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THREE ESSAYS ON PAYMENTS SYSTEM EVOLUTION IN THE US AND THE ROLE OF THE FEDERAL RESERVE AS PROVIDER OF LAST RESORT

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PROGRAMA DE DOCTORADO EN ECONOMÍA Y EMPRESA

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DEDICATORIAS

Para mis hijos Ethan y Christian.

¡Nunca es tarde para perseguir tus sueños!

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1.1 Introducción

La Reserva Federal fue creada en 1913 y es el Banco Central de los Estados Unidos de América. La mayoría de la gente conoce su papel en proporcionar estabilidad de precios, maximizar el empleo y moderar las tasas de interés a largo plazo.

La mayoría de la gente, sin embargo, no sabe que el Sistema de la Reserva Federal se compone de varias capas. La Junta de la Reserva Federal está gobernada por los gobernadores designados por el Presidente de los Estados Unidos y por los Presidentes de los doce bancos regionales de la Reserva Federal, ubicados en ciudades de todo el país, donde la Junta delega el trabajo de supervisar las instituciones financieras, mejorar el desarrollo comunitario, facilitar la investigación económica, ser el proveedor de pagos y prestamista de último recurso para la institución financiera, para mantener una infraestructura financiera eficiente y diversa en los Estados Unidos.

La Reserva Federal es uno de los proveedores de infraestructura de pago en los Estados Unidos: el sistema de Liquidación Bruta en Tiempo Real (FedWire); la Cámara de Compensación (FedACH); la Cámara Compensación de Cheques y Pagos Internacionales (FedGlobal ACH).

La idea es que, si bien se fomenta la competencia, y la Reserva Federal no es el único proveedor de servicios financieros, la Reserva Federal está disponible en caso de riesgo sistémico o una falla del mercado, por lo que es necesario que la Reserva Federal mantenga la economía en marcha.

Este estudio explora la importancia de tener a la Reserva Federal involucrada dentro de la Innovación de Pagos en los Estados Unidos mediante el análisis del impacto que tiene a través de tres temas diferentes: De-Risking; Transparencia en los precios de las remesas; e implementación de pagos más rápidos.

El capítulo 2 explora el De-Risking. ¿Qué pasaría si los bancos comerciales globales ya no quisieran prestar sus servicios a determinados países o bancos? Una falla del mercado o un riesgo sistémico sería posible y la supremacía de monedas como el dólar podría estar en riesgo.

Parece que este escenario se está produciendo. El FMI y el Banco Mundial están denunciando posibles fallas de mercado y riesgos sistémicos debido al De-risking, ya que las instituciones financieras de todo el mundo están reexaminando sus relaciones de corresponsalía bancaria (Association of Certified Anti-Money Laundering Specialists, 2016).

Las grandes instituciones financieras globales están decidiendo optar por un enfoque basado en el riesgo / recompensa para abordar la posibilidad de financiamiento del terrorismo y lavado de dinero y las presiones regulatorias y de costos al retirarse de ciertas jurisdicciones y relaciones. Como resultado, están floreciendo consecuencias más

amplias para todo el sector, a pesar de que las decisiones pueden tener sentido comercial para las instituciones financieras globales en cuestión.

No hay un banco central oficial para los bancos centrales. Todo el mundo confía en los bancos comerciales globales para facilitar los negocios internacionales. Los bancos comerciales globales incluso crearon su propia red de transmisión, SWIFT, en 1973 y han estado realizando negocios con éxito desde entonces.

Los bancos comerciales siempre han facilitado las transacciones internacionales entre países a través de cuentas bilaterales. Como banco gubernamental, incluso los bancos centrales utilizan bancos comerciales para llevar a cabo transacciones comerciales gubernamentales, como pagar a sus diplomáticos en el extranjero, comprar recursos o inyectar dólares en la economía local en nombre de sus propios bancos en su país. Las economías multidivisa dependen totalmente de los bancos comerciales para la inyección de liquidez. Todos los bancos centrales tienen cuentas en bancos comerciales internacionales. Supongamos que las relaciones de los bancos comerciales globales se interrumpieran con los bancos comerciales (o incluso los bancos centrales) en un país específico. En ese caso, ese país podría experimentar una falla de mercado que podría restringir la correcta operación financiera local. Cada vez hay más pruebas de que los bancos comerciales internacionales han interrumpido las relaciones con los bancos comerciales locales en algunos países.

Este documento busca exponer una inminente falla del mercado en muchos países y examina los posibles enfoques para buscar una solución ahora, antes de que el sistema financiero se vea irrevocablemente comprometido y el papel que la Reserva Federal puede desempeñar.

Las preguntas que se plantean en el documento son las siguientes:

1) ¿Qué es el De-risking y está sucediendo realmente?

2) ¿Podemos cruzar los datos e investigaciones existentes con nuevas investigaciones que nos permitan comprender mejor las causas y tendencias de reducción de riesgos?

3) ¿Pueden las naciones, a través de las instituciones financieras afectadas, encontrar canales alternativos para llevar a cabo los negocios? Por ejemplo:

A. Haciendo que los bancos centrales actúen como agregadores en nombre de los bancos de su país y liquiden las transacciones de su cuenta con la Reserva Federal de Nueva York o sus cuentas corresponsales comerciales en el Sistema FedWire.
B. Al racionalizar el proceso de cumplimiento y hacer que los bancos centrales o las instituciones financieras busquen nuevas relaciones de corresponsalía bancaria con instituciones financieras más pequeñas en los Estados Unidos.
C. Haciendo que los bancos centrales o las infraestructuras de pago utilicen iniciativas de pagos regionales como FedGlobal ACH del Banco de la Reserva Federal de Atlanta, el Sistema de Pago Regional del Consejo Monetario Centroamericano (CMCA), el Sistema de Moneda Local de América del Sur (Sistema de Monedas Locales, SML) o la iniciativa latinoamericana ACH (Encuentro Latinoamericano de Cámaras de Compensación, ELOCC) para desacoplar la necesidad de

mantener cuentas en dólares estadounidenses de la capacidad de poder hacer transferencias en la misma divisa.

D. Mediante el uso de la tecnología blockchain y los activos digitales como una herramienta puente entre las monedas para desacoplar la necesidad de mantener cuentas corresponsales en dólares estadounidenses.

Vemos que la capacidad de conectarse e interoperar entre los sistemas de los países podría abordar los problemas de reducción de riesgos y riesgos sistémicos a nivel nacional (Financial Stability Board, 2018). También abre la puerta a un sistema transfronterizo más eficiente, facilitando el comercio, los flujos de remesas y, en última instancia, la inclusión financiera. Sin embargo, ningún sistema de pagos general conecta a todos los países a través de bancos centrales u otras infraestructuras de mercado como el Banco Central Europeo en Europa. En la mayoría de los países, la capacidad de una institución financiera no estadounidense para satisfacer sus necesidades en dólares depende completamente de su capacidad para entablar relaciones comerciales de corresponsalía con bancos y otras instituciones financieras (FBI) en los Estados Unidos.

Es posible que se requiera un enfoque múltiple para mitigar los efectos adversos para los bancos centrales y para las instituciones financieras. Desde la perspectiva operativa de las instituciones financieras (F.I.s), el "De-risking" ha afectado a sus instituciones en menor medida que a las empresas de transferencia de dinero u otras entidades financieras.

El Capítulo 3 explora la transparencia de los precios de las remesas y cómo una mayor transparencia de los precios puede conducir a

decisiones de usuario más informadas y precios más bajos por transacción, lo que resulta en ahorros para los remitentes de remesas y sus familias.

Las remesas son la transacción financiera más común para los inmigrantes estadounidenses. Los precios han sido muy opacos a lo largo de los años, ya que las transacciones son llevadas a cabo por una cadena ineficiente de instituciones financieras que se benefician de ocultar el costo real de una transacción o no pueden predecirlo.

Appleseed Foundation y los autores de este estudio han desempeñado un papel importante en la defensa de las primeras regulaciones federales de consumo de los Estados Unidos para este creciente servicio financiero al consumidor. Las regulaciones fueron emitidas por la Oficina de Protección Financiera del Consumidor ("CFPB") basadas en la autoridad contenida en la Sección 1073 de la Ley Dodd-Frank de 2010 (Dodd-Frank, Wall Street Reform and Consumer Protection Act) y entraron en vigor el 28 de octubre de 2013. La intención de estas regulaciones históricas de remesas era aumentar la transparencia del proceso de remesas al exigir divulgaciones uniformes para que los consumidores estén mejor equipados para comparar diferentes proveedores de remesas y tomar la decisión más informada sobre qué proveedor usar.

En 2015, se estimó que los flujos internacionales de remesas superaron los 601.000 millones de dólares (World Bank Group, 2015). Estados Unidos encabezó la lista más reciente con 56.000 millones de dólares a finales de 2014.

La transparencia de los precios es una preocupación importante que Appleseed ha abordado a lo largo de los años a lo largo de su trabajo de

promoción. La declaración del Banco Mundial que figura a continuación ilustra claramente el desafío fundamental en el mercado de las remesas.

> *"….el factor individual más importante que lleva a los altos precios de las remesas es la falta de transparencia en el mercado. Es difícil para los consumidores comparar precios porque hay varias variables que componen los precios de las remesas"*

Una herramienta para las remesas transparentes y de bajo costo fue el servicio FedGlobal ACH del Banco de la Reserva Federal de Atlanta que ha permitido a las instituciones financieras de todos los tamaños proporcionar soluciones competitivas de remesas para las poblaciones migrantes.

Este estudio es una primera mirada retrospectiva al impacto en el consumidor de las regulaciones de 2013. Appleseed desarrolló una encuesta única en su tipo para probar la efectividad de las nuevas regulaciones para ayudar a los consumidores a tomar mejores decisiones.

La encuesta trató de responder a las siguientes preguntas:

¿Cuáles son sus características típicas de transacción de remesas?

¿Cuáles son los comportamientos típicos de compra de remesas, el conocimiento común de la resolución de errores de divulgación y los derechos de cancelación, los problemas pasados con los productos de remesas y la confianza general en los servicios de remesas?

Los resultados de la encuesta Appleseed muestran que:

1. Los consumidores están recibiendo divulgaciones previas a la transacción y recibos posteriores a la transacción, pero algunos consumidores no notan información específica.

   Aunque la mayoría de los consumidores los recibieron, solo el 59% notó que las divulgaciones incluían información sobre las tarifas y solo el 63% recordaba haber visto un tipo de cambio. Es importante destacar que las barreras lingüísticas parecen haber jugado un papel en estas discrepancias.

2. Los clientes están eligiendo las tarifas más bajas.

   Los clientes están comparando compras. Más de la mitad de los clientes comparan tarifas entre servicios de transferencia de dinero y siempre eligen el servicio que tiene la tarifa más baja; dos tercios siempre o a veces eligen el servicio con la tarifa más baja.

   FedGlobal, un servicio bancario de la Reserva Federal, ofrece tipos de cambio competitivos, a menudo subcotizando las tasas de mercado. En septiembre de 2016, el Banco de la Reserva Federal planea extender el servicio el mismo día a los participantes de FedGlobal (Federal Reserve Bank of Atlanta, 2010). FedGlobal ofrece transparencia de precios, así como una oportunidad para reducir tanto las tarifas como los tipos de cambio.

3. Los consumidores identificaron la velocidad, la confiabilidad, la seguridad para el destinatario, el precio y el tipo de cambio como prioridades.

Aunque los precios son un factor de primer nivel, los consumidores continúan priorizando la seguridad, la confiabilidad y la velocidad, sobrevalorando. Este patrón varía ligeramente según la edad, el nivel de ingresos y el género, pero el precio es consistentemente una prioridad de primer nivel.

4. El tipo más popular de proveedores de remesas son los agentes ubicados en negocios minoristas.

   A pesar de la mejora de la tecnología, el 75% de los clientes en nuestra encuesta informaron que continúan realizando remesas a través de agentes ubicados en negocios minoristas.

   Este hallazgo es similar a los hallazgos en nuestro trabajo anterior y el trabajo de otros investigadores (U.S. Government Accountability Office, 2016).

5. Los consumidores reportan precios estables o decrecientes

   Los precios de las remesas se mantienen estables o están disminuyendo, pero las transacciones pequeñas siguen siendo costosas. La mayoría de los participantes no informaron haber notado un cambio en los costos (69%) o una disminución de los costos durante el año pasado (6%). Esto se correlaciona con la caída de los precios internacionales. Aunque los precios de las remesas internacionales disminuyeron en general, el 25% de los encuestados percibieron ligeros aumentos en los costos ($ 0.15 para la transferencia más popular de $ 200 o menos). En particular, los clientes que compraron remesas a través

> de los bancos fueron significativamente más propensos a reportar costos crecientes durante el año pasado que los clientes que no usaron bancos.

El Capítulo 4 aborda las iniciativas de implementación de *Faster Payments* en los Estados Unidos. Más de 40 países ya han implementado un esquema de pago en tiempo real (Rolfe, 2018), mientras que Estados Unidos se ha quedado atrás de la mayoría de las naciones industrializadas en la implementación de un sistema de pagos en tiempo real 24/7. Tal pago en tiempo real permitiría la oportunidad de abrir el sistema bancario a la innovación financiera y la tecnología (Omarini, 2018).

Estados Unidos, si bien sigue siendo la economía más grande del mundo y su moneda es la moneda de reserva más importante, todavía depende de un sistema ACH por lotes[1] y un sistema de Liquidación Bruta en Tiempo Real[2], que están disponibles solo durante las horas de trabajo y tienen un costo prohibitivo[3] para los consumidores y las pequeñas empresas.

Hasta ahora, la falta de implementaciones más innovadoras tenía que ver con la falta de mandato legal y el cuestionable ROI (retorno de la inversión). Los sistemas existentes son altamente rentables para las instituciones financieras, mientras que las nuevas infraestructuras de pago son prohibitivamente costosas para la mayoría de las instituciones, especialmente las más pequeñas.

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[1] Ver: https://www.nacha.org/content/ach-network
[2] Ver: https://app.frbservices.org/resources/financial-services/wires/operating-hours.html
[3] Ver: https://www.finder.com/international-money-transfers/bank-of-america-wire-transfers

Mientras tanto, en la Unión Europea, ya en 2014, la Junta de Pagos Minoristas en Euros (ERPB) invitó al Consejo Europeo de Pagos (EPC) a desarrollar un esquema de pago instantáneo paneuropeo, la Transferencia de Crédito Instantánea SEPA (SCT Inst), que es ampliamente utilizada en Europa.

En ausencia de un mandato, en 2015, la Reserva Federal trató de ganar consenso en la comunidad financiera publicando primero el documento sobre "Estrategias para mejorar el sistema de pagos de los Estados Unidos" (Federal Reserve, 2021) y luego creando el Grupo de Trabajo de Pagos Más Rápidos con el objetivo de "aprovechar esta oportunidad histórica para realizar la visión de un sistema de pago en los Estados Unidos que sea más rápido, ubicuo, ampliamente inclusivo, seguro, altamente seguro y eficiente para 2020" (Faster Payments Task Force, 2021).

Después de la *TaskForce*, el *Faster Payments Council* (FPC) fue implementado por las partes interesadas del sistema financiero en los Estados Unidos, tratando de llevar a buen término la visión de *Faster Payments* en los Estados Unidos.

Este documento se facilitó con la ayuda del Comité de la Red del Consejo de Pagos Más Rápidos para analizar las seis Redes de Pagos Más Rápidos presentes o que se están implementando en los Estados Unidos: la Cámara de Compensación, Juniper Payments, VISA, Mastercard, Zelle y, por supuesto, la Reserva Federal como proveedor de último recurso.

Este trabajo debería ayudar a las instituciones financieras a determinar qué red es más apropiada para adherirse y qué mecanismos serían más apropiados para la interoperabilidad entre ellas.

La intención era delinear las diferencias entre los diferentes sistemas y comprender cómo la posible interoperabilidad entre los sistemas puede funcionar potencialmente haciendo las siguientes preguntas a los proveedores mencionados anteriormente.

- ¿Qué es la interoperabilidad de pagos más rápidos?
- ¿Cuáles son los modelos de Interoperabilidad?
- ¿Cómo se enrutan los pagos por una red disponible?
- ¿La red maneja créditos y débitos?
- ¿Qué tan rápido se entregan los pagos?
- ¿Cómo se produce el acuerdo?
- ¿El pago es definitivo o puede ser revocado?
- ¿Hay funcionalidad de mensajería adicional disponible?
- ¿Qué medidas se toman para el fraude y el control de riesgos?

Entre los resultados, podemos ver que a medida que la modernización digital ocurre en el mundo que nos rodea, el comportamiento del consumidor ha cambiado para esperar experiencias digitales. Tanto los consumidores como las empresas están adoptando esta transformación digital y dependen cada vez más de la capacidad de pagar y recibir pagos de una manera rápida, fluida y segura. La interoperabilidad de los pagos, que puede adoptar diversas formas como se ha descrito anteriormente, es un enfoque para ampliar el alcance y la ubicuidad en el ecosistema de pagos más rápido.

Es difícil decir en este momento cuál de las redes de pagos se establecerá más y podrá impulsar la masa crítica y la adopción incluso en ausencia de interoperabilidad. Los sistemas RTP de The Clearing House seguramente serán los primeros en salir. Sin embargo, parece que un número significativo de cooperativas de crédito y bancos comunitarios están inquietos sobre la solución de The Clearing House, debido a la percepción de que está sesgada hacia los grandes bancos,

debida a la estructura de propiedad de la compañía, que de hecho representa a los 50 principales bancos de las 10.000 instituciones financieras que operan actualmente en los Estados Unidos.

1.2 Conclusiones fundamentales

Sobre la base de los hallazgos del Capítulo 2, el De-risking es un problema multidimensional que consiste en cuestiones operativas, financieras y de supervisión / regulación que son perjudiciales tanto para los bancos centrales como para las F.I.s.

Si bien, en la mayoría de los casos, el De-risking aún no está en el nivel de riesgo sistémico, es posible que solo se necesite una crisis financiera menor para llegar allí potencialmente. Por lo tanto, este documento sugiere que los bancos comerciales extranjeros adopten un enfoque doble: comenzar a abrir cuentas en instituciones financieras más pequeñas en los Estados Unidos para crear algunas contingencias ahora e investigar el uso de los sistemas de pago regionales existentes siempre que sea posible, en asociación con el Banco Central local, como el Servicio FedGlobal de la Reserva Federal.

A nivel de supervisión, los bancos centrales se han esforzado por racionalizar los marcos de supervisión y regulación con análisis de datos y mejoras técnicas diseñadas directamente para abordar los desafíos que el "De-risking" ha precipitado en la región. Además, los bancos centrales pueden imponer diversas sanciones por incumplimiento de las medidas de CDD y establecer un régimen administrativo de sanciones monetarias en caso de que las instituciones financieras locales puedan hacer que el riesgo país percibido aumente. A nivel operativo de las F.I.s., las jurisdicciones también estructuraron sus respuestas a la "reducción de riesgos" mediante el fortalecimiento de su marco

ALD/CFT, la participación en el diálogo sobre la mejora de las CBR y un mayor enfoque en los organismos de establecimiento de normas ALD/CFT y los reguladores internacionales (Association of Supervisors of Banks of the Americas, 2017).

Si bien la situación aún no parece ser catastrófica, podemos estar a solo un paso o una pandemia de las fallas del mercado. Por lo tanto, el tiempo es esencial para poner las contingencias en su lugar ahora.

En el Capítulo 3, las regulaciones de remesas Dodd-Frank parecen estar trabajando para facilitar la transparencia de los precios. Appleseed cree que estas regulaciones aportan transparencia de precios que reducirá los precios y mejorará las opciones de envío de remesas en el mercado. Appleseed ve las regulaciones de remesas como un modelo global. Estas regulaciones pueden ser replicadas en otros países para mejorar tanto el envío como la recepción de remesas. Y al hacerlo, las familias trabajadoras que envían dinero a parientes y amigos en casa y a las economías locales en los Estados Unidos, se beneficiarán de los ahorros de costos esenciales que crea un mercado transparente y competitivo en precios, mientras que soluciones como FedGloblal ACH de la Reserva Federal pueden reducir aún más los costos y aumentar la transparencia.

En el Capítulo 4, obtenemos que a medida que la modernización digital ocurre en el mundo que nos rodea, el comportamiento del consumidor ha cambiado para esperar experiencias digitales. Tanto los consumidores como las empresas están adoptando esta transformación digital y dependen cada vez más de la capacidad de pagar y recibir pagos de una manera rápida, fluida y segura. La interoperabilidad de los pagos, que puede adoptar diversas formas como se ha descrito anteriormente, es un enfoque para ampliar el alcance y la ubicuidad en

el ecosistema de pagos más rápido. Sin embargo, no podemos concluir cuál de las redes de pagos se establecerá más y podrá impulsar la masa crítica y la adopción incluso en ausencia de interoperabilidad.

Un resultado probable involucrará a las instituciones financieras más pequeñas que se adhieren a la Red de la Reserva Federal y a las instituciones financieras más prominentes que utilizan las redes RTP y FedNow de la Reserva Federal y hacen que ambos proveedores compitan en precio.

Definir las diferentes formas de entregar pagos La interoperabilidad y explorar las consideraciones comerciales y la complejidad técnica subyacente es un primer paso necesario para crear una discusión reflexiva. Esperamos que, al proporcionar una descripción exhaustiva de los modelos de interoperabilidad de pagos, delinear las distintas opciones de liquidación y describir cómo los servicios de superposición afectan la interoperabilidad, podremos tener una conversación en toda la industria sobre los diversos enfoques que el mercado estadounidense podría tomar para lograr la ubicuidad. En un mercado como el de los Estados Unidos, cuando hay muchas redes diversas de pagos más rápidos y servicios superpuestos, habrá múltiples enfoques para lograr la ubicuidad. Si bien este documento revela muchos aspectos esenciales de la interoperabilidad de los pagos, el Comité de la Red continuará desarrollando materiales que impulsen la conversación, incluidos otros documentos técnicos que definen los riesgos y las consideraciones.

2. The Phenomenon of De-risking: unintended consequences and possible solutions.[4]

2.1 Abstract

Global commerce relies on correspondent banking to execute international transactions. Due to the increasing cost of compliance, however, some US-based global financial institutions have been terminating their correspondent banking relationships — a practice known as de-risking. In some cases, correspondent banks have even terminated their relationships with central banks.

This kind of situation creates systemic risk at a country level, and central banks are looking at alternatives to better serve the needs of their respective financial systems. This paper analyses prior work and surveys on the magnitude of de-risking, and cross-references the findings with recent surveys conducted in the Dominican Republic and Argentina to determine whether market failures and systemic risk are inevitable. The results indicate that while the situation is not yet catastrophic, it is sufficiently precarious that foreign countries that rely on the US dollar should start looking for alternative solutions for global correspondent banking immediately. The paper also describes some of the alternatives

[4] *Artículo publicado en la revista Journal of Payments Strategy & Systems, vol 15 (3), pp.305-318.*

currently available, including intervention from the Federal Reserve Bank of New York, regional payments systems, and smaller US correspondents.

Keywords: de-risking, international trade, remittance, global correspondent banking, financial institutions, regional payment infrastructure

2.2 Introduction

International business has always relied on global commercial banks to facilitate transactions between countries through bilateral accounts. Indeed, it was commercial banks rather than central banks that created SWIFT to facilitate such transactions, and they have been successfully conducting business ever since.

Central banks also have accounts with international commercial banks. These are used to carry out government business transactions, such as paying overseas diplomats, buying resources, or injecting dollars into local economies on behalf of the banks in their own country. Multicurrency economies, meanwhile, depend on global banks for the injections of liquidity they provide.

Suppose, however, that global commercial banks suspended their services to certain countries — not just to the commercial banks there, but also the central banks. This kind of disruption could lead to systemic risk or a market failure of sufficient magnitude to compromise local financial operations, and put the supremacy of strong legacy fiat currencies like the dollar at risk.

It appears that this scenario is taking place.

To reduce the regulatory and cost pressures associated with combating the financing of terrorism (CFT) and improving their anti-money laundering (AML) practices, global financial institutions are adopting a risk–return-based approach to business and retreating from certain jurisdictions and relationships.

As the International Monetary Fund and World Bank have both highlighted, such de-risking may make business sense for the individual institutions concerned, but the consequences for the economies these decisions affect are potentially catastrophic (International Monetary Fund, 2017).

The present paper considers this looming market failure and examines potential approaches to pursue a solution now before these countries' financial systems are irrevocably compromised.

To analyse the phenomenon of de-risking appropriately, the paper asks the following questions:

- What is de-risking, and is it really happening?
- Can one cross-reference existing data and research with new research to better understand the causes and trends?
- Can the banks in affected nations find alternative channels to conduct business as usual? For example:
  - by having central banks act as an aggregator on behalf of their country's banks and settle transactions its account with the Federal Reserve of New York or its commercial correspondent accounts in the FedWire System;
  - by streamlining the compliance process and having either central banks or financial institutions form new correspondent banking relations with smaller financial institutions in the USA;

- by having central banks or payment infrastructures utilise regional payments initiatives, such as the Federal Reserve Bank of Atlanta's FedGlobal ACH, Central American Monetary Council Regional Payment System (Consejo Monetario Centroamericano), the South American Local Currency System (Sistema de Monedas Locales), or the Latin American ACH initiative (Encuentro Latinoamericano de Cámaras de Compensación), to uncouple the need to hold accounts in US dollars from the ability to transact in the same currency; or
- by using blockchain technology and digital assets as a tool to bridge between currencies to uncouple the need to hold accounts in US dollars from the ability to transact in the same currency.

As central banks are supposed to be the lenders of last resort in the event of market failure, and there are no widespread contingencies in place for global trade, remittances and capital injection that do not depend on the traditional global correspondents, it becomes essential for governments to find alternative solutions. To this end, the present research sets out to improve understanding of the factors that drive de-risking.

2.3 The phenomenon of de-risking

The Financial Action Task Force (FATF) defines de-risking as the process in which a bank or financial institution restricts or terminates banking relations with certain 'higher-risk' jurisdictions or clients to prevent, rather than manage, the associated risks. This may include the withdrawal of services from countries that are under geopolitical sanctions (FATF, 2016).

The Association of Supervisors of Banks of the Americas (ASBA) describes compliance risks as the risks of reputation losses, regulatory or legal sanctions, and material financial losses that banks can suffer as a result of their failure to adhere to the codes of conduct, standards, rules, regulations and laws applicable to their business (Association of Supervisors of Banks of the America, 2016). By contrast, regulatory risks relate to potential changes in regulations and laws that could substantially affect the market, sector, business or security. For example, changes in regulations or laws made by supervisory bodies or governments can change the competitive landscape, increase the cost of doing business, and reduce the attractiveness of investment (Vasquez, 2017).

Common to both ASBA's and FATF's definitions for 'de-risking' is the avoidance rather than management of risk, as the most vital element for the success of financial institutions (Association of Certified Anti-Money Laundering Specialists, 2016).

2.3.1 De-risking drivers

The global cost of adhering to AML/CFT requirements has increased dramatically over the past ten years, with annual compliance and supervisory costs in the billions of dollars. At the same time, the rise of new, more competitive, technology-based business models, has led to smaller profit margins that do not justify the compliance costs for correspondent financial institutions. Given that failure to comply — even inadvertently — with regulations can result in heavy fines and sanctions, banks that previously provided correspondent services have reduced their risk appetite (Wright et al., 2018). Indeed, as a survey conducted by the World Bank in 2015 found, concerns about AML/CTF risks are by far the main driver of large international banks withdrawing correspondent banking services (as indicated by 95 per cent of respondents) (World

Bank and International Bank for Reconstruction and Development, 2015).

2.4 How big is the problem, and what are the triggers?

Having identified the problem, the following questions are apposite:

- How significant a problem is it for the financial system?
- Are there specific triggers, and could they predict de-risking in the future?
- Are there any new variables that existing research has not uncovered?

2.4.1 Size of the problem

According to data collected by the Bank of International Settlements (2020), there was a 22 per cent decrease in the number of active correspondent banks between 2011 and 2019. This decrease, however, was not linear among countries; indeed, there were significant variations between territories. It was therefore decided to list the countries where the most de-risking had been observed in order to facilitate identification of specific triggers.

2.4.2 The four ‘horsemen’ of de-risking

Four triggers were identified as having the greatest negative impact on the provision of correspondent banking to a nation. In descending order of impact, these four ‘horsemen of the apocalypse’ were:

- being blacklisted by the international community;
- financial crisis;

- war; and
- limited potential for profit (ie poor risk– return ratio).

Using BIS data from 2012 to 2015 (Bank of International Settlements, 2016) the present study shows how by identifying the 'horseman' or 'rider' affecting a specific country over a certain period, it is possible to predict the impact it will have on the provision of correspondent banking in that country. For example:

- blacklisting: 40–100 per cent reduction;
- financial crisis: 15–50 per cent reduction;
- war: 15–30 per cent reduction;
- risk–return: 0–20 per cent reduction.

To predict the impact of the specific rider, this paper introduces the Rider Index as follows:

$$R = \frac{\sum \Delta c}{\sum c}$$

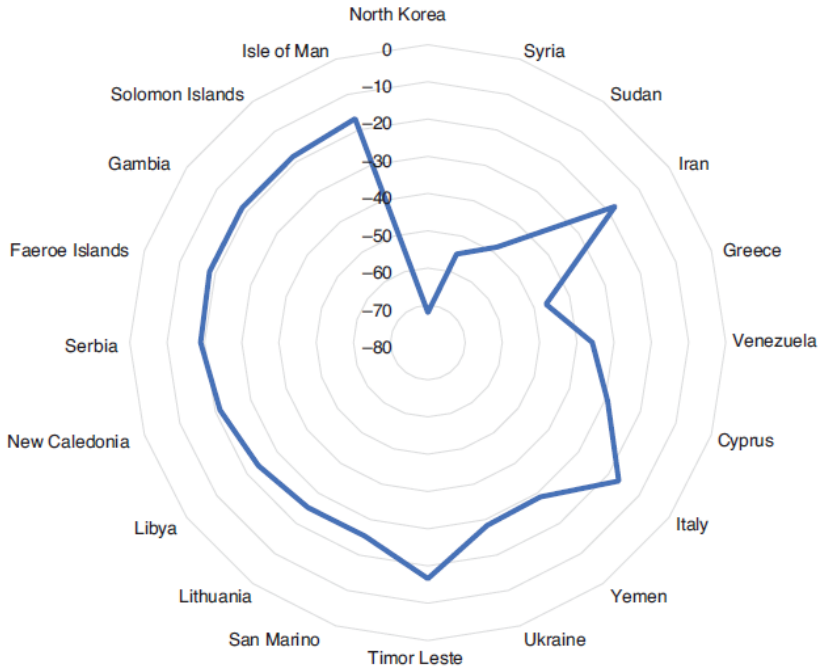
where R is the Rider Index (percentage loss of active correspondents) and C is the number of active banking correspondents.

Therefore, there is a reasonable expectation that a country afflicted by war may lose 15–30 per cent of its active correspondents, while a country affected by financial crisis may lose 15–50 per cent of its correspondent base. Iran's index number may be anomalous as it was previously blacklisted by the USA but not the European Union, which is likely to have impacted the risk– return for European correspondent banks (Table 1, Figure 1). Based on data for 2011–2015 from Bank of International Settlements, 2016. 'Correspondent Banking', available at: https://www.bis.org/cpmi/publ/d147.htm

Country	Change in no. active correspondents (%)	Change in no. payments (%)	Change in value (%)	Rider of de-risking	Rider Index
North Korea	–71.90	–78.20	–92.40	Blacklist	40–100%
Syria	–55.00	–49.10	–78.00	Blacklist	40–100%
Sudan	–48.30	–15.20	12.30	Blacklist	40–100%
Iran	–17.90	53.20	–47.70	Blacklist (not EU)	40–100%
Greece	–46.70	–33.80	–66.10	Financial crisis	15–50%
Venezuela	–35.90	–50.80	–49.10	Financial crisis	15–50%
Cyprus	–29.30	–46.70	–67.40	Financial crisis	15–50%
Italy	–16.70	–8.10	1.80	Financial crisis	15–50%
Yemen	–28.70	–53.90	–41.20	War	15–30%
Ukraine	–28.40	–17.80	–62.60	War	15–30%
Timor Leste	–16.60	–16.30	–63.60	War	15–30%
San Marino	–25.30	99.70	–48.90	Risk–return	0–20%
Lithuania	–25.20	0.70	–22.90	Risk–return	0–20%
Libya	–23.70	–22.60	–22.30	Risk–return	0–20%
New Caledonia	–21.30	–6.50	–13.60	Risk–return	0–20%
Serbia	–19.00	–56.10	–53.10	Risk–return	0–20%
Faeroe Islands	–18.40	–33.80	–3.60	Risk–return	0–20%
Gambia	–18.40	17.50	2.00	Risk–return	0–20%
Solomon Islands	–18.30	8.70	–8.70	Risk–return	0–20%
Isle of Man	–16.80	83.80	–52.90	Risk–return	0–20%

Table 1. Countries with a decline in correspondent banking provision of more than 16 per cent, 2011–2015.

Figure 1. Countries with a decline in correspondent banking provision of more than 16 per cent, 2011–2015 — Change in number of active correspondents.



2.4.3 The survey. Are there any new variables that existing research has not uncovered?

To test the result of the BIS investigations, a survey was conducted in two Latin American countries, namely, the Dominican Republic and Argentina. The survey was designed to capture a snapshot of the respective countries' financial systems from 2000 (ie before the introduction of the US Patriot Act) until 2018, and to identify whether de-risking was more common among US banking institutions versus their European counterparts.

2.4.3.1 The Dominican Republic

According to BIS data (Bank of International Settlements, 2016), correspondent banking in the Dominican Republic was not affected by the Rider Index between 2011 and 2015, and experienced the following increases:

- change in number of active correspondents: 3.20 per cent.
- change in volume: 27.30 per cent.
- change in value: 18.40 per cent.

Questions	2000	2010	2018
Gross domestic product (US$bn)	24.31	53.86	85.56
Number of US international banks providing correspondent accounts to the central bank	8	10	7
Average daily balance (aggregated) of the central bank at correspondent banks in the USA (US$)	22,960,000	111,460,000	153,110,000
Average daily balance (aggregated) of the central bank at Federal Reserve (US$)	142,700,000	851,070,000	974,510,000
Number of domestic commercial banks in the country with a correspondent banking relationship in the USA	NA	12	18
Average daily balance (aggregated) of commercial banks at correspondent banks in the USA (US$)	105,630,000	122,400,000	804,600,000

Table 2. Questionnaire provided to the central bank of the Dominican Republic.

As Table 2 shows, despite a small drop in the number of US banks offering correspondent accounts to the central bank of the Dominican Republic, there was a considerable increase in the volume of financial activity the country was conducting in the USA, with the number of correspondent accounts in the country growing accordingly.

It is worth noting that the BIS study does not differentiate between US correspondents versus correspondents from other countries. For this reason, it is unclear whether the loss of US correspondents is more significant than the loss of correspondents from other countries.

2.4.3.2 Argentina

For the purpose of comparison, correspondent banking in Argentina experienced the following changes between 2011 and 2015:

- change in number of active correspondents: –13.40 per cent;
- change in volume: 50.50 per cent;
- change in value: –13.60 per cent.

The –13.40 per cent change in correspondent banking provision is consistent with the risk–return category of the Rider Index.

The precise impact of US de-risking is less clear in this example due the multiple financial crises that occurred in Argentina prior to the survey, combined with the fact that countries other than the USA are providing correspondent services.

As Table 3 shows, while correspondent relationships with the USA do not change during this period, relationships with European service providers are growing. Again, the BIS data do not differentiate between US correspondents and correspondents from other countries, and therefore the risk of potential market failure relating to operations conducted in US

dollars may be worse than the BIS figures indicate. Countries that use the US dollar as their domestic currency or as a multicurrency economy may be more vulnerable, and therefore should be more careful to look at the Rider Index adjusted for US-based relationship to measure the actual impact.

Questions	2004	2008	2012	2014	2018
Gross domestic product (US$bn)	164.7	361.6	546.0	526.3	517.6
Number of US banks providing correspondent accounts to the central bank	1	1	1	1	1
Number of European banks providing correspondent accounts to the central bank	1	3	3	3	5

Table 3. Questionnaire provided to the central bank of the Argentina.

As US regulators disincentivise US-based global correspondents from maintaining foreign respondent relations, the US dol- lar may be affected by the desire of other countries to hold it as their primary reserve currency. The US dollar share of global foreign exchange reserves drops to 25-year low to 61 per cent, down from 67 per cent just in 2014 International Monetary Fund (2021).

2.5 Possible Solutions

To ensure local financial institutions can manage their need for US dollars for both their local payments as well as international requirements, foreign central banks and commercial banks must find a way to meet those needs today, without having to wait for a foreign commercial entity to change its policy or risk appetite.

The present paper proposes four possible solutions that foreign central banks and commercial banks could pursue to achieve more independence from the de-risking decisions of global correspondents:

- Central banks could position themselves as aggregators for the activity conducted by the financial intuitions in their respective countries, and settle dollar transactions between their own correspondent accounts and the Federal Reserve Bank of New York via the FedWire system.
- Regional payments initiatives could be used to connect currencies, uncoupling the need to hold accounts in US dollars from the ability to transact in US dollars.
- Central banks and financial institutions could seek new correspondent banking relations with smaller financial institutions in the USA.
- Blockchain technology and digital assets could be used as a tool to bridge between currencies, uncoupling the need to hold accounts in US dollars from the ability to transact in US dollars.

2.5.1 Using the Federal Reserve Bank of New York for commercial activity

To conduct their foreign activities, all central banks maintain accounts at the Federal Reserve Bank of New York. At the same time, all financial institutions have access to the central bank within their respective country in order to transact within their local payment systems.

To facilitate US dollar payments in the USA, foreign financial institutions require a US dollar commercial correspondent. Where these financial institutions need to inject liquidity into the US dollar account they hold with their central bank, for use within their local payments system (such as a real-time gross settlement system), financial institutions must send payments in the USA to and from the commercial account of their central

bank, in case the country system is a multicurrency system or a US dollar-denominated system.

There is no policy reason to prevent a foreign central bank from acting as an aggregator for the activity of its country's financial intuitions and settling transactions using the Federal Reserve of New York and its own correspondent accounts via the FedWire system.

To secure access to the US banking system for the financial institutions in their respective countries, foreign central banks could act as sponsor for these institutions, either through their existing accounts at the Federal Reserve Bank of New York or even their existing correspondent accounts. Certainly, the Federal Reserve Bank of New York is able to send and receive payments on behalf of central banks — it already facilitates, among other things, the salaries that foreign governments pay to their consulates through their respective central banks.

As part of the present study, confidential, interviews were conducted with staff from the Federal Reserve Bank of New York, the central banks of the Dominican Republic and Argentina, and International Account Services (part of the Markets Group). Interviewees commented that compliance considerations might make this solution unappealing for the Federal Reserve Bank of New York.

As things stand, with no mandate from the Federal Reserve Board of Governors' to push the issue, the Federal Reserve Bank of New York is under no obligation to increase its potential exposure to questionable transactions, and hence has little incentive to increase its compliance risk or reputational risk in such a manner.

Likewise, in private interviews held with representatives from five central banks in Latin America, interviewees commented that they did not

consider this problem to be their responsibility to solve, and neither did they have the risk appetite for the additional reputational risk associated with such an approach.

Foreign governments could, of course, push the US Congress and the Federal Reserve Board for a mandate that would commit Federal Reserve Bank of New York to provide a solution. At this time, however, there seems to be little institutional or political will for that.

2.5.2 Regional payment systems

Regional payments systems have evolved considerably over the last 15 years, yet the banking system is yet to embrace them. In part this is due to a misconception that such systems pose a threat to the revenue banks receive from international wire fees; in part it is simply due to a lack of familiarity in how they work.

Regional payments initiatives, such as the Federal Reserve's Bank of Atlanta FedGlobal ACH, the Mercosur's Regional Local Currency System, Central American Monetary Council Regional System, and the Western Hemisphere Payments Operator Alliance, connect currencies, uncoupling the need to hold accounts in US dollars from the ability to transact in US dollars.

In what follows, this paper will discuss some of the most relevant regional payment systems.

2.5.2.1 FedGlobal ACH

The initial push for the FedGlobal service began (Board of Governors of the Federal Reserve System, 2011) within the Alliance for Prosperity framework as part of the Free Trade Agreement of North America

(NAFTA). In 2001, BANXICO and the Federal Reserve Bank of Atlanta started investigating the possibility of interconnecting their payment systems to reduce the costs of payment services between the two countries via electronic low-cost credit transfers.

At an early stage, functionality was enabled to allow payments from the USA to Mexico, primarily to facilitate remittance transfers that typically were handled outside the financial system. In 2003, the Federal Reserve Bank of Atlanta and the Bank of Mexico started transacting government payments to US government pensioners living in Mexico. In 2005, the service was branded as 'Directo a Mexico'. It extended its scope to other payment types, such as remittances from Mexican workers and payments among small businesses. This mechanism allowed any financial institution in the USA connected to the Fed ACH network to transfer funds to any financial institution participating in the BANXICO's SPEI network.

FedGlobal ACH Payments offer an efficient means for sending cross-border ACH credit payments to countries around the world, in addition to debit payments to Canada only. To take advantage of the efficiencies provided by the FedGlobal ACH Payments, a variety of foreign exchange alternatives are available. Based on competitive exchange rates, US dollars are exchanged into the destination currency. Settlements are between the Federal Reserve banks in the USA and participating US financial institutions. Payment is both received and transferred in foreign currencies. Via their foreign correspondent banks, the settlement and rate of the foreign exchange are processed and managed by the respective foreign gateway operators and participating US financial institutions.

Currently, about 400 financial institutions out of more than 10,000 in the USA have opted to send payments in this manner. However, only 100 institutions use the system regularly. This service can also send transactions to Canada, Panama and 25 countries in Europe.

2.5.2.2 The Mercosur's Regional Local Currency System

The Mercosur's Regional Local Currency System (SML) was approved in 2006 by the Council of MERCOSUR as a payment system for business transactions between Argentina and Brazil. The SML was also approved for the use of local currencies for payment to final beneficiaries. MERCOSUR established that the SML could be operated in accordance with bilateral agreements between central banks of member countries. It empowered the implementation of agreements between other countries in addition to Argentina and Brazil. Now also Uruguay and Paraguay are part of it. The system started operating in 2008, with the central purpose of facilitating credit transfers for commercial transactions between the two countries, initiating and settling in the local currencies part of the transaction. The SML operation cycle is initiated by the payment issuer (importer) that registers and executes the payment in its local currency in a financial institution authorised to operate in the scheme. After receipt of the funds of the financial institutions involved in an operation, the central banks carry out clearing daily. The payments are registered, and settlement is made through the international banking system. The posting of the operation in the account of the beneficiary's financial institution is carried out in local currency.

The daily settlement between the central banks is performed in US dollars or other currency if previously agreed between the parties. The exchange rate used by the central banks for the compensation process in the SML is determined by the domestic interbank exchange rates and

must be used by the financial entities incorporated into the system at the time of executing any operation. The SML does not allow central banks to collect commissions during the clearing of funds. However, it does allow financial institutions to charge a commission for the transfer. In the same way, each authorised financial institution can define an exchange directly with the customer, or it can use the official rate provided by the central banks.

SML was initially valid only for the import and export of goods, and related ser- vices such as freight and insurance. In line with ongoing efforts for regional integration, the use of the SML was extended in 2009 to any transaction between acceding countries, allowing central banks under bilateral agreement to define new payment concepts to be channelled through the scheme (Table 4). (Data obtained via interviews with representatives from the Central Bank of Brazil; additional data retrieved from: https://www.bcb.gov.br/rex/sml/UYU_taxas.asp?frame=1).

Year	*Exports Transfers*	*Value (R$)*	*Imports Transfers*	*Value (R$)*
2008	31	9,882,612.65	10	1,313,842.06
2009	1,163	451,061,104.78	72	4,296,941.53
2010	3,353	1,252,700,553.25	40	8,998,129.07
2011	4,870	1,623,201,038.91	50	8,736,895.69
2012	7,431	2,277,897,217.86	83	17,245,299.73
2013	9,041	2,581,447,704.82	47	10,525,643.55
2014	9,190	2,313,261,335.97	38	5,033,622.97
2015	10,788	2,504,490,534.16	38	37,573,226.81
2016	8,264	2,469,907,531.59	34	21,772,789.50
2017	7,619	2,341,900,041.18	22	4,092,223.25
2018	7,454	2,499,328,889.38	33	3,260,353.58
2019	6,141	1,999,488,421.48	17	8,167,316.05
Jan 2020	630	161,567,094.04	1	1,434.53
Feb 2020	439	103,473,637.31	0	0.00
Mar 2020	583	131,231,046.75	0	0.00
April 2020	522	170,328,210.04	0	0.00
May 2020	405	144,270,984.39	2	66,395.85
June 2020	407	79,311,517.23	2	43,929.10

July 2020	515	107,830,615.33	0	0.00
August 2020	622	125,121,511.81	0	0.00

Table 4. Volume statistics on the SML system

2.5.2.3 Central American Monetary Council (CMCA) Regional System (SIP)

The Central American Monetary Council (CMCA) Regional System (SIP) is a system of cross-border payments between Central America and the Dominican Republic. It was created within the framework of the CMCA's programme for strengthening regional payment systems to enhance financial integration within Central America. It began operating in February 2011 under the Payment and Securities Settlement Systems Treaty, signed and ratified by the governments of each of the CMCA member countries. The primary purpose of the SIP is to create a US$ regional payment platform through the interconnection of national clearing and settlement infrastructure in each member country of the CMCA to support intra-regional trade and remittance.

Year	*Costa Rica*	*El Salvador*	*Guatemala*	*Honduras*	*Nicaragua*	*Dominican Republic*	*Total*
2011		44,219,722.97	1,472,646.85	734,395.00	23,815.12	172,014.50	46,622,594.44
2012		65,369,194.34	8,693,116.20	74,308.63	224,032.56	66,240.00	74,426,891.73
2013		81,152,535.30	8,963,155.22	708,146.66	261,620.22	72,090.00	91,157,547.40
2014		5,614,346.33	14,920,659.33	493,596.44	1,201,086.34	47,636.32	22,277,324.76
2015		43,374,813.87	40,282,124.96	116,621.45	1,539,566.33	18,067.44	85,331,194.05
2016		4,388,853.35	51,530,707.26	58,858.36	649,180.36	16,981.44	56,644,580.77
2017		1,309,315.21	83,807,939.27	645,676.94	1,880,109.17	25,906.90	87,668,947.49
2018		2,319,872.99	81,844,277.13	3,134,322.07	2,926,519.62	55,607.12	90,280,598.93
2019		993,843.64	91,063,252.07	8,698,312.26	7,224,376.38	28,651.62	108,008,435.97
Total	20,399.64	253,623,395.40	435,836,860.50	18,624,165.55	23,156,621.61	523,067.40	731,784,510.09

Table 5. US dollar processed to each country and in total since the inception of the service in 2011

All commercial banks in Guatemala, the Dominican Republic and Nicaragua participate in the system, along with some from El Salvador

and Honduras. Costa Rica started participating in 2020. The central bank of the Dominican Republic is the liquidating agent for the system through its national payment system (SIPARD). The SIP uses SWIFT MT messaging to carry out cross-border electronic communication and uses the US dollar to execute the debit and credit for each transaction. Clearing and settlement are finalised within two hours of the initial instruction. Payments are aggregated and settled between central banks in real time (see Tables 5 and Figure 2). (Data obtained via interviews with officials from the Central American Monetary Council; additional data retrieved from: http://www.secmca.org/sipa/)

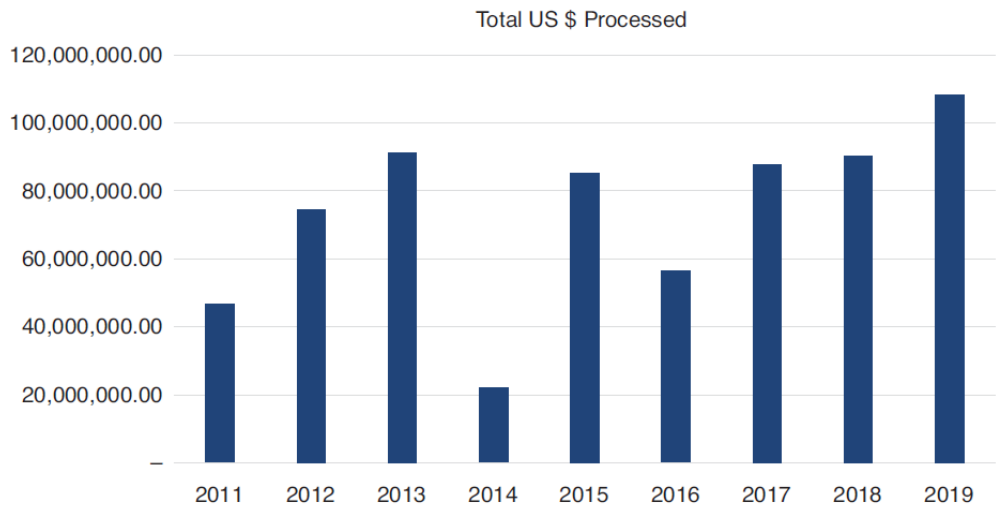


Figure 2. Countries US dollar processed to each country and in total since the inception of the service in 2011

2.5.3 A streamlined compliance process with accounts at smaller financial institutions

Most global correspondents invest 20 per cent (American Banker, 2016) of their revenues in compliance. Smaller financial institutions have lower costs and need smaller potential revenues to onboard new customers and make the return worth the risk. The small size of the financial markets

in Latin America and the limited number of financial institutions utilising correspondent banking can exacerbate de-risking among traditional providers of correspondent banking. These banking systems may not be seen as sufficiently cost-effective to maintain profitable correspondent banking relations and may also fall below the minimum volume of operations accepted by international correspondent banks (FATF Secretariat, 2015). Furthermore, the perception of AML/CFT frameworks within Latin America also contributes to a tendency to view Latin American jurisdictions as inherently high-risk. National and regional coordination and cooperation efforts should aim to utilise approaches that can respond to these vulnerabilities.

2.5.3.1 Survey to smaller financial institutions in the USA on correspondent banking

A complementary or alternative approach is to allow foreign financial institutions to bank with smaller banks in the USA. A sur- vey was therefore conducted to see which smaller banks were providing or willing to consider providing correspondent services to central banks and foreign banks.

Questionnaires were sent to 200 of the 12,000 banks and credit unions in the USA, offering prepaid cards or FinTech-enabled services as a way to incentivize response. Fourteen banks responded, expressing an overwhelming interest in pursuing this new line of business.

- What is your asset size?
- Who is your regulator (Federal Reserve, Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), National Credit Union Administration (NCUA)?
- What is your state of registration?

- Do you provide services to central banks?
- Do you provide services to foreign banks?
- Would you provide services to central banks?
- Would you provide services to commercial banks?

Table 6 presents the responses.

The results suggest that this option could be a viable solution for foreign banks as well as a new revenue stream for smaller US financial institutions that are willing to invest in adequate compliance tools and processes.

Bank	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Asset														
	1bn	700m	100m	100m	100m	1bn	100m	100m	100m	1bn	100m	100m	100m	1bn
Regulator														
	OCC	Fed	CDB	OCC	FDIC	FDIC	OCC	OCC	FDIC	Fed	OCC	FDIC	OCC	OCC
State														
	FL	CA	CO	IA	FL	FL	GA	CA	WA	NV	AL	AL	GA	NY
Provides services to foreign central banks														
	N	N	N	N	N	Y	N	N	N	N	Y	N	N	N
Provides services to foreign commercial banks														
	N	N	N	N	N	Y	N	N	N	N	Y	N	N	N
Would provide services to foreign central banks														
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Would provide services to foreign commercial banks														
	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y

Table 6. Survey of 14 US financial institutions

2.5.4 Using blockchain/digital assets

Digital currencies offer novel approaches for managing liquidity. With greater adoption of distributed ledger technology solutions, smaller financial institutions could work with other smaller financial institutions worldwide without relying on bilateral accounts to hold funds in every currency, giving them greater scope to compete with global banks in the provision of correspondent banking services. Holding funds in a digital

asset such as Tether (tethered to the US dollar) and settling to multiple currencies would reduce the liquidity required, with low volatility risk. Many people think of digital assets (or currencies) as risky tools that allow consumers and businesses to maintain anonymity. In this regard, financial institutions and governments agree that digital currencies traded on anonymous peer-to-peer net- works should be managed, controlled and monitored by appropriate authorities. Nevertheless, digital currencies are viable in the current banking system as an investment source, and when classified as a service, asset or commodity, they may provide efficiencies for global trade and liquidity for financial infrastructures.

Whether the exchange of digital assets in a closed loop could facilitate access within the counterpart payment system without the need of a correspondent or even a SWIFT relationship, however, is a question for another paper.

2.6 CONCLUSION

This study has found de-risking to be a multi-dimensional problem that consists of operational, financial and supervisory/regulatory issues that are detrimental to both central banks and financial institutions.

The paper recommends that foreign commercial banks take a two-pronged approach of opening accounts in smaller financial institutions in the USA to create contingencies, and investigating the use of existing regional payment systems, when- ever possible in partnership with the local central bank.

Making national payment systems interoperable would not only help to address the systemic risk issues associated with de-risking, but also

open the door for more efficient cross-border payments (Financial Stability Board, 2018), facilitating trade, remittance f lows and ultimately financial inclusion.

For the time being, the best example of a payments system that connects multiple countries through their central banks and other market infrastructures is the Euro- pean Central Bank. In the absence of such a system for US dollars, however, most non-US financial institutions will have to continue to fulfil their dollar needs by entering into correspondent business relations with banks and other financial institutions in the USA.

At the supervisory level, central banks must continue to streamline supervisory and regulatory frameworks via data analysis and technical improvements to address the regional challenges associated with de-risking. Additionally, central banks can impose various sanctions for non-compliance with customer due diligence measures and impose financial penalties in cases when local financial institutions engage in activity that could cause the perceived country risk to increase.

At the operational level, financial institutions need to strengthen their AML/ CFT frameworks, engage in dialogue about improving correspondent banking relations, and increase their focus on AML/CFT standards and international regulations (Association of Supervisors of Banks of the Americas, 2017).

In most cases, de-risking is yet to become a systemic risk; for some countries, how- ever, another minor financial crisis — or pandemic — could be enough to result in market failure. For this reason, it is essential to establish contingencies now.

3. Making Remittance Cost more efficient[5]

3.1 Introduction and background

Remittances are typically small amounts of money earned by workers living in one country and transferred to a person, often a relative, in another country to meet domestic needs back home. Appleseed's work has found that this money normally pays for daily expenses—food, housing, and medical care—and generally amounts to approximately $200 per transfer. The majority of customers send money at least once a month.

The CFPB, the entity that regulates remittance disclosures at the federal level, defines remittances as "...most electronic money transfers from consumers in the United States through remittance transfer providers to recipients abroad" (Consumer Financial Protection Bureau, 2016).

[5] *Adaptación del documento publicado como informe: Sending Money. The Path Forward, del que son autores: Annette LoVoi, Ann Baddour, Laura R. Gerber, Jorge Jimenez, Bob Kettle, Benet Magnuson, Maile Molin, Gloria Sarmiento, Darcy Tromanhauser y Yamanda Wright, en 2016.*

3.1.1 How big is the remittance market?

Two dimensions of the U.S. remittance market are notable: first, its size, estimated to have exceeded $601 billion in 2015, and second, its dramatic growth.

The size of the informal market, estimated to be as high as $123 billion from the U.S. alone in 2012, is often described as being twice as large as the formal market (Consumer Financial Protection Bureau, 2016).

U.S. Remittance Outflows Global Remittance Outflow

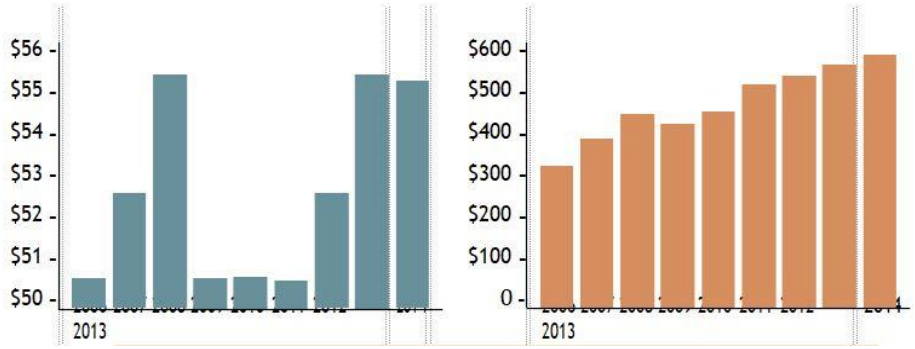


Figure 3. U.S. Remittances Compared to Global Remittances (in U.S. billions) as per World bank data from IMF Balance of Payments statistics database released from central banks, national statistical agencies, and World bank country desks.

The General Accountability Office describes the distinction between formal remittance transfer systems and informal methods:

Formal remittance transfer methods typically include banks, credit unions, money transfer businesses such as wire services and postal services. In the United States, providers of remittance transfer services (including bank and nonbank institutions) are subject to federal oversight and, depending on the state in which they operate, can be subject to supervision by states.

Informal remittance transfer methods include hand-carried cash and others not subject to federal oversight or state supervision (U.S. Government Accountability Office, 2016).

> *I don't send remittances very often because the fees are so high.*
>
> *-Participant*
>
> *Muslim Housing services Focus Group*
>
> *Seattle, Washington – December 8, 2015*

3.1.2 What has Appleseed been doing to promote remittance transparency?

Appleseed, which coordinated this study, began its research on remittances by interviewing people who send remittances to understand their needs and concerns. We learned that people who send money home have a deep-seated concern about all of their money arriving safely to their families. They told us they wanted three things: reliability, security, and clear pricing.

Below is a brief history of Appleseed's advocacy and research efforts in the area of remittances.

3.1.2.1 2003

Texas Appleseed advocated for the passage of the second remittance consumer protection law in the nation (State of Texas Statutes).

3.1.2.2 2005

Four Appleseed Centers—in Chicago, Georgia, Nebraska, and Texas—studied key issues raised by people who send remittances about international remittances and discovered three serious barriers that customers face in shopping for services:

- Lack of marketplace transparency,
- Lack of consistent access to correct pricing information, and
- Lack of consistent regulation or standardized pricing disclosure practices (Appleseed, 2005).

3.1.2.3 2007

The U.S. House of Representatives Committee on Financial Services, Subcommittee on Financial Institutions and Consumer Credit, invited Appleseed to testify on remittance disclosures featured in Appleseed's report, "The Fair Exchange: Improving the Market for International Remittances." This work showed that consumers want information about the total cost of remitting money. Appleseed's consumer focus groups found that when participants were shown various pre-transaction posted disclosures, they chose a disclosure with more information over those that offered little data United States Congress (2007).

3.1.2.4 2009

Appleseed partnered with five remittance providers to promote improved market transparency through a pilot project called the Fair Exchange Initiative. The project developed and piloted remittance cost and service disclosures. The 2009 Appleseed study, "Remittance Transparency: Strengthening Business," presents findings from 742 remitter surveys and provider interviews evaluating the impact of the pilot project. The

study found that improved disclosures benefit both customers and the businesses that serve them. Offering improved pre-transaction remittance disclosures meets a consumer need, supports competition, and benefits market players interested in transparency and fair prices (Appleseed, 2009).

The U.S. House of Representatives Subcommittee on Financial Institutions and Consumer Credit invited Appleseed to testify a second time and serve as a resource during the Dodd-Frank Act remittance transfer reform process. Appleseed's testimony focused on the Fair Exchange Initiative Disclosure Pilot (United States Congress, 2009).

3.1.2.5 2011-2013

Appleseed advocated for federal regulations to promote greater transparency for consumers in the remittance market and filed comments related to defining money transfer services as "large participants" to bring them under CFPB supervision (Appleseed, 2011).

3.1.2.6 2014-15

Appleseed filed six federal comment letters on issues related to remittances: mobile financial services, prepaid cards, language access, and CFPB complaint collection.

3.1.3 What consumer protection provisions were included in the landmark Dodd-Frank Act remittance transfer reforms?

Section 1073 of the 2010 Dodd-Frank regulatory reform legislation added a new section to the Electronic Funds Transfer Act dealing with international consumer remittances. The purpose of the new language was to increase the transparency of the remittance process, mandating

uniform disclosures so that consumers are better able to compare different remittance providers and make the most informed choice about which provider to use.

The CFPB issued final regulations in February 2012, with an original effective date of February 2013. The regulations were subsequently amended several times in response to practical issues raised by industry representatives as they developed policies, procedures, and systems to comply. Amendments included:

a. excluding persons providing 100 or fewer transfers a year from the definition of remittance transfer provider (and therefore not subject to federal regulations);
b. modifying some of the requirements addressing senders ordering transfers in advance;
c. clarifying disclosures of certain fees and taxes and the error and resolution process when the sender provides incorrect information, and
d. extending an exemption for banks regarding estimated disclosures of amounts expected to be received by the recipient (Bureau of Consumer Financial Protection, 2012).

The main focus of the regulations is to require that certain disclosures be made prior to and after a customer orders a funds transfer (Dodd-Frank, Wall Street Reform and Consumer Protection Act). Information to be disclosed prior to the transfer includes:

a. The amount that will be transferred to the recipient in the currency in which the transaction is funded.

b. Any fees imposed and any taxes collected on the remittance transfer by the provider.
c. The total amount of the transaction [sum of items (a) and (b)].
d. The exchange rate is used by the provider for the remittance transfer.
e. The amount that will be received by the designated recipient in the currency in which the funds will be received.
f. A statement indicating that there might be fees associated with the transfer that are collected by a person on the receiving end that may result in the designated funds' recipient receiving less than the amount disclosed in paragraph (b).

The customer must receive a receipt post-payment that includes the information noted above, along with some additional information including the following:

a. The date in the foreign country on which funds will be available to the designated recipient.
b. The name and, if provided by the sender, the telephone number and/or address of the designated recipient.
c. A statement about the rights of the sender regarding the resolution of errors and cancellations related to the transaction.
d. The name, telephone number(s), and website of the remittance transfer provider.
e. A statement that the sender can contact the state agency that licenses or charters the remittance transfer provider with respect to the remittance transfer and the CFPB for questions or complaints about the remittance transfer.

Disclosures must be in English and (if applicable) either in (a) each of the foreign languages principally used by the remittance transfer provider to advertise, solicit, or market remittance transfer services at the office in which a sender conducts a transaction or asserts an error; or (b) the

foreign language primarily used by the sender with the remittance transfer provider to conduct the transaction, provided that such foreign language is principally used by the remittance transfer provider to advertise, solicit, or market remittance transfer services.

In addition, there are model forms that can be used to make the required disclosures (Scott, 2016).

I have sent two remittances, and I remember both as expensive. At the storefront, I spent $8 to send $100. When I realized that I would be charged nearly 10% to send an amount I had saved for months, I decided to look for a smaller business, hopeful for a lower rate.

The second business...was farther from my home, which was an inconvenience that day, the clerk demanded $5 to be able to transfer the fifty I gave him.

I never had any issues with money not getting to my family or experiencing hidden fees.

Still, the rates that the businesses charged, as well as the time I had given up to make the transfers proved to be too costly.

-Clinic Patient

Austin, Texas – July 2015

3.2 An Overview of the Appleseed Remittance Survey Project

Two years into implementing the final federal regulations, Appleseed worked with five Appleseed Centers—Connecticut, Kansas, Nebraska, Texas, and Washington—to launch a survey project to evaluate the implementation and impact of the remittance regulations from the perspective of consumers. Appleseed partnered with community-based organizations that work directly with remittance-sending communities to collect responses to a survey, which resulted in 702 completed responses.

The survey asked consumers about their typical remittance transaction characteristics, comparison shopping behaviors, knowledge of disclosure error resolution and cancellation rights, past problems with remittance products, and overall confidence in remittance services. In addition, four Appleseed Centers—Connecticut, Nebraska, Texas, and Washington—conducted focus groups to identify immigrant financial concerns.

Several notable trends emerged from the data:

- Demographic Profile
- Participants generally reported low household incomes, with a majority in the $15,000 to $30,000 per year range.
- On average, female customers tended to have less income and spend less on remittances than male customers.
- Survey participants reported sending up to $200, on average, mostly to Mexico, Central America, and the Caribbean.
- Notable Trends
- The vast majority of consumers are receiving disclosures.
- Customers are choosing the lowest fees.

- Consumers report stable or decreasing prices.
- Consumers say their confidence has improved over last year or stayed the same, and receiving a statement of rights on how to correct errors was the single best predictor of confidence in remittance services.
- Half of the customers do not know how to file a complaint.
- Language matters.

3.2.1 How did our survey sample compare to the broader U.S. market?

Remittance consumers defy easy stereotypes. They come from many countries and speak a variety of languages. Some are economic migrants, while others are refugees fleeing from war and dangerous political circumstances.

What's more, remittance consumers are not limited to new immigrants or refugees. Many citizens and legal permanent residents, including first, second, and third-generation Americans, continue to support family abroad. Even non-relatives occasionally send money abroad through remittance transactions.

Likewise, our 2015 survey participants were diverse. A majority of participants (87%) speak Spanish as their primary language, and representation across Mexico, Central, and South America were vast.

Other participants reported speaking languages as varied as Amharic, Castilian, and Tigrinya.

The top five countries to which survey participants sent remittances were Mexico, Guatemala, Honduras, El Salvador, and the Dominican

Republic. Mexico is the only top-five destination country in both our survey and in a U.S. Government Accountability Office (GAO) report. In the GAO report, the top five destination countries for the U.S. also include China, India, the Philippines, and Vietnam (U.S. Government Accountability Office, 2016).

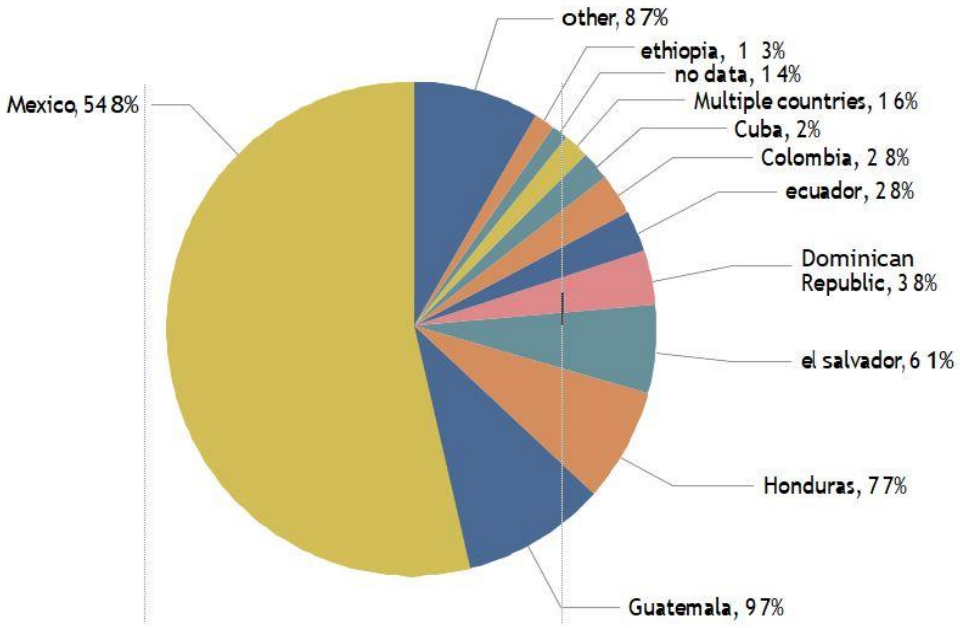


Figure 4. Survey Participants by Typical Remittance Destination

3.2.2 What were some of the key characteristics of our survey sample?

3.2.2.1 Sending amount and frequency by type of sender

Appleseed survey participants are largely female (59%), reflective of recent data on who sends remittances. Recent research shows that women compose about half of all immigrants from Latin America and the Caribbean, and Mexico (Monroy and Cervantes, 2015).

Female survey respondents send remittances more frequently than their male counterparts, most often once a month of $200 or less.

3.2.2.2 Sending amount and frequency based on income

Half of the survey respondents earn $30,000 or less per year. These respondents accounted for half of the remittances in our survey and generally sent remittances of $200 or less at least once a month.

3.2.2.3 Sending amount and frequency based on the amount of time in the U.S.

Survey respondents living in the U.S. for 10 years or more sent almost half of the remittances in our survey. These customers generally send remittances at least once a month with smaller amounts of money of $200 or less, a pattern that we also observed with low-income senders.

3.3 Data and Methodology

Survey data were analyzed using R and Microsoft Excel Pivot Tables. Only one survey item was excluded from analysis due to inconsistent wording between the item question and response options.

Binomial and ordinal logistic regressions were used to compute the relative influence of various demographic (e.g., gender) and situational factors (e.g., typical amount sent) on customers' remittance-related decision-making and confidence. Generally, logistic regression is a type of statistical modelling used to estimate the probability of an event by fitting the data to a logistic curve It makes use of one or more independent variables, which may be either numerical or categorical.

For example:

- To determine which demographic and situational factors predict whether customers perceived increasing or decreasing fees over the past year (binary outcome), we employed a binary logistic regression model with four predictor variables (age, length of time in U.S., whether the customer received a disclosure in his or her primary language, accessibility of the disclosure) and customers' tendency to remember seeing fees on disclosures ("Yes" or "No") as the dependent variable.
- To determine which demographic and situational factors predict the likelihood that a customer will shop around for the service with the lowest fees (ordered outcome), we employed an ordinal logistic regression model with four predictor variables (age, sex, household income, and length of time in the U.S.) and customers' tendency to choose the service with the lowest fees ("Never" "Sometimes" or "Always") as the dependent variable.

For logistic regression models, p-values reflect the extent to which the observed data fit a logistic curve. Statements about significance reflect a significance threshold of $p < 0.05$.

3.4 Key Findings and Discussion

3.4.1 National Data

In addition to the online survey described above, this report is supplemented with public data from the CFPB's Consumer Complaint Database, available online at:

http://www.consumerfinance.gov/data-research/ consumer-complaints/

3.5 Call for Solutions

A smooth-running remittance system requires effort by all interested constituencies—remittance senders, businesses, the CFPB, the nonprofit organizations that work with them, and academics who study the market and pricing trends.

These groups can each contribute to achieving Appleseed's three recommendations:

Recommendation One:

All consumers should be given clear and conspicuous legally required disclosures for all remittance transactions, including prominent error resolution notices/statements of rights required in the Dodd-Frank act to increase consumer confidence

Why is this important?

The main focus of the regulations is to require that certain disclosures be made prior to and after a customer orders a funds transfer.

- About 84% of customers confirmed that they receive written disclosures before transactions.
- Similarly, 72% of customers confirmed that they received written receipts following transactions.
- Receiving an error resolution notice/statement of rights is the strongest predictor of consumer confidence in the remittance process.
- However, half of all consumers surveyed do not remember seeing a statement of rights.

A "statement of rights" could be referred to differently by sectors of the industry (e.g., as a statement about the rights of the sender regarding the resolution of errors and cancellation of the transaction, as an error resolution notice, or as a statement of consumer rights).

In addition, there are CFPB model forms that can be used to make the required disclosures.

Recommendation Two:

Measures should be enacted to promote better customer understanding of disclosures.

Why is this important?

- Although a majority receive disclosures, only 59% of remittance customers notice information about fees, and only 63% remember seeing an exchange rate.
- Language barriers appear to play a consistent role: customers who reported receiving disclosures in their primary language were significantly more likely to remember seeing fees and exchange rates on the disclosures.

Recommendation Three:

The complaint process should be improved, and consumers should receive assurances that complaints will be resolved where possible.

Why is this important?

- Among customers who experienced problems after transactions were completed, the most common issues were late funds

delivery (51%), money being lost (13%), and the transaction going through after cancellation (13%).

- Thirteen percent of respondents experienced problems, and only 1% filed complaints with the government, according to Appleseed surveys.
- Almost half of the respondents do not know how to file complaints with businesses or the government.

3.5.1 Recommendations for People who Send Remittances:

1. Take time to study your disclosure and make certain you fully understand it before you send money. Shop for the lowest price. Ask someone you trust if you don't understand the disclosure.
2. Be sure the information below appears on the disclosure you receive before you send any money:
    a. The amount that will be transferred to the recipient in the currency in which you are paying for the transaction.
    b. Any fees imposed and any taxes collected on the remittance transfer by the provider.
    c. The total amount of the transaction [the sum of (a) and (b)].
    d. The exchange rate is used by the provider for the remittance transfer.
    e. The amount that will be received by the recipient in the currency in which the funds will be received.
    f. A statement indicating that there might be fees in connection with the transfer that is collected by a person other than the provider (such as on the receiving end) that may result in the recipient receiving less than the amount disclosed in (a).

3. Be sure you receive a receipt after you make your payment that includes the information noted above and the additional information below:
    a. The date in the foreign country when funds will be available to the recipient.
    b. The name, the telephone number(s), and/or address of the recipient.
    c. A statement about your rights regarding the resolution of errors and cancellation of the transaction.
    d. The name, telephone number(s), and website of the remittance transfer provider.
    e. A statement that you can contact the state agency that licenses or charters the remittance transfer provider with respect to the remittance transfer as well as the CFPB for questions or complaints about the remittance transfer.
4. Keep your post-payment receipt in case there is a problem.
5. Use the information on the error resolution notice/statement of rights to contact officials if you have a problem.

3.5.2 Recommendations for Businesses:

1. Conduct internal audit, agent practices audits, or other reviews of disclosure practices to make certain the legally required pre-transaction disclosure and post-transaction receipt is provided at all physical or online locations and that agents are providing pre-transaction and combined disclosures prior to the transaction.
2. Verify that pre-transaction disclosure is shown to the customer before the transaction where combined disclosures are used.
3. Make certain language is "clear and conspicuous." Implement necessary formatting and distribution practices to make certain

disclosures are easy to understand. Place the error resolution notice/statement of rights as required in close proximity to the pricing information contained on the post-transaction receipts. Provide the error resolution notice/statement of rights in the appropriate language.

4. Train agents on their responsibilities under regulations. A remittance transfer provider is liable for any violation of the regulations by its agent. Remittance transfer providers should conduct internal audits and consider anonymous testing to ensure that agents are following all the regulations' requirements.
5. Analyze complaint trends (nature of the complaint, city or state of sender, ethnicity, provider, method of service, and destination country), and determine contributing factors that could lead to possible solutions. Where there are patterns of problems, take corrective action and inform consumers.
6. Resolve all consumer complaints within the time frames set out by the CFPB. Create a feedback loop with customers on individual complaints, so they understand how their complaint has been resolved.
7. Publish complaints received by category of problem and the percent of complaints resolved by problem category. Analyze whether there has been improvement in the number and type of complaints quarter to quarter and year to year.

3.5.3 Recommendations for the CFPB:

- Review compliance with all disclosure requirements. Make certain that diverse types of providers—large and small, urban and rural, different technology users—are following disclosure requirements.

The CFPB could collect samples of disclosures to review for compliance and consider testing by sending money through various types of providers using varied methods to determine if the regulations' language and disclosure requirements are being met.

a. Determine if language requirements are met.
b. Verify that pre-transaction disclosure is shown to the customer before the transaction where combined disclosures are used.
c. Determine if "clear and conspicuous" requirements are being met.

- Review the types of extra charges that are imposed on remittance transfers and see how extra charges are handled on disclosures.
- Conduct research to determine why some customers do not understand the disclosures even if the disclosures comply with the regulations. What are the factors improving or inhibiting comprehension? Is the information on the same screen or page, so consumers don't have to hunt for information? Are model disclosures being used? Are new model disclosures needed to address comprehension problems? Are fees and exchange rate separated from the error resolution notice such that some customers don't see these items?

  Are fees and exchange rates separated from the error resolution notice such that some customers don't see these items? Determine if language requirements are met. Through supervision, review the placement of the error resolution notice/statement of rights on the receipt and consider whether the regulations should be more specific about the placement of the notice and its prominence (e.g., bold or bigger font), and provide revised model forms.

- Ensure that no population is disenfranchised from government complaint services. Monitor complaints filed by customers (by nature of complaints, complaint resolution, and patterns of problems categorized by city or state of sender, ethnicity, provider, method of service, and destination country). Determine whether an alternative method of securing information about consumer satisfaction can be developed, such as through a CFPB remittance ombudsman.

  Conduct public outreach to inform consumers about the availability of the complaint system, the percent of complaints resolved, and the steps taken to protect a customer's identity.

- Promulgate is a standard format companies should use to collect and document complaints and resolutions. Include categories, level of detail, and the percentage resolved in favor of the consumer or the business. A consumer may have multiple complaints, so formats should include room for multiple complaints.
- Urge consumers to save their receipts in case there is a problem.
- Through supervision, review the placement of the error resolution notice/statement of rights on the receipt and consider whether the regulations should be more specific about the placement of the notice and its prominence (e.g., bold or bigger font), and provide revised model forms.

3.5.4 Recommendations for Nonprofit Organizations and Academics:

1. Study customer practices of (i) obtaining both pre-transaction disclosures and post-transaction receipts, (ii) comparison shopping, (iii) saving post-transaction receipts, and (iv) filing complaints with the CFPB and/or remittance transfer provider if there is a problem. Reach out to consumers to better understand their level of comprehension of their error resolution rights and consider whether revised proposed language can be developed and proposed to the CFPB that might be clearer to the consumer.
2. Encourage customers to use disclosures to comparison shop before they send money, save post-transaction receipts, and file a complaint with the CFPB and business if an error occurs.
3. Use English as a Second Language and other community forums to explain the important information found on remittance disclosures.
4. Interview immigrants to understand the circumstances or factors that encourage or inhibit the filing of complaints. Will immigrants attach their names to complaints filed with the government? Will the frequency of complaints increase if immigrants understand that personal information is not shared with government agencies? Is the low number of complaints related to lack of information and awareness of the complaint system or to discomfort due to particular factors that can be addressed?
5. Alert customers about any patterns of problems unique to a city or state.

3.5.5 Areas for Future Remittance Research

Appleseed recommends additional research in the following areas:

3.5.5.1 Examine high prices attached to small amounts sent

Appleseed's survey shows much higher percentage charges to send small amounts of money, with average fees of $9.11 for the pricing of small-scale remittances (under $200). The percent charges are more than twice as high as those to send $201-$500.

These findings point to a core market challenge: how do we reduce the cost to send small amounts of money, a topic that often receives scant attention? Pricing tends to be for a range of money sent, but with most people sending amounts under $200. The highest fees are impacting the largest number of remittance consumers sending the smallest dollar amounts.

When companies price by dollar range, it can be unfair for most remittance senders.

3.5.5.2 Conduct research to understand what leads customers to comparison shop among multiple providers

Conduct research to determine if remittance consumers shop only within a certain category of a service provider (e.g., only among banks or nonbank remittance transfer providers) or do they shop across the range of service providers to consider using a cheaper mobile phone and Internet-based remittance services?

3.5.5.3 Evaluate price as a motivating factor in comparison shopping

Is price more important among certain individuals? Collect information on factors that affect comparison shopping by demographic categories such as income level, tenure in the U.S., age, and gender.

3.5.5.4 Connect sending remittances to financial inclusion

An immigrant's ability to send money home demonstrates an ability to save and plan, but most of the lowest income immigrants do not have bank accounts. The marketplace needs research about how remittances can be linked to simple bank products that offer savings and checking accounts without heavy fees.

Markets cannot ignore immigrants' purchasing power and the contributions they make through employment and taxes to local, state, and federal government. Integrating immigrants into the financial system is good business and creates opportunities. And law enforcement finds crime reductions related to consumers paid in cash on payday. And low-income immigrants find more opportunities to rise out of poverty and build assets.

Remittances constitute a large-volume and recurrent payment stream. The World Bank Group Committee on Payments and Market Infrastructure encourages "...leveraging of large-volume and recurrent payment streams for financial inclusion objectives, which act as catalytic pillars/ drivers to facilitate access to and promote wide usage of transaction accounts."

3.5.5.5 The Federal Reserve FedGlobal system can reduce remittance costs

Like past generations of immigrants, today's new Americans are an important market for financial institutions. Their climb up the economic ladder can involve opening a savings account and/or checking account, repaying small-dollar commercial and personal loans reliably, and stimulating more financial institutions to expand their international remittance business. The Federal Reserve System's FedGlobal ACH Payments (Automated Clearinghouse) is poised to grow and reduce costs for immigrants by using FedGlobal.

Remittance providers and the Federal Reserve should explore pooling transactions to reduce rates further.

3.5.5.6 Collect and present real-time pricing information to the public

Study the best manner to present current pricing information. Internet-based and mobile phone online services and some pricing aggregators provide real-time prices and exchange rates.

Although numbers are rising, not all remittance senders can access mobile phones and computers. The public needs real-time pricing information to comparison shop.

3.5.5.7 Study complaint resolution among businesses

What percentage of complaints are resolved at the company level? Are certain complaints resolved more often and quickly than others? What is the sequence of complaints: Do remittance senders complain first to the business and then to the CFPB only if a resolution is not secured? Can

the CFPB encourage more thorough complaint resolution at the company level?

Conduct follow-up surveys and focus groups of persons facing problems with remittances to understand nuances of their problems and patterns (by nature of the complaint, city or state of sender, ethnicity, provider, method of service and destination country, and provider's relationships with other financial providers).

Review how often disclosures are provided in languages other than English and confirm that they are provided when the remittance transfer provider solicits or markets in those other languages.

3.6 Conclusion

The Dodd-Frank remittance regulations are working. Appleseed believes that these regulations bring pricing transparency that will reduce prices and improve remittance sending options in the marketplace. Appleseed views the remittance regulations as a global model. These regulations can be replicated in other countries to improve both the sending and receipt of remittances. And in so doing, hard-working families who send money to relatives and friends back home—and local economies in the U.S.—will benefit from the essential cost savings that a transparent and price-competitive market creates.

4. Faster Payments in the United States[6]

4.1 Introduction

Over 40 countries have already implemented a real-time payment scheme (Rolfe, 2018), while the United States has lagged behind most industrialized nations in implementing a 24/7 real-time payments system. Such a real-time payment would allow the opportunity to open the banking system to financial innovation and technology (Omarini, 2018).

The United States, while still is the biggest economy in the world, and its currency is the most significant reserve currency, still relies on a batch ACH[7] system and Wire System[8], which are available only during working hours and cost-prohibitive[9] for consumers and small businesses.

So far, the lack of more innovative implementations had to do with a lack of legal mandate and the questionable ROI (return on investment). The existing systems are highly profitable for financial institutions, while new

[6] *Adaptación del documento publicado como informe: Faster Payments Interoperability, del que son autores: Jorge Jimenez, Reed Luhtanen, Susan Foley, Steve Ledford, Matthew Friend, Andrea Gilman, Laura Weinflash, Bradley Wilkes, en 2016.*
[7] See https://www.nacha.org/content/ach-network
[8] See https://app.frbservices.org/resources/financial-services/wires/operating-hours.html
[9] See https://www.finder.com/international-money-transfers/bank-of-america-wire-transfers

payment infrastructures are prohibitively costly for most institutions, especially the smaller ones.

"If you look around the world at the implementations of faster payment solutions, many of them were top-down, federal mandates, prescriptive and single-service provider solutions in the market," said Roy DeCicco, from JP Morgan Chase[10].

Meanwhile, in the European Union, as early as 2014, the Euro Retail Payments Board (ERPB) invited the European Payments Council (EPC) to develop a pan-European instant payment scheme, the SEPA Instant Credit Transfer (SCT Inst), which is widely used in Europe.

In the absence of a mandate, In 2015, the Federal Reserve tried to gain consensus in the financial community by first publishing the paper on "Strategies for Improving the U.S. Payment System" (Federal Reserve, 2021) and then creating the Faster Payments Taskforce with the goal of "to seize this historic opportunity to realize the vision for a payment system in the United States that is faster, ubiquitous, broadly inclusive, safe, highly secure, and efficient by 2020" (Faster Payments Task Force, 2021).

Following the TaskForce, the Faster Payments Council (FPC) was implemented by the stakeholders of the financial system in the United States, trying to bring to fruition the vision of Faster Payments in the United States.

This paper was facilitated with the help of the Faster Payments Council Network Committee to analyze the six Faster Payments Networks

[10] See https://www.pymnts.com/news/faster-payments/2017/federal-mandate-us-payment-system/

present or being deployed in the United States. Financial Institutions may use this work to determine which network is more appropriate to adhere to and what mechanisms would be most appropriate for Interoperability amongst them.

4.2 The goals of the study

This report provides a unique point of view at the market for instant and immediate payment services in the United States in 2021, since the authors of the paper are the providers of the underlying payment networks. All participants collaborated in providing a homogenous description of the network and potential models of Interoperability.

For this report, we have defined a payment network as one that connects financial institutions to make funds transfers. A network in which the transmission of the payment message and the availability of final funds to the payee occur in real-time or near real-time on as near to a 24-hour and seven-day (24/7) basis as possible is considered to be either instant or immediate, depending upon the settlement mechanism. We will also include core clearing and settlement networks and value-added networks or overlays built on top of core payments infrastructure.

The following participants of the Faster Payments Network Committee were interviewed: Juniper Payments, Federal Reserve, Mastercard, VISA, The Clearing House, OPN, and Zelle.

The intent was to delineate the differences among the different systems and understand how possible Interoperability between the systems may potentially work by asking the following questions to the above-mentioned providers.

1) What is Faster Payments Interoperability?
2) What are the models of Interoperability?
3) How are Payments Routed by available network?
4) Does the network handle Credit and Debits?
5) How fast are the payments delivered?
6) How does the settlement occur?
7) Is the payment final, or can it be revoked?
8) Is there additional messaging functionality available?
9) What measures are taken for Fraud and Risk Control?

4.3 Faster Payments Interoperability

As U.S. payments stakeholders address policy issues concerning faster payments, there have been many discussions around the best ways to achieve ubiquity in the ecosystem. We understand that as we move to modernize the U.S. payments system, end-users – both businesses and consumers – will want solutions that allow them to easily pay or be paid by others. The idea is to enable individuals to make payments to anyone else in a seamless, secure and simple way that meets the demands of today's customers – digital, fast, and easy to use.

Interoperability, which can take a variety of forms, may help the U.S. extend faster payment functionality to consumers and businesses across the country and further the goal of spreading the benefits of faster payments broadly regardless of what network is being used.

Part of the mission of the U.S. Faster Payments Council (FPC) is to facilitate understanding, convene stakeholders and reconcile issues that may limit the Interoperability of payments networks and services. The Network Committee of the FPC, comprised of payment network

operators, is well-positioned to provide objective information to FPC members and all stakeholders in the U.S. about faster payments Interoperability based on our role in the payments ecosystem, our international experience, and collective institutional history. To ensure that the industry is exploring the topic with a common baseline of understanding, the FPC believes it is critical to compare the different models and considerations that must be addressed.

4.3.1 Overview of Payment Interoperability

Interoperability in a faster payment system can help achieve seamless processing - both sending and receiving - of payment instructions across various payment solutions. This can significantly benefit all players in the ecosystem if it provides access and reach to any end-user, regardless of the network their financial institution connects to.

Through Interoperability, the ecosystem can promote competition, reach and scale.

4.3.2 Models for Payments Interoperability

It is important to remember that Interoperability is a tool, not a goal in and of itself. For some networks, the goal could be to extend reach; however, another network may need Interoperability to add functionality to its network. Given the complexities and differences between faster payment systems, there is no one model required to achieve payment system interoperability. When considering different approaches, it is important to keep three questions top of mind:

1. What is the overall objective of Interoperability?
2. Which parties should be interoperable?
3. What impact will it have on senders and receivers, if any?

Answering the first question, and defining the objective for Interoperability, will help identify which parties are interoperable. Payment service providers, third-party processors, and other networks are all viable options to accomplish Interoperability, and their impact varies depending on the model chosen.

In general, payment system interoperability can occur three ways: at the point of origination, at the network level, or with an intermediary.

4.3.2.1 Point of Origination

A payment service provider or financial institution to the payment originator has access to two or more clearing and settlement networks.[11] The payment originator can accept or send payments on any network, with the payment service provider enabling the transaction. For example, through the point of origination model, a merchant is able to accept multiple card brands through a single merchant processor or acquirer. Another example is an integrated disbursement service that allows companies to originate payroll or insurance claim payments via ACH, checks, wire transfers or one of the faster payment services through a single interface. Interbank clearing and settlement for payments on each network is separate.

[11] A clearing and settlement network is a system that provides infrastructure allowing the exchange of payment messages containing information about a payment transaction (clearing) and the transfer of assets to discharge an obligation related to a payment message (settlement). For certain payment services, clearing and settlement can be conducted on separate systems.

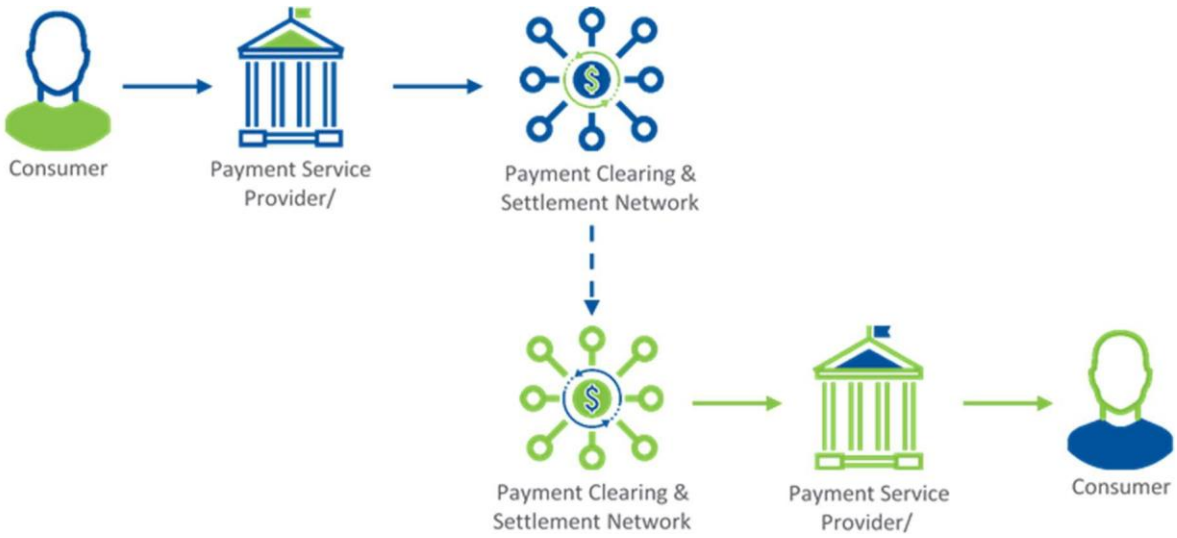


Figure 5. Network interoperability achieved by the Financial Institution at the point of origination.

4.3.2.2 Network to Network

Two clearing and settlement networks exchange transactions so that a payment message initiated on one network can be delivered to a receiver on another network. Payment service providers or financial institutions do not need to connect to both networks; a single connection to the network of their choice can be used to send or receive transactions to endpoints on either one. All participating financial institutions, however, must use the same settlement network for inter-network transactions. Today, this model allows financial institutions to choose between FedACH and EPN to connect to the US ACH.

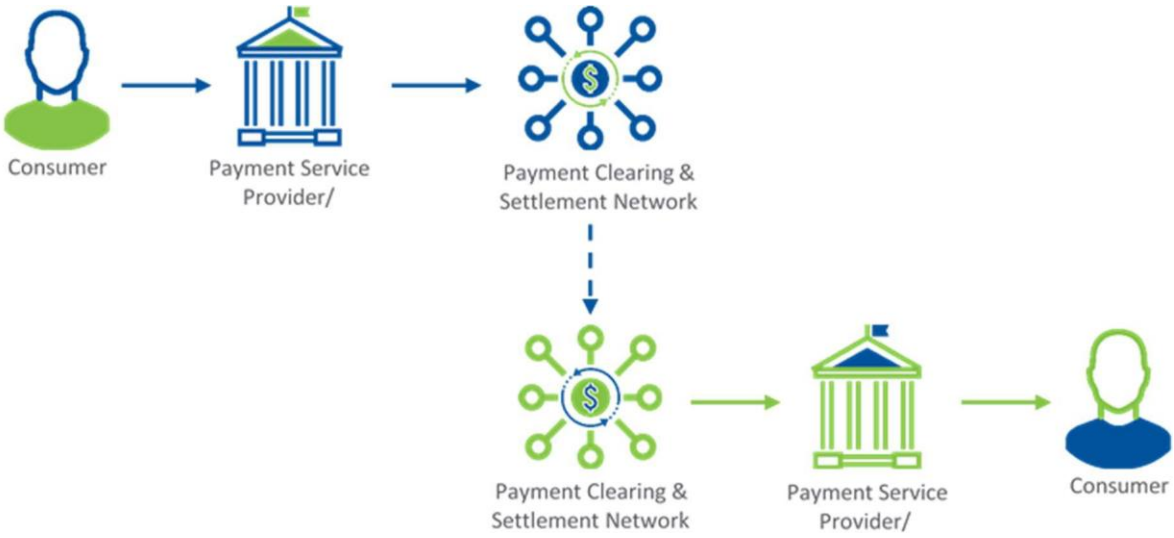


Figure 6. Network interoperability achieved by network connecting to another Network

4.3.2.3 Intermediary as Party to the Payment

An intermediary receives a payment from one party and sends it to another party. The end-to-end process involves a chain of payments through one or more intermediaries. This model has been used for centuries to clear checks, with correspondent banks acting as intermediaries. It is also the way most international wire transfers are cleared and settled through correspondents. Each leg of the transaction is cleared and settled separately. The ultimate payer and payee, as well as their service providers or financial institutions, depend on the intermediaries to execute both sides of each transaction.

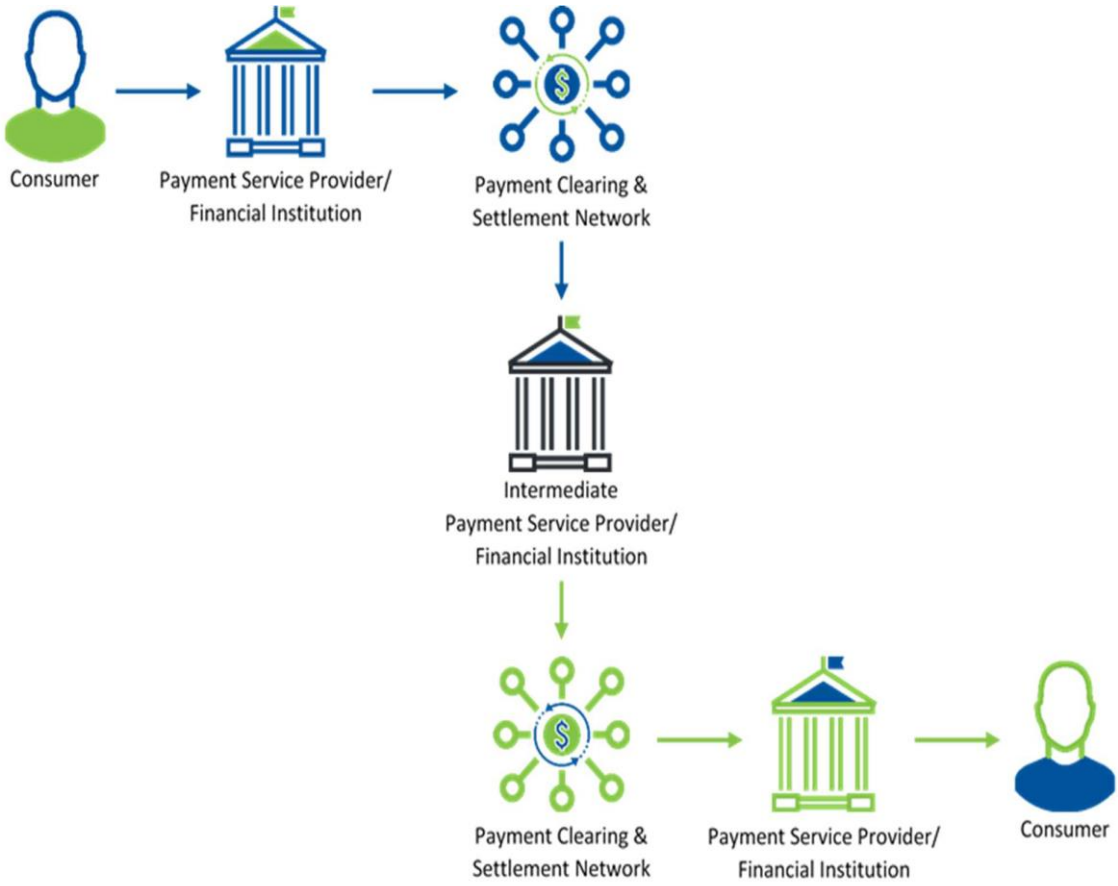


Figure 7. Network Interoperability achieved by Intermediary as Party of the Payment

4.3.3 Summary of Interoperability Models

The following table compares the three models for payment system interoperability, including which players must be involved to achieve Interoperability and the most common uses cases. This table is intended to help industry members answer the three critical questions outlined at the beginning of this section. It is important to note that the descriptions of settlement outlined below are the norm in most cases; however, there may be situations when settlement is achieved in a slightly different manner.

	Origination	Network to Network	Intermediary
Point of Integration	Payment Service Provider/Financial Institution	Network	Intermediary Payment Service Provider/ Financial Institution
Settlement	Settlement for payments on each network is separate. If the payment originator's payment service provider is an aggregator for other parties, it may fund payments across multiple networks with a combined "settlement" transaction for each of its clients, but this does not eliminate the need for discrete settlement for each rail.	In most cases, participants in both networks must participate in the same settlement network if they want to send or receive cross-network payments. This could mean that all participants join one of the two networks to use its settlement process for inter-network payments. This is essentially how FedACH and EPN settle for inter-operator ACH entries — EPN participants also join the FedACH network. Alternately, participants in both networks could become part of a third settlement arrangement.	An intermediary payment service provider or intermediary financial institution that is a participant in both networks settles separately with each network for inter- network payments. Each network maintains its existing settlement processes. In some models, there are multiple intermediaries.

Table 7. Interoperability Settlement Options

4.3.4 Understanding Settlement – A Unique Aspect of Payment Network Interoperability

Settlement is one of the defining characteristics of a payment system because settlement is how the transfer of value from one party to another

occurs. Until settlement is completed, there is the risk of loss for one or more parties to a payment; thus, settlement is an essential part of any payment process.

There are a variety of different models for settlement, but overall, they can be defined in terms of two factors: timing and netting. (Note: Further information and examples for how each settlement type works is included in Appendix A.)

4.3.4.1 Timing: Deferred or Real-time Settlement

Payments can be settled in real-time, (at the same time payments are cleared), or settlement can be deferred until later.

4.3.4.2 Netting: Gross or Net Settlement

Each payment can be settled individually, what is known as gross settlement, or a group of payments can be netted against each other and settled for the net amount. Net settlement processes can be further divided into bilateral net settlement between two parties, and multi-lateral net settlement among multiple parties.

Based on the timing and netting factors, a settlement process can be defined as one of the following:

- Deferred Gross Settlement

  Every payment message is followed later, by a corresponding settlement payment. This can be a single settlement payment, such as a "covering wire" that follows a payment instruction sent on the SWIFT network. It could also be a single settlement payment that covers multiple payment instructions from one party to another, such as a single ACH payment or wire transfer sent by

a bill pay service to settle multiple payments to the same biller. In either case, the receiver is at risk until the settlement payment is complete.

- Deferred Bilateral Net Settlement
  Multiple payments sent and received between two parties are offset against each other, with the party sending more than they received owing the other party the net amount. This net amount can be settled later by a single settlement payment or by book transfer between accounts held at the same institution. Deferred bilateral net settlement is commonly used in situations where two parties both send and receive many payments to each other, including trade credit, F.X. trades and "direct send" check or ACH exchanges.

- Deferred Multilateral Net Settlement
  Multiple payments sent and received between multiple parties are settled against each other, with the parties sending more than they received owing the other parties the settlement net amount, and net receivers receiving their settlement net value. This is a common form of settlement for batch payments, including check clearing houses, ACH and card networks.

- Real-time Gross Settlement (RTGS)
  Each payment is immediately settled as an integral part of the clearing process. RTGS settlement is generally final and irrevocable, so the receiving party can use funds immediately without the possibility of reversals or chargebacks. Settlement can be executed either by transfer between accounts at a central bank (e.g. FedWire) or on a ledger backed by risk-free funds or collateral (e.g. CHIPS). High-value sure transfer systems usually

employ RTGS, and it is becoming more common for immediate retail payments (e.g., RTP & FedNow in the U.S., RT1 & TIPS in the E.U.).

The form of settlement is an important factor when considering options for Interoperability between faster payment systems. Settlement is an essential element of a payment transaction, determining such factors as revocability, access to final funds, and credit risk among participants. These factors have a bearing on both banks participating in a service and their end user customers.

While real-time payment might imply that real-time gross settlement (RTGS) is the logical settlement model to achieve Interoperability, for individual faster payment services that are based on RTGS, a question arises about how settlement could be handled if the services were to connect and send payment messages back and forth between or among multiple services. With an RTGS service, settlement is embedded within the Service on a payment-by-payment basis, thus inter-service settlement could involve new processes within one or more of the individual services. New processes could impose new costs on the services involved.

Interoperability for real-time payment services using deferred net settlement would also impose new costs on the services involved. For example, credit risk mitigation arrangements that are put in place to manage counterparty credit risk in deferred net settlement (e.g., collateralization of net exposures and loss sharing arrangements) would also need to be established on an inter-service basis. In addition, an inter-service net settlement agent would likely need to be established.

Differences between RTGS and deferred net settlement offer a distinct contrast as reflected in the table below:

	Deferred Net Settlement	Real-time Gross Settlement
Timing of settlement	Sometime after clearing, which could be hours later	Simultaneous with clearing
When is settlement final?	Occurs at a scheduled time after clearing	Immediately upon clearing
What can cause settlement to fail?	A participant does not fulfill its settlement obligation (e.g., bank failure, operational problems, other issues that prevent funding of settlement position)	Insufficient funds in settlement account or position at the time of payment clearing
When can settlement fail?	After payment is cleared, at time of net settlement	Immediately after initiation
What happens if settlement fails?	Payments are reversed or settlement is recast without defaulting participant	Payment is rejected
Are any participants at risk of losing funds due to settlement failure?	Yes, unless net debit positions are fully pre-funded or collateralized	No, participants are not allowed to accrue inter-participant net debit or credit positions
How can settlement risk between participants be mitigated?	Pre-funding or collateralization of net debit positions enforced by net debit limits	N/A
Can payment clearing continue if the settlement system is unavailable?	Typically, yes. The exception is if the payment system cannot enforce net debit limits without access to the settlement system.	Usually, no. Some payment systems allow participants to receive payments if they choose to accept risk of loss due to unsettled payments, but this is uncommon

Table 8. Comparing deferred settlement vs. real-time settlement

4.3.5 Overlay Services

Overlay services are not models for Interoperability. However, they are an important element in the faster payments ecosystem. In an overlay service, the sender and the receiver of a payment are users of the same payment service (e.g., Zelle, Venmo) and therefore have common expectations regarding user experience, rights, and obligations, regardless of the underlying clearing and settlement networks used. An overlay can add a layer of value to a single underlying payment network. When more than one network is involved, overlay services can be thought of as an enhancement of the Point of Origination payment interoperability model, designed to ensure that the end-user experience is consistent and seamless.

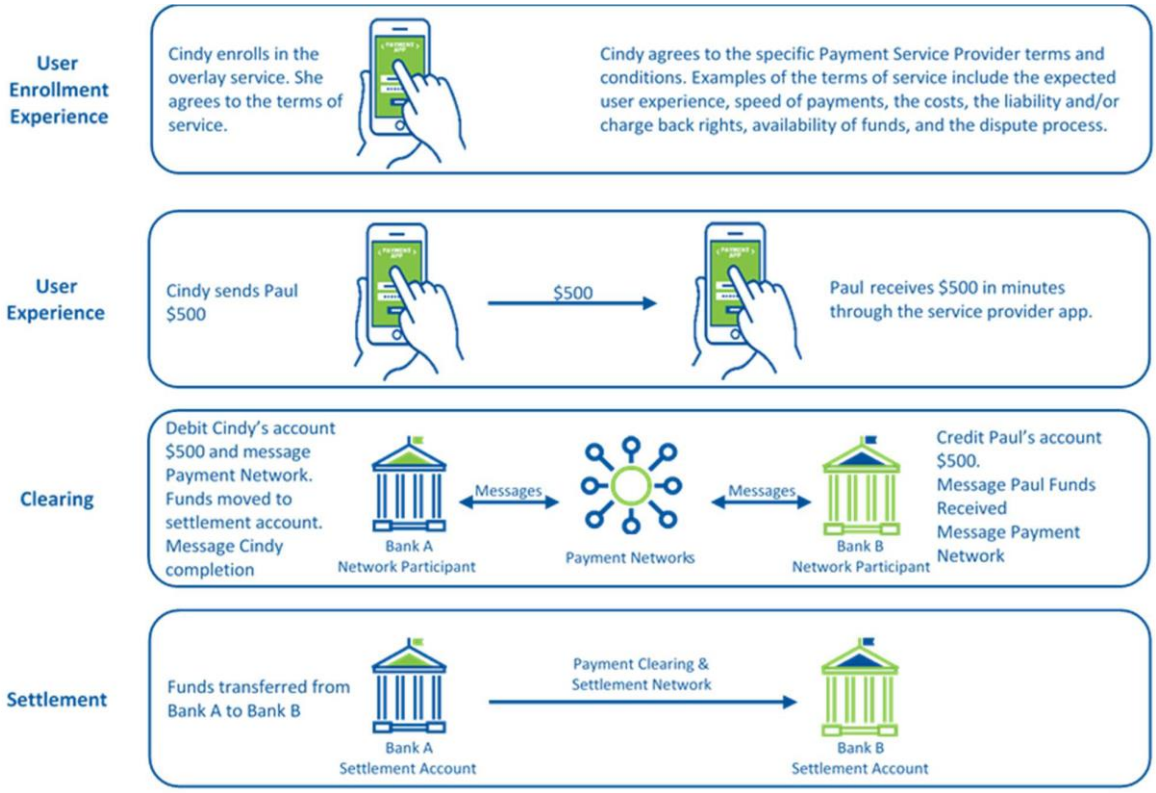


Figure 8. Network Interoperability achieved by overlay

4.4 Faster Payment Networks Profiles in the United States

Consumers and businesses in the United States will have a choice of networks that provide faster payments. These networks have different characteristics, which have implications for the variety of use cases faster payments enable. This range of features allows financial institutions and payment service providers to choose the networks that best meet their needs. Providers of payment services often use multiple networks to extend the capabilities of their offerings. The choice among networks provides a rich platform for innovative solutions that no single network can offer.

All primary Faster Payments Networks in the United States were surveyed and described below

4.4.1 FEDNOW Service provided by the Federal Reserve

The Federal Reserve is developing the FedNow Service to enable financial institutions of every size and in every community across America, to provide safe and efficient instant payment services around the clock, 365 days a year. The target release date of the Service is 2023 or 2024.

The FedNow Service will provide core clearing and settlement capabilities to support a range of transaction types and use cases. The Service is being designed to advance the Fed's public mission of Accessibility, Safety and Efficiency

The Federal Reserve's broad reach, encompassing connections and service relationships with more than 10,000 financial institutions, supports a nationwide infrastructure for instant payments.

The figure below illustrates a completed payment over the FedNow Service in its simplest form. This process is designed to take place within seconds.

Figure 9. FedNow Network flow

1. Sender initiates payment.
2. Sender's financial institution submits payment message to FedNow Service.
3. FedNow Service validates payment message.
4. FedNow Service sends contents of the payment message to receiver's financial institution.
5. Receiver's institution confirms that it intends to accept the payment message.
6. FedNow Service debits and credits the designated master accounts of the sender's and receiver's institutions at the Federal reserve.
7. FedNow Service sends a payment message to the receiver's institution with an advice of credit and an acknowledgement of settlement to the sender's institution.

8. Sender's and receiver's accounts are debited and credited, respectively, outside the Service.

Feature	Description
Recent Development and Initiatives	• Aug. 6, 2020: The Federal Reserve announced the features and functionality planned for the initial release of the FedNow Service via a Federal Register notice. • Oct. 13, 2020: the Federal Reserve announced and solicited interest for the FedNow Pilot Program to support the development, testing, and adoption of the FedNow Service. The program is slated to kick off in early 2021. • July-Nov. 2020: The FedNow Community and associated working groups collaborated to assist with finalizing FedNow ISO 20022 message specifications and defining participant reconcilement needs.
Access and Distribution Model	The FedNow Service will be broadly available to all depository institutions in the United States, provided they are eligible to hold accounts at the Federal Reserve Banks under applicable federal statutes and Federal Reserve rules, policies, and procedures. Financial institutions will connect to the Service using the FedLine® Access Solution. Participants will be able to designate a service provider or agent to submit or receive payment instructions on their behalf and may choose to settle payments in the account of a correspondent. Merchants, consumers, or non-bank payment service providers can access the Service through depository institutions as they do with other Federal Reserve payment services.
Additional Information	The FedNow Community is composed of industry leaders with expertise across the payments ecosystem who help inform and evolve the development of the FedNow Service. There are currently more than 700 FedNow Community members. The latest service information, along with instant payments educational materials, is available at FedNow.org.

Table 9. Network Profile – FedNowSM Service

4.4.2 Junifunds Network provided by the Juniper Payments

Over 3,000 financial institutions use the Juniper Network in the United States by outsourcing and automating wires, ACH, faster payments, check, real-time ledger, and international for correspondents, financial institutions, banks, and corporates. U.S. $3 billion are transacted daily by Juniper and networks worldwide, examined by the Federal Reserve, the OCC, NCUA, and FDIC.

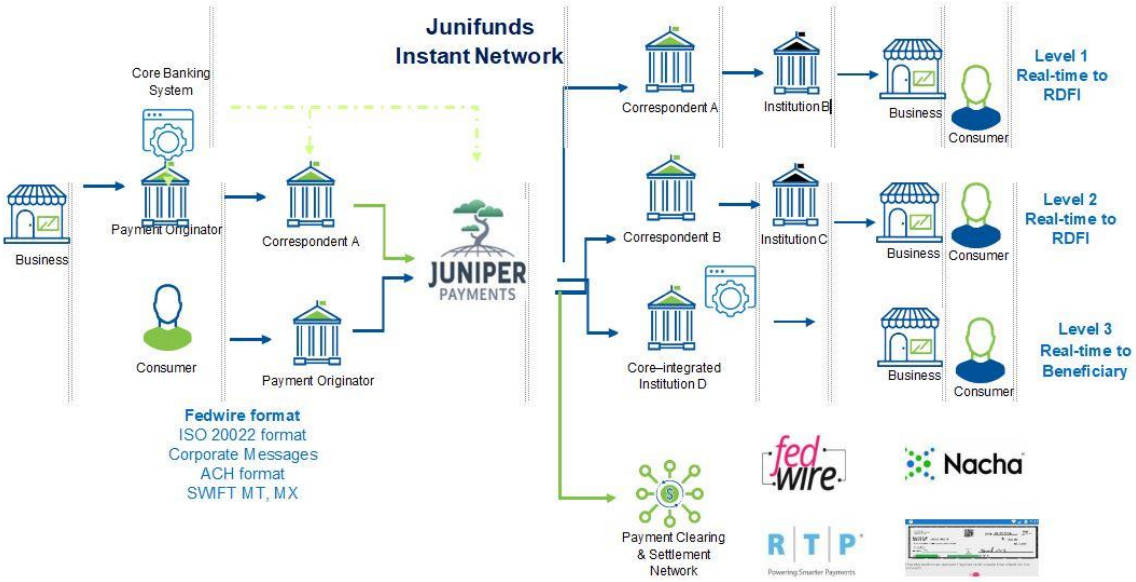


Figure 10. Junifunds Network Operation.

Feature	Description
Overview	Operated by Juniper Payments. The Junifunds network is an immediate message transfer, clearing, and settlement network for U.S. financial institutions. The system has 3 levels. • Level 1: transfer where clearing financial institutions have same correspondent. • Level 2: transfer where clearing financial institutions may be using different correspondents for settlement, but both are part of the Junifunds network. • Level 3: transfer where the financial institution is part of Junifunds network and beneficiary will receive the transaction in under 30 seconds.
User Experience	Junifunds network rules define requirements for end-user funds availability, cost of receipt timeliness of payment notification, and finality of payment. Other aspects of user experience such as user interface are determined by the participating financial institution or payment service provider.
Links to Other Networks	Junifunds is working on interconnection with foreign ACH and central banks to facilitate efficient global payments.
Access and Distribution Model	Any U.S. depository financial institution is eligible to participate in the network. All financial institutions on the network are full participants. Financial institutions can connect directly to the network or can use an approved third-party financial institution sponsor.
Recent Development and Initiatives	The Junifunds network Level 1 and Level 3 are currently available in pilot mode. Level 2 is expected to go live in 2021.

Table 10. Network Profile – Junifunds® Network

4.4.3 Mastercard Send provided by Mastercard

Mastercard Send™ is a multi-rail platform that enables near real-time payment transfers to and from billions of card, bank, and digital accounts globally.

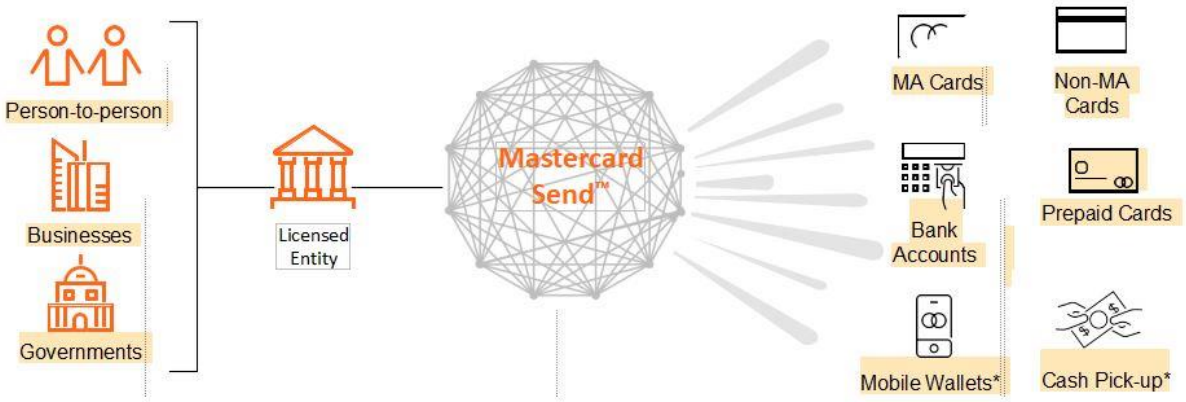


Figure 11. Mastercard Send Network Operation.

Feature	Description
Overview	Mastercard Send Domestic enables transaction originators to send domestic payments for various use cases, including person-to-person payments as well as business and government disbursements to recipients located in the same country, regardless of card brand.
Links to Other Networks	Mastercard Push Payment Gateway Service allows senders (disbursers or P2P providers) to send funds to receivers (individual consumers or businesses) on one of five receiver networks: Mastercard, Visa, STAR, NYCE, or Pulse, with 24/7 availability. Mastercard Send provides one single API connection into debit networks to optimize transfers so that funds are delivered in real time in most cases, using just one single API connection.

Feature	Description
User Experience	Mastercard offers Mastercard Send as a B2B2C solution. Transaction originators control the user experience of the disburser; receiving networks control the user experience of the recipient. Mastercard provides best practices and data and services solutions to advise customers to create and maintain best-in-class user experience, customized by end-user segment. Mastercard also administers the network's integrity, mandating for example standards of know your customer (KYC) requirements, sanctions screening, consumer disclosures, transactions limits, etc. Mastercard Send programs and payment transfer activities are governed by the Mastercard rules and Mastercard Send domestic program guidelines.
Access and Distribution Model	Mastercard Send leverages existing Mastercard relationships with 24,000 financial institutions in over 200 countries and territories. Besides card endpoints, in select markets Send can also deliver funds to bank accounts, mobile wallets, and cash pick-up locations.
Recent Development and Initiatives	• Transfast: In 2019, Mastercard acquired Transfast, the global cross-border payments network provider serving over 125 countries across Asia, Europe, Africa, Americas, and Australia, and integrated with 300+ banks and other financial institutions. This acquisition enables banks to send and receive money cross-border, reaching over 90% of the world's bank accounts. • Finicity: In 2020, Mastercard entered into an agreement to acquire Finicity, a leading North American provider of real-time access to financial data and insights. This planned acquisition will enhance Mastercard's existing open banking solutions, streamline the credit decisioning process for consumers and small businesses, and deliver real-time payments experience via account validation tools.
Statistics	Mastercard Send enables secure, near real-time payment transfers to and from billions of card, bank, and digital accounts around the world.

Table 11. Network Profile – Mastercard Send

4.4.4 OPN Network offered by Open Payments Network

OPN's technology stack allows financial institutions to innovate more rapidly by enabling approved developers (i.e., FinTechs) to individually connect to an open API and create solutions that then can be offered to the financial institution's customers.

Feature	Description
Overview	Open Payment Network (OPN®) is a real-time payment network for financial institutions and their customers. It supports low cost, immediate transfers in good funds, 24/7/365 for both wholesale and retail payments in all currencies.
User Experience	OPN's end user experience is optimized by value added developers using OPN's API. In many cases, the end user is aware that their financial institution is providing the user experience and may not be aware that OPN is providing the underlying network.
Links to Other Networks	OPN is interoperable with the payment card networks (e.g., Shazam, Visa) using standard ISO 8583 message format, FedACH using NACHA format, and other networks using more updated ISO 20022 message format.
Access and Distribution Model	OPN's network services are distributed by participating institutions or their authorized agents and accessible through value added applications by their customers without direct integration with the participating institution's banking core.

Table 12. Network Profile – Open Payment Network

4.4.5 RTP Network provided by the Clearing House

The RTP® Network is a real-time payment system that provides immediate clearing, settlement, and message delivery to financial institutions to support a variety of use cases.

The RTP System provides consumers and businesses the ability to conveniently send and receive immediate funds transfers directly from Accounts at their financial institution anytime 24 hours a day seven days a week.

The RTP® Network does not provide Service directly to end users – that is done by banks, credit unions, and other payment firms. The RTP® Network is open to every U.S. depository financial institution.

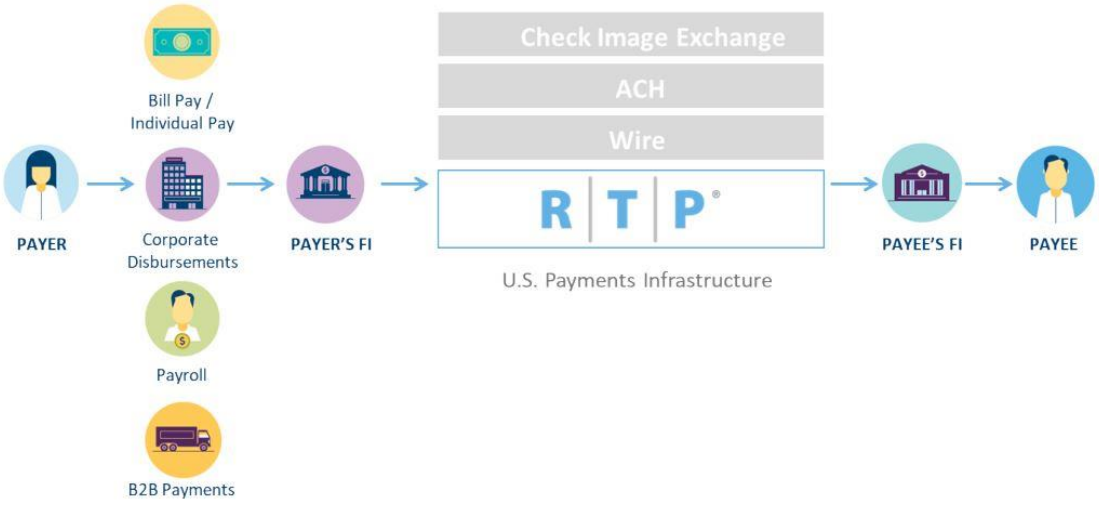


Figure 12. RTP Network Operation.

RTP rules and specifications are published on The Clearing House website at

https://www.theclearinghouse.org/payment-systems/rtp/document-library

Feature	Description
Overview	Operated by The Clearing House (TCH). The RTP® Network is an immediate message transfer, clearing, and settlement network of U.S. financial institutions.
User Experience	RTP network rules define requirements for end user funds availability, timeliness of payment notification, and finality of payment. Other aspects of user experience such as user interface are determined by the participating financial institution or payment service provider.
Links to Other Networks	The Zelle® Network supports RTP payments.
Access and Distribution Model	Any U.S. depository financial institution (see RTP rules for formal definition) is eligible to participate in the RTP network. All financial institutions on the network are full participants. Financial institutions can connect directly to the network or can use an approved third-party processor. Financial institutions can also pre-fund their position in the joint account directly or can rely on another financial institution such as a bankers' bank or corporate credit union to do so. Non-bank payment service providers can use the RTP network via participating financial institutions. Those that are considered money transmitters by the Financial Crimes Enforcement Network (FinCEN) agree to abide by a schedule of safety and consumer protection provisions under RTP rules.
Recent Development and Initiatives	Projects are underway for financial institutions to route Zelle transactions over the RTP network, and to pilot use of requests for payment to present and pay consumer bills.
Statistics	The RTP network clears and settles millions of payments, for billions of dollars, monthly. Average transaction value is $350-$400.

Table 13. Network Profile – RTP® Network

4.4.6 Visa Direct provided by VISA

Visa Direct[12] is a VisaNet processing capability that allows safe, convenient, real-time1 funds delivery directly to financial accounts using card credentials. Visa Direct clients use the capability to enable use cases such as person-to-person (P2P) payments, funds disbursements, bill pay, or cross border remittances directly to an eligible debit or prepaid card.

The growing expectation to have immediate access to money is changing the way consumers, merchants, corporations, financial institutions, and governments send and receive payments. In 2017, 56% of disbursements took between 2 days to 14 days for recipients to receive their funds. This creates an opportunity to innovate with new push-to-card payment solutions.

The North America opportunity for real-time payments represents $18.5T in addressable payment volume. For disbursements alone, in just four years between 2014 and 2018, the total dollar volume rose 48%, and now amounts to an estimated $12.5 trillion annually. Globally, funds disbursements are an $80 trillion opportunity.

[12] See https://www.visa.co.uk/supporting-info/visa-direct/visa-direct-faq.html

Feature	Description
Overview	Operated by Visa. Visa Direct is Visa's global real-time* money movement platform supporting money flows to consumers and businesses.
User Experience	Visa does not control elements of the user experience—as acquirers, service providers, and merchants provide the user experience for their customers. Instead, Visa does offer guidance and best practices around user experience (e.g., card capture, design), research, risk considerations, proof points, developing product identity, messaging examples, consumer preference testing, FAQ recommendations, marketing/communications, and launch plans.
Links to Other Networks	The Visa Push Payment Gateway Service (PPGS) allows acquirers, service providers, and merchants to send their account funding transactions (AFTs) and original credit transactions (OCTs) to Visa for routing to multiple debit networks in the United States, as well as account-based schemes in 88 countries and territories. The Service provides authorization, clearing, settlement, reporting, and exception processing support for Accel, CU24, Maestro, NYCE, Pulse, STAR, and Mastercard PPGS.
Access and Distribution Model	Visa Direct can be used to send transactions to recipient accounts for consumers and small business addressing an estimated $65T+ in new flows. By the end of 2019, Visa payments network1: 3.5B cards in force, 61M merchants, over 15K financial institutions supporting over $8T of payments volume. Visa Direct took this same network and reversed it by allowing Visa clients to enable consumers and small businesses to receive money through card as a network endpoint.
Recent Development and Initiatives	Visa has invested to provide robust network capabilities - allowing senders and receivers to enable and transform a variety of domestic and cross- border move money use cases. These investments are intended to allow Visa to go beyond cards to support an "open" money movement network that connects to and utilizes existing global payments infrastructures. • Visa Payments Limited (formerly Earthport)2 – provides cross-border payment services via a network that connects with local ACH systems in 88 countries and territories. Visa recently launched a push to account capability for Visa Direct, which will extend its reach to bank accounts in many markets. • Token ID (formerly Bell ID) – provides tokenization services for both card and accounts. Tokenization of sensitive information helps devalue data and reduce fraud.
Statistics	Visa Direct has a global reach to over 200 countries and territories, 99% coverage of banked consumers and small businesses in 88 countries, 130 countries enabled for real-time payouts, and 75 countries enabled for real-time X.B. payouts. In FY19, Visa Direct launched over 250 programs globally, risen to over 130MM active users, generated over 2B annual transactions globally, and grew quarterly payment volume to $68B in Q4 2019, which is an 85% CAGR.2

Table 14. Network Profile – Visa Direct

4.4.7 Zelle Provided by Early Warning

Zelle is a United States–based digital payments network owned by Early Warning Services, LLC, a private financial services company owned by the banks Bank of America, BB&T, Capital One, JPMorgan Chase, PNC Bank, U.S. Bank and Wells Fargo. The Zelle service enables individuals to electronically transfer money from their bank account to another registered user's bank account (within the United States) using a mobile device or the website of a participating banking institution.

Feature	Description
Overview	Operated by Early Warning, the Zelle Network® enables consumers and businesses to easily pay others using a social token (email or mobile number). Funds are available directly in bank accounts generally within minutes when the recipient is already enrolled with Zelle.
User Experience	The Zelle experience is found within participating financial institutions' mobile and online banking services as well as the standalone Zelle app for out-of-network participants. User experience is defined by the Zelle Network for Zelle financial institution participants.
Links to Other Networks	The Zelle Network enables settlement over ACH, Mastercard, Visa, and The Clearing House's RTP Network.
Access and Distribution Model	U.S. financial institutions may join the Zelle Network directly through Early Warning or through reseller partners including FIS, Fiserv, and Jack Henry & Associates.
Recent Development and Initiatives	Zelle is now available to send and receive money from eligible small businesses, as well as for disbursements from companies and government entities to customers who have bank accounts in the United States. Early Warning is in the process of defining a bill pay experience with Zelle.
Statistics	Over 1,000 direct financial institutions are signed to participate in the Zelle Network with over 730 live and over 7,400 financial institutions represented via their customers using the Zelle app. There were 323 million payments representing $84 billion in Q3 2020.

Table 15. Network Profile – Zelle®

4.5 Detailed Network Characteristics

4.5.1 Network Characteristics – Debits & Credits

Network	Description
FedNowSM Service	Credit transfers only; service transaction limit to be determined prior to launch.
Junifunds® Network	Level 1 and Level 2 have no limit, Level 3 is $1 Million USD.
Mastercard Send	Mastercard Send offers both funding (pull) and payment (push) transactions in near real time. Funding transactions facilitate pulling funds (debit) from an eligible debit card for the purpose of either (a) funding a subsequent and linked funds transfer from the sender to another person or entity; or (b) transferring funds into another eligible financial account held by the sender. Push transactions facilitate pushing funds (credit) to consumer and small business debit and prepaid cards.
Open Payment Network	Credit transfers.
RTP® Network	Credit transfer up to $100,000.
Visa Direct	Visa Direct works through Visa's card systems using two types of VisaNet financial transactions: original credit transactions (OCTs) and account funding transactions (AFTs). OCTs are used to push funds ("credit") to an eligible debit, credit, or prepaid card, and AFTs are used to pull funds ("debit"). Whereas purchase transactions are used to fund a merchant for purchase of goods/services, AFTs are used to fund another financial account or to fund a P2P transfer. Information in this document is specific to OCTs except where noted.
Zelle®	Zelle is a good funds network where the sending financial institution debits the sender's account and the receiving financial institution credits the receiver generally within minutes when the recipient's email address or U.S. mobile number is already enrolled. Settlement occurs later either through ACH, debit, or RTP.

Table 16. Network Characteristics – Debits & Credits

4.5.2 Network Characteristics – Speed

Network	Description
FedNowSM Service	Transfers are expected to be completed within seconds. Participants will agree to make funds available to receivers immediately upon receipt.
Junifunds® Network	Immediate between financial institutions. Level 1 and Level 2: Most interbank transfers are completed within 10 seconds. Receivers have access to funds within 30 minutes, a service level defined by network rules. Level 3: Most transfers are completed within 10 seconds. Receivers have access to funds within 30 seconds.
Mastercard Send	Mastercard Send transactions can be routed to a variety of receive networks. Posting time is governed by the receive network and may also vary by issuer. MoneySend Payment Transaction routed through the Mastercard Network to eligible cards are required to post within 30 minutes of Authorization approval. In the United States, typically, funds are made available to the recipient in near real time.
Open Payment Network	Immediate for on-network transfers. A good-funds invitation is created when transfers are initiated to a recipient off-network. Good funds are immediately available to the recipient upon acceptance of the invitation.
RTP® Network	Immediate. Most transfers are completed within 2-3 seconds, with a maximum of 15 seconds before transactions time out. Receivers have access to funds within seconds, a service level defined by network rules.
Visa Direct	The original credit transaction (OCT) uses Visa's real-time information network. Issuers approve OCTs in real time. So, the sender of funds will know within seconds whether the issuer will accept the funds and deliver money to the recipient account. The Visa "fast funds" rule requires issuers to make the funds available to the cardholder in 30 minutes or less of approving the OCT. Typically, funds are available in real time (actual fund availability depends on receiving financial institution and region). Cross-border transactions to account vary by country and receiving financial institution.
Zelle®	Transactions typically occur in seconds when the recipient's email address or U.S. mobile number is already enrolled with Zelle.

Table 17. Network Characteristics – Speed

4.5.3 Network Characteristics – Settlement

Network	Description
FedNowSM Service	Real-time gross settlement through debit and credit entries to balances in participants' reserve bank accounts (or an account of a correspondent).
Junifunds® Network	Level 1, 3 (financial institutions using same correspondent): Real-time gross settlement backed by pre-funded balances in an account at correspondent financial institution of choice. Level 2, 3 (financial institutions using different correspondent in Junifunds): Real-time gross settlement. Settled at the Federal Reserve Bank of New York.
Mastercard Send	Mastercard Send operates on a good funds model. The transaction originator must have sufficient funds available for settlement of the payment transaction prior to its submission to Mastercard Send. The acquirer or sponsor bank is responsible for settlement of payment transactions.
Open Payment Network	Real-time gross settlement with prefunded account balances at participating institutions with deferred net settlement as needed between financial institutions.
RTP® Network	Real-time gross settlement backed by pre-funded balances in a joint account at the Federal Reserve Bank of New York.
Visa Direct	Net settlement, once per day. Visa manages settlement with the acquirer (the sending entity's bank) and the issuer (the recipient's bank). Visa collects funds from the acquirer and delivers funds to the issuer.
Zelle®	Zelle enables financial institutions to settle on existing and future settlement services. Today, financial institutions may settle transactions via ACH, Mastercard Send or Visa Direct, and RTP.

Table 18. Network Characteristics – Settlement

4.5.4 Network Characteristics – Payment Finality

Network	Description
FedNowSM Service	Immediate, irrevocable.
Junifunds® Network	Immediate, irrevocable.
Mastercard Send	Immediate, irrevocable. Both P2P and disbursement transactions are irrevocable and cannot be reversed. The transaction originator (P2P provider or disburser) must ensure that all payment information is correct before sending a transaction via Mastercard Send. Exception items are supported but resolved based on agreement.
Open Payment Network	Immediate, irrevocable.
RTP® Network	Immediate, irrevocable.
Visa Direct	Immediate, irrevocable. The Visa system does support a process for exception items for original credit transactions (OCTs) – notably originator errors, or situations where recipient does not receive funds – but all adjustments associated with these exception items are agreed upon with the recipient issuer.
Zelle®	Immediate, irrevocable.

Table 19. Network Characteristics – Payment Finality

4.5.5 Network Characteristics – Payment Confirmation

Network	Description
FedNowSM Service	Sending and receiving institutions will receive acknowledgement of receipt of a payment message and an advice of credit, respectively, within seconds, notifying them that settlement is complete.
Junifunds® Network	Sending and receiving financial institutions typically receive confirmation within 10 seconds. Junifunds rules require confirmation to payers and payees within 10 seconds over available electronic channels.
Mastercard Send	Mastercard Send provides a synchronous response with status indicating the receiving institution's authorization decision. Transaction originators have the option to utilize the status and notify the sender and/or the beneficiary.
Open Payment Network	Payment confirmation is sent to sender, receiver, and other parties concurrent with execution of the transfer as specified by the transfer's workflow configuration.
RTP® Network	Sending and receiving financial institutions typically receive confirmation within 2-3 seconds, with a maximum of 15 seconds. RTP rules require confirmation to payers and payees within seconds over available electronic channels.
Visa Direct	Visa Direct provides a synchronous response with status indicating the receiving institution's authorization decision. Transaction originators have the option to utilize the status and notify the sender and/or the beneficiary.
Zelle®	Sending and receiving financial institutions typically receive confirmation within seconds.

Table 20. Network Characteristics – Payment confirmation

4.5.6 Network Characteristics – Additional Message Functionality

Network	Description
FedNowSM Service	Request for payment, request for return (for payments sent in error), request for payment status, request for information, confirmation of posting, request for account balance, and account activity reports. All messages are based on the ISO 20022 standard.
Junifunds® Network	All messages receive a positive confirmation from the receiving financial institution. Credit transfers can include links to external documents (remittance data, involves, bills, etc.).
Mastercard Send	Mastercard Send checks eligibility of a recipient card to receive funds, including whether the card type is eligible in-market. Provides participants the flexibility to use custom fields and configure statement descriptor. Establishes transaction limits (daily and monthly per card) and checks every transaction against established limits. Send enables acquirers and sponsor banks to establish daily credit limits for any of their customers (transaction originators). Based on established thresholds, proactive notifications are generated to participants. Alleviates PCI compliance for participant with tokenization capability.
Open Payment Network	OPN supports multiple standard message formats (e.g., ISO 8583, ISO 20022), modern program interface message formats (e.g., JSON, XML, etc.), and design to migrate from older message formats to modern ones.
RTP® Network	Request for payment, acknowledgment of receipt, request for information, request for return of funds (for payments sent in error), and remittance advice. All messages receive a positive confirmation from the receiving financial institution. Credit transfers and requests for payment can include links to external documents (remittance data, involves, bills, etc.).
Visa Direct	Visa sets dynamic controls in the network overall, with transaction limits of $10,000 and $50,000, for most U.S. domestic consumer-funded (e.g., P2P) and cross-border, and U.S. domestic business-funded transactions (e.g., disbursements), respectively, and with some exceptions. Visa has set one-, seven-, and thirty-day count velocity limits on transaction funding to a single Visa card. In addition, issuers, acquirers, and processors may set limits based on a variety of characteristics to limit their risk. It is important to note that Visa actively monitors and frequently updates its risk policies and controls.
Zelle®	Zelle enables multiple messages including sending a payment and requesting funds. Alerts, notifications, and reminders are also part of the Zelle Network.

Table 21. Network Characteristics – Additional message functionality

4.5.7 Network Characteristics – Payment Routing

Network	Description
FedNowSM Service	Based on account number or proxy for account number (e.g., alias) of the receiver and routing number of the receiving bank.
Junifunds® Network	Account number and routing transit number. Alpha-numeric domain-controlled tokens will be supported in future.
Mastercard Send	Mastercard Send transmits funds into consumer and small business debit card, and eligible prepaid card accounts. Through API integration with Mastercard Send, program participants can leverage intelligent network routing capabilities for near real- time payments, eliminating the need to establish connections with multiple networks or build custom routing logic, and to optimize acceptance rates and fastest funds availability.
Open Payment Network	Account number and routing transit number, social alias routing, and domain alias routing are all supported.
RTP® Network	Account number and routing transit number. Alpha-numeric domain-controlled tokens will be supported in 2021.
Visa Direct	Card credentials or account number and routing transit number.
Zelle®	Alias based tokens are used to route payment.

Table 22. Network Characteristics – Payment routing

4.5.8 Network Characteristics – Directories

Network	Description
FedNowSM Service	Participants that leverage alias directories external to the FedNow Service to provide P2P or other services for their customers will be able to use the Service as a platform for clearing and settling alias-based payments.
Junifunds® Network	The Junifunds network does not have an integrated directory.
Mastercard Send	Mastercard partners use their own directory to support payment process. Send provides mapping service to partners. This enables partners to tokenize the account credentials of senders/beneficiaries. The mapping service also enables partners to create and manage a directory of senders and recipients.
Open Payment Network	OPN has a tightly integrated global directory service that is updated in real time with contextual security and alias capability that allows end users to create, read, update, delete, and control their entries in the directory.
RTP® Network	The RTP network does not have an integrated directory. Independent third-party networks can provide alias or directory-based initiation of payments routed over the RTP network via routing number/account or token.
Visa Direct	Visa currently does not have an integrated directory in the United States. Partners use Visa Direct in conjunction with their proprietary directory for P2P payments or other use cases.
Zelle®	Early Warning maintains the Zelle directory which associates social tokens with financial institutions.

Table 23. Network Characteristics – Directories

4.5.9 Network Characteristics – Fraud & Risk Controls

Network	Description
FedNowSM Service	At launch, the Service will allow participants to set lower limits and conditions for transaction rejection. Enhanced fraud prevention tools will be provided in subsequent releases of the Service. In addition, the Service is being designed to assist its participants with consumer protections and resolving errors.
Junifunds® Network	Rules require participating financial institutions to implement strong fraud detection/prevention, fraud reporting, and consumer protection policies.
Mastercard Send	To maintain the integrity of each transaction, the Mastercard Send Domestic service performs transaction controls prior to routing payment transactions for processing: eligibility of a recipient card to receive funds; validation of use case by participant and market; proper field configuration in message; defined limits by use case, market and participant. Default limits in the United States are $10,000 per card per day and per month for P2P transactions; and $10,000 per card per day; and $50,000 per card per month for disbursements. Send participants are subject to risk review by Mastercard. Acquirers and transaction originators shall perform all applicable anti-money laundering (AML) measures for each consumer/merchant for whom they submit payment transactions via the Mastercard Send Domestic Service. Each program participant must ensure that its service providers and other agents, if any, that facilitate, initiate, or otherwise participate in Mastercard Send transactions for or on behalf of the acquirer or transaction originator have all licenses, permits, registrations, other governmental approvals, and satisfy all other requirements, including applicable money transmitter laws, necessary to engage in such activities. On the Mastercard network, additional controls and capabilities are available for banks to opt-in and configure.

Network	Description
Open Payment Network	Participating financial institutions or their authorized agents are each responsible for anti-money laundering (AML), combating the financing of terrorism (CFT), and know your customer (KYC) for their customers. OPN has appropriate balance between privacy and transparency that allows participating institutions (and their agents) to comply with both legal and regulatory requirements to control and mitigate fraud and risks.
RTP® Network	Rules require participating financial institutions and payment service providers to implement strong authentication, fraud detection/prevention, fraud reporting (to the network), and consumer protection policies. Lack of debit transactions limits potential fraud vectors; immediate confirmation provides transparency. All transactions are digitally signed and encrypted. The Clearing House tracks reported fraud and participating financial institutions are required to investigate suspected fraud.
Visa Direct	Originators, acquirers, and issuers need to manage multiple risks every time their customers pay/get paid. Visa Direct has multi-layered controls including: • Only members (issuers and acquirers) trusted and vetted by Visa can participate. • Visa program approval and system-level risk controls and analytics including know your customer (KYC), anti-money laundering (AML), account takeover (ATO) protection, sanctions screening, transaction controls and monitoring, velocity limits, compliance, and risk management. • Robust payment details in a single payment message.
Zelle®	The Zelle Network provides comprehensive risk management and is layered with the Zelle Network participating financial institution's controls. Key categories include due diligence, know your customer (KYC), anti-money laundering (AML), authentication of customers, transaction controls, blocking transactions before funds are sent, protecting consumers from sending money for fraud, and scams. Early Warning provides participants recommended best practices. Additionally, the Zelle Network provides education on safer payments to consumers.

Table 24. Network Characteristics – Fraud & Risk controls

4.5.10 Network Characteristics

	FedNowSM	Junifunds®	Mastercard Send	Open Payment Network OPN®
Credits and Debits	Credit transfers	Credit transfers	Credits and Debits	Credit transfers, pre- authorized payments
Payment Routing	Routing number and account number	Routing number and account number	Card credentials (primary account number)	Routing number and account number, social alias (email etc.)
Speed	Within seconds	Typically, seconds up to 30 minutes	Typically, seconds up to 30 minutes	Immediate
Settlement	Real-time gross settlement	Real-time gross settlement	The acquirer is responsible for settlement	Immediate
Payment Finality	Immediate, irrevocable	Immediate, irrevocable	Immediate, irrevocable	Immediate, irrevocable
Payment Confirmation	Within seconds for sender and receiver	Within seconds for sender and receiver	Synchronous response with status	Occurring immediately with initiation and receipt
Additional Messaging Functionality	Request for payment and other non-payment messages	Link to external documents	Eligibility check; transaction limits and thresholds	Full API with support for multiple message formats and program interfaces
Directories	N/A	N/A	N/A	Integrated and updated in real time with context-sensitive security and interoperable with other directories (e.g., social media, contacts, routing, and account number, etc.)
Fraud and Risk Controls	See detailed network characteristics	See detailed network characteristics	See detailed network characteristics	Limits, authorized transfers, etc. See detailed network characteristics for more information

	RTP® Network	Visa Direct	Zelle®
Credits and Debits	Credit transfers	Credits and Debits	Credit transfers
Payment Routing	Routing number and account number	Card credentials (primary account number) or routing number and account number	Social aliases (e.g., email or phone number)
Speed	Average 2-3 seconds, up to 15 seconds	Typically, seconds up to 30 minutes	Typically, within seconds when the recipient is already enrolled
Settlement	Real-time gross settlement	Deferred net settlement	ACH, Visa Direct and Mastercard Send, and RTP
Payment Finality	Immediate, irrevocable	Immediate, irrevocable	Immediate, irrevocable
Payment Confirmation	Within seconds for sender and receiver	Pre-transaction	Typically, within seconds for the sender and receiver
Additional Messaging Functionality	Request for payment and other non-payment messages	Dynamic controls including transaction limits and velocity limits	Request, unregistered notifications, alerts, and reminders
Directories	N/A	N/A	Social alias directory
Fraud and Risk Controls	See detailed network characteristics	See detailed network characteristics	See detailed network characteristics

Table 25. Network Characteristics

4.6 Conclusion

As digital modernization occurs in the world around us, consumer behavior has shifted to expect digital-first experiences. Consumers and businesses alike are embracing this digital transformation and increasingly depend on the ability to pay, and be paid, in a fast, seamless and secure manner. Payments interoperability, which can take various forms as outlined above, is an approach to extend the reach and ubiquity in the faster payments ecosystem.

It is hard to say at this time which of the payments networks will become more established and will be able to drive critical mass and adoption even in the absence of Interoperability. The Clearing House RTP systems is surely first out of the gates, and has the opportunity of taking the lead. It appears however that a significant number of Credit Unions and Community Banks are weary of the Clearing House solution, due the to perception that it is biased towards Big Banks, given the company's ownership strature, which in fact representative of the top 50 banks out of 10000 financial institutions currently operating in the United States.

A likely outcome will involve smaller financial institutions adhering to the Federal Reserve Network and more prominent financial institutions using both RTP and the Federal Reserve's FedNow networks and making both providers compete on price.

Defining the different ways to deliver payments Interoperability and exploring business considerations and underlying technical complexity is a necessary first step in creating a thoughtful discussion. We hope that by providing a thorough description of the models for payments Interoperability, outlining the distinct settlement options, and describing how overlay services affect Interoperability, we will be able to have an

industry-wide conversation on the various approaches the U.S. market could take to achieve ubiquity. In a market like the U.S., when there are many diverse faster payments networks and overlay services, there will be multiple approaches to achieve ubiquity. While this paper unpacks many essential aspects of payments interoperability, the Network Committee will continue to develop materials that drive the conversation forward, including other whitepapers that define risks and considerations.

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Appendix I.

Amount and frequency by type of sender.

Appleseed survey participants are largely female (59%), reflective of recent data on who sends remittances. Research shows that women compose about half of all immigrants from Latin America and the Caribbean, and Mexico.

Female survey respondents send remittances more frequently than their male counterparts, most often once a month of $200 or less.

Gender/Amount Sent	At least once a week	At least once a month	At least twice a year	At least once a year
Female	40 (6%)	215 (31%)	101 (14%)	40 (6%)
$0-$200	28	155	58	29
$201-$500	11	44	22	8
$501-$1,000	1	12	17	2
More than $1,000	--	1	2	--
Male	32 (5%)	115 (16%)	48 (7%)	23 (3%)
$0-$200	21	70	22	9
$201-$500	9	35	13	8
$501-$1,000	1	9	12	5
More than $1,000	1	--	1	1
Grand Total*	81 (12%)	361 (51%)	157 (22%)	71 (10%)

Tabla 26. Frequency of Remittances by Gender and Amount Sent.

(**Grand total includes participants without responses for Gender/Amount Sent).*

Amount and frequency of remittance transactions, by income

Half of the survey respondents earn $30,000 or less per year. These respondents accounted for half of the remittances in our survey and generally sent remittances of $200 or less, at least once a month.

Household Income / Amount Sent	At least once a week	At least once a month	At least twice a year	At least once a year
$0-$15,000	17 (2%)	84 (12%)	35 (5%)	20 (3%)
$0-$200	13	64	28	16
$201-$500	4	15	6	2
$501-$1,000	--	5	1	2
$15,001-$30,000	17 (2%)	122 (17%)	56 (8%)	12 (2%)
$0-$200	10	76	24	10
$201-$500	6	36	19	2
$501-$1,000	1	10	11	--
More than $1,000	--	--	1	--
$30,001-$50,000	7 (1%)	44 (6%)	23 (3%)	17 (2%)
$0-$200	5	30	9	5
$201-$500	2	11	5	10
$501-$1,000	--	2	9	2
$50,000 or more	1 (0%)	12 (2%)	7 (1%)	4 (1%)
$0-$200	1	9	2	2
$201-$500	--	3	3	--
$501-$1,000	--	--	2	2
Unknown	21 (3%)	47 (7%)	15 (3%)	10 (1%)
$0-$200	15	33	10	7
$201-$500	5	10	1	1
$501-$1,000	1	2	3	1
More than $1,000	--	--	1	1
Grand Total*	81 (12%)	361 (51%)	157 (22%)	71 (10%)

Tabla 27. Frequency of Remittances by Income and Amount Sent.

(**Grand total includes participants without responses for Household Income/Amount Sent).*

Remittance Amount and frequency by amount of time in the U.S.

Survey respondents living in the U.S. for ten years or more sent almost half of the remittances in our survey. These customers generally sent amounts of $200 or less, at least once a month, a pattern that we also observed with low-income senders.

Years in U.S. / Amount Sent	At least once a week	At least once a month	At least twice a year	At least once a year
1-5 years	14 (2%)	77 (11%)	28 (4%)	16 (2%)
$0-$200	11	49	13	13
$201-$500	3	19	9	--
$501-$1,000	--	6	3	2
More than $1,000			1	
10 or more years	34 (5%)	165 (24%)	82 (12%)	32 (5%)
$0-$200	20	113	48	17
$201-$500	12	41	18	10
$501-$1,000	1	10	15	4
More than $1,000	1		1	1
6-10 years	23 (3%)	79 (11%)	29 (4%)	19 (3%)
$0-$200	16	54	14	11
$201-$500	6	18	6	6
$501-$1,000	1	5	7	1
More than $1,000	--	1	1	--
Grand Total*	81 (12%)	361 (51%)	157 (22%)	71 (10%)

Tabla 28. Frequency of Remittances by Years in the U.S. and Amount Sent.

(**Grand total includes participants without responses for Years in U.S./Amount Sent).*

Appendix II. More Information on Each Type of Settlement

While each type of settlement provides for a change in financial position of each participating financial institution, the timing and netting also factor into how the settlement itself occurs. The following examples reflect how the different types of settlement are applied across a financial system containing three fictitious financial institutions: FPC Credit Union, Rock Creek Bank, and Autumn Leaf Bank.

The following reflects the starting balances of each financial institution:

	Balance
FPC Credit Union	**$63**
Rock Creek Bank	**$147**
Autumn Leaf Bank	**$130**
Total	**$340**

Tabla 29. Starting balances of each financial institution

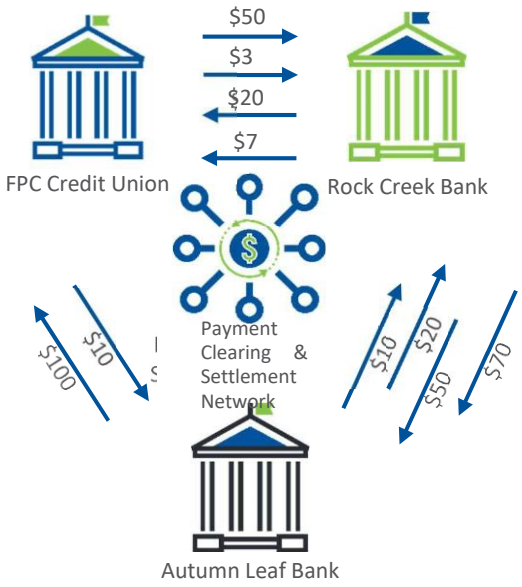
Day 1. The three financial institutions initiate the following transactions to each other (also reflected in the diagram):

FPC Credit Union

1. Sends Rock Creek Bank a $50 transfer
2. Sends Rock Creek Bank a $3 transfer
3. Sends Autumn Leaf Bank a $10 transfer

Rock Creek Bank

1. Sends FPC Credit Union a $20 transfer
2. Sends FPC Credit Union a $7 transfer
3. Sends Autumn Leaf Bank a $50 transfer
4. Sends Autumn Leaf Bank a $70 transfer



Autumn Leaf Bank

1. Sends FPC Credit Union a $100 transfer
2. Sends Rock Creek Bank a $10 transfer
3. Sends Rock Creek Bank a $20 transfer

The following table reflects the ending Day 1 balances of each financial institution:

	Balance
FPC Credit Union	**$127**
Rock Creek Bank	**$83**
Autumn Leaf Bank	**$130**
Total	**$340**

Tabla 30. The ending Day 1 balances of each financial institution

Although the balances would be the same after Day 1, settlement could have occurred in different ways depending upon the type of settlement used for the underlying payments.

Deferred Gross Settlement

Deferred means that each financial institution participant settles what it owes to another financial institution at predetermined times.

Gross Settlement means individual payments or the aggregate of what is owed is charged against the settlement account for each participant.

Applying the Day 1 transactions, the underlying settlement transactions are recorded in each participant's settlement ledger as follows at settlement time:

	Debits	Credits	Running Balance
Day 1 Opening Balance			$63
Rock Creek Bank	$53		$10
		$27	$37
Autumn Leaf Bank	$10		$27
		$100	$127
Day 1 Ending Balance			$127

Tabla 31. FPC Credit Union

	Debits	Credits	Running Balance
Day 1 Opening Balance			$147
FPC Credit Union	$27		$120
		$53	$173
Autumn Leaf Bank	$120		$53
		$30	$83
Day 1 Ending Balance			$83

Tabla 32. Rock Creek Bank

	Debits	Credits	Running Balance
Day 1 Opening Balance			$130
FPC Credit Union	$100		$30
		$10	$40
Rock Creek Bank	$30		$10
		$120	$130
Day 1 Ending Balance			$130

Tabla 33. Autumn Leaf Bank

Note: Each participating financial institution must have the full amount available for the transactions they are sending.

Deferred Bilateral Net Settlement

Deferred means that each financial institution participant settles what it owes to other financial institutions at predetermined times.

Bilateral Net Settlement means that each financial institution participant charges only the net amount of what is owed against the settlement account for each participant 1 to 1.

Applying the Day 1 transactions, the underlying settlement transactions are netted together across participant pairs as follows:

FPC Credit Union and Rock Creek Bank

- FPC Credit Union to Rock Creek Bank: $53
- Rock Creek Bank to FPC Credit Union: $27
- Net Transaction is FPC Credit Union to Rock Creek Bank: $26
-

FPC Credit Union and Autumn Leaf Bank

- FPC Credit Union to Autumn Leaf Bank: $10
- Autumn Leaf Bank to FPC Credit Union: $100
- Net Transaction is Autumn Leaf Bank to FPC Credit Union: $90

Rock Creek Bank and Autumn Leaf Bank

- Rock Creek Bank to Autumn Leaf Bank: $120
- Autumn Leaf Bank to Rock Creek Bank: $30
- Net Transaction is Rock Creek Bank to Autumn Leaf Bank: $90

The netted amounts are recorded in each participant's settlement ledger as follows at settlement time:

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$63
Rock Creek Bank	$26		$37
Autumn Leaf Bank		$90	$127
Day 1 Ending Balance			$127

Tabla 34. FPC Credit Union

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$147
FPC Credit Union		$26	$173
Autumn Leaf Bank	$90		$83
Day 1 Ending Balance			$83

Tabla 35. Rock Creek Bank

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$130
FPC Credit Union	$90		$140
Rock Creek Bank		$90	$130
Day 1 Ending Balance			$130

Tabla 36. Autumn Leaf Bank

Note: Each participating financial institution does not need to have the full amount available for all the transactions they are sending, and only the net amount is recorded in the settlement accounts.

Deferred Multilateral Net Settlement

Deferred means that each financial institution participant settles what it owes to other financial institutions at predetermined times.

Multilateral Net Settlement means that each financial institution participant charges only the net amount of what is owed against the settlement account across all participants.

Applying the Day 1 transactions, the underlying settlement transactions are netted together across all participants as follows:

FPC Credit Union, Rock Creek Bank, and Autumn Leaf Bank

- FPC Credit Union to Rock Creek Bank: $53
- Rock Creek Bank to FPC Credit Union: $27
- FPC Credit Union to Autumn Leaf Bank: $10
- Autumn Leaf Bank to FPC Credit Union: $100
- Rock Creek Bank to Autumn Leaf Bank: $120
- Autumn Leaf Bank to Rock Creek Bank: $30

- Net Transaction is Rock Creek Bank to FPC Credit Union: $64

The netted amounts are recorded in each participant's settlement ledger as follows at settlement time:

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$63
Rock Creek Bank		$64	$127
Autumn Leaf Bank	No settlement transaction required		
Day 1 Ending Balance			$127

Tabla 37. FPC Credit Union

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$147
FPC Credit Union	$64		$83
Autumn Leaf Bank	No settlement transaction required		
Day 1 Ending Balance			$83

Tabla 38. Rock Creek Bank

Netted	Debits	Credits	Running Balance
Day 1 Opening Balance			$130
FPC Credit Union	No settlement transaction required		
Rock Creek Bank	No settlement transaction required		
Day 1 Ending Balance			$130

Tabla 39. Autumn Leaf Bank

Note: Each participating financial institution does not need to have the full amount available for all the transactions they are sending, and only the net amount across all participants is recorded in applicable settlement accounts.

Deferred Multilateral Net Settlement is used in most payment systems around the world. While this settlement type provides the best financial leverage for financial institutions, it is the method with the highest systemic risk so appropriate safety mechanisms need to complement this approach.

Real-time Gross Settlement (RTGS)

Real-time means that each financial institution participant settles what it owes to another financial institution at the same time as the underlying payment is cleared.

Gross Settlement means individual payments of what is owed is charged against the settlement account for each participant.

Applying the Day 1 transactions, the underlying settlement transactions are recorded in each participant's settlement ledger as follows as the payment is cleared:

Payment Amount		FPC Credit Union Running Balance	Rock Creek Bank Running Balance	Autumn Leaf Bank Running Balance
Day 1 Opening Balance		**$63**	**$147**	**$130**
FPC Credit Union to Rock Creek Bank	$50	$13	$197	
FPC Credit Union to Rock Creek Bank	$3	$10	$200	
Rock Creek Bank to FPC Credit Union	$20	$30	$180	
Rock Creek Bank to FPC Credit Union	$7	$37	$173	
Autumn Leaf Bank to FPC Credit Union	$100	$137		$30
FPC Credit Union to Autumn Leaf Bank	$10	$127		$40
Rock Creek Bank to Autumn Leaf Bank	$50		$123	$90
Rock Creek Bank to Autumn Leaf Bank	$70		$53	$160
Autumn Leaf Bank to Rock Creek Bank	$10		$63	$150
Autumn Leaf Bank to Rock Creek Bank	$20		$83	$130
Day 1 Ending Balance		**$127**	**$83**	**$130**

Tabla 40. All RTGS Participants

Note: Each participating financial institution must have the full amount available for the transactions they are sending.