity—can be seen as a decision point for setters, who must choose to either:

- raise the NSL to allow the payment, or payments, to go through
- coordinate with the counterparty to ensure reciprocal payment inflow

We observe this behaviour in our data: setters responded to 20% of breaches by loosening NSLs. This supports the idea that scheduled NSLs are not seen as immovable thresholds, but as soft thresholds designed to trigger a decision from the setter when certain conditions are met (i.e., when the net outflow with a contra reaches a limit). This system of automated thresholds, monitoring and notifications requires less active attention and intraday decision-making from Lynx participants than manually throttling and adjusting the flow of payments.

Another compelling example of participants' desires to use automation as a way to ration attention is their use of $0 NSLs as an alternative to Lynx's pause payments tool. A pause on payments freezes all payments until participants manually lift the pause. But an NSL set at $0 has a built-in release condition: it freezes all payments until the contra's payments tip the bilateral flow back into a net receiver position for the setter.

Participants regular and consistent use of scheduled NSLs supports the notion that NSLs are a tool to reduce the need for participants to actively manage intraday liquidity. Rather than setting different scheduled limits day-to-day, setters tend to keep a consistent roster of scheduled NSLs for each contra that they keep in place day-to-day. This roster tends to cover all other Lynx participants—six out of seven NSL setters use daily scheduled NSLs against all other participants, and some even set scheduled NSLs against the Bank of Canada.

Furthermore, these seven Lynx participants chose to use NSLs rather than rely solely on an in-house equivalent (Abbink et al. 2017). This suggests that participants avoid spending time and money on developing an equivalent in-house liquidity management tool—as well as computational costs. Lynx participants are, in fact, already bearing the cost of developing and operating the NSL function, given that Payments Canada is fully funded by membership and transaction fees.

Conclusion

We use data on Lynx NSLs, payments and settlement times to produce summary statistics on the use of NSLs and their impact on the Lynx system. We find that participants adopt a "set it and forget it" approach to scheduling NSLs, as well as distinct intraday loosening and tightening behaviours with different timing and distinct impacts on payment delays.

We discuss two potential reasons for this behaviour: counterparty signalling and rational inattention. We find the data and the design of Lynx support the rational inattention theory, where participants use NSLs to avoid having to actively manage their intraday liquidity. Instead, participants intervene at key decision points where the NSL is breached or about to be breached.

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