

# The Demand for Programmable Payments: Extended Abstract\*

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In Kahn and Van Oordt (2022), we examine the desirability of programmable payments, arrangements in which transfers are automatically executed conditional upon preset objective criteria. We study optimal payment arrangements in a continuous-time framework where a buyer and a seller of a service interact. We stack the cards in favor of programmable payments by considering an environment where neither agent has any legal recourse if the other fails to deliver upon their promises. We identify scenarios where programmable payments could improve economic outcomes and scenarios where they cannot. Direct payments increase the surplus by avoiding the liquidity cost of locking-up funds in a programmable payment arrangement until the moment where the conditions are satisfied to release those funds to the payee.

Programmable payments will be desirable, and may in fact be the only viable payment arrangement, in situations where economic relationships are of a short duration. Nonetheless, there is a limit to the length of the arrangement a single programmable payment can support, because eventually the additional liquidity cost of locking up *more* funds for a *longer* period starts to exceed the additional surplus generated from extending the length of the arrangement. For longer periods multiple payments are necessary.

Sufficiently long optimal chain-of-payments arrangements always start with direct payments because of the lower liquidity costs. Only towards the end of a relationship do the parties switch to the use of programmable payments. Moreover, the optimum for infinitely long payment arrangements consists of

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direct payments only. These results suggest that programmable payments are unlikely to become the new “standard” for all payment arrangements.

Many have argued that technological developments in the payments space will lead to an explosion of so-called micro-payments. Our results suggest a more complex relationship between transactions cost and the number of payments. Lower transaction costs increase the number of payments for the *extensive* margin in the sense of increasing the set of potential buyer-seller pairs where transaction costs are no longer prohibitively expensive. For the *intensive* margin, that is, within buyer-seller pairs, we find the opposite effect: lower transaction costs are associated with fewer payments, as trust becomes easier to achieve.

## References

C.M. Kahn and M.R.C. Van Oordt. The Demand for Programmable Payments. *Tinbergen Institute Discussion Paper*, 2022-076, 2022. URL [https://papers.ssrn.com/abstract\\_id=4218966](https://papers.ssrn.com/abstract_id=4218966).