

Fintech Developments and Antitrust Considerations in Payments

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FINANCIAL SERVICES PRODUCTS AND financial technology (fintech) are receiving ever-increasing attention from competition authorities. The U.S. Department of Justice has newly established the Financial Services, Fintech, and Banking Section.¹ In November 2020, the DOJ filed a lawsuit seeking to prevent Visa's acquisition of Plaid, alleging, "If allowed to proceed, Visa's proposed acquisition of Plaid would eliminate the nascent competitive threat that an independently owned Plaid poses to Visa's monopoly power and unlawfully maintain Visa's monopoly power in the online debit market,"² after which Visa and Plaid abandoned plans for the merger.³

These developments come approximately two decades after the *United States v. Visa* decision, which concluded that Visa and Mastercard possessed market power in the payments "network service market."⁴ It is, thus, fair to ask: how much has the payments industry changed in the last twenty years and does this change how one thinks about competition?

Changes in the payments industry may be driven by technological innovation, changes in government policy, and other legal and institutional factors. These changes can occur at multiple levels of a payment supply chain, including the rails over which transactions run.⁵

Payment platforms, and the products that customers, banks, and merchants use, are evolving. As a generalization, payments are becoming increasingly digitized, and what used to occur with a plastic card or paper check now often happens by presenting your phone or entering details on a computer. Stepping down a level of detail, the technical

innovations that are driving these changes fall into three broad categories:

- Over-the-top (OTT) technologies, such as Venmo, that operate using existing payment rails.
- Innovations that improve existing payment rails, like real time payments.
- Innovations that create new payment rails, including cryptocurrencies such as Bitcoin.⁶

These innovations are potentially reshaping this sector's competitive landscape with the development of new services, entry of new firms, and alternatives to existing payment rails. However, it is difficult for two reasons to assess the competitive effects of innovation in this space. First, payments involve two-sided or even multi-sided platforms. As discussed in *Ohio v. American Express Co. (Amex)*, antitrust practitioners need to account for the two-sided nature of the sector.⁷ Second, payment transactions are often multi-layered—they can involve many sequential steps (involving many different players) to carry out a transaction. The competitive effects of payment innovation must be investigated against the backdrop of those structural issues in the payments sector.

Digitization appears to have lowered barriers to entry across many levels of the payments supply chain. For antitrust practitioners, this raises the question of whether digitization will result in more direct competition in one or more functional levels of the payments process, including those specific services for which policy makers have historically been concerned about competition. For example, entry at one functional level that is currently considered competitive could facilitate building a user base that could be leveraged in such a way as to ease entry into another level of the payment markets of that supply chain, thus overcoming networks effects or the "chicken-and-egg" problem in two-sided markets. This article summarizes historic analyses of antitrust in payment markets and considers the potential competitive effects of various types of payment innovations.

Payments Function Through Sequential Steps that Define the Functional Levels of the Payments Supply Chain

A payment involves transmitting money from one account to another. Describing the infrastructure of payments can become technical quickly. This section presents a primer of payment methods and the various functional levels of payment systems.

Traditional Methods of Payment. To make this more concrete, consider a customer buying a shirt in a store ("the merchant"). The customer approaches the cash register and chooses how to pay for the shirt. The customer selects from various alternatives for money to travel from the customer's account to the merchant's account, including the following traditional payment methods:

- **Cash:** The customer could take cash out of his literal wallet and, net of change, it goes into the store's cash

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register. Both the customer and the merchant are willing to use cash because it is legal tender.

- **Bank Transfer:** The customer could offer to make an account-to-account transfer using the interbank settlement network (e.g., the Automated Clearing House (ACH)).⁸ If the transfer cannot be verified in close to real time, the merchant may not accept this as a method of payment.
- **Check:** The customer could offer to write a check to pay for the shirt, in which case the transfer would be processed with a lag via the interbank settlement network (e.g., ACH). Some merchants, however, may be unwilling to accept check payment due to the delay in processing and the resultant potential for a check to “bounce” if the customer’s account lacks sufficient funds to cover the transaction.
- **Card:** The customer could make a payment by card only if the store accepts his or her card. If he or she makes a card payment, the payment travels over a debit or credit network and is processed and verified in real time.

Historically, cash has been considered the prima facie substitute for the other traditional payment platforms (though not necessarily in a formal antitrust market definition sense).⁹ It will be interesting to see if this remains the case as the payments space and antitrust analysis of the payments space evolve.

Anatomy of Card Payments and Functional Levels of Payment Supply Chains. As two notable decisions, *United States v. Visa* and *Amex*, concern card networks, understanding the anatomy of credit card networks can be helpful in understanding existing case law and the application of existing law to new and evolving payment technologies.

The sequence of steps in the payments supply chain that typically occur when a customer makes a purchase from a merchant involve multiple functional levels. The role of the players in each functional level is explained in Figure 1. These functional levels can include a payment network and both an acquiring bank (the merchant’s bank) and an issuing bank (the cardholder’s bank).¹⁰ For credit cards, when a cardholder makes a payment to a merchant:

- The cardholder presents their card (or phone in the case of digital wallets) physically at a terminal or enters details into a payment gateway if making an online purchase;
- The terminal directs the transaction to a payment switch/processor that then routes the transaction to the acquiring bank for authorization;
- The acquiring bank then routes transaction to the relevant payment network (e.g., Visa or Mastercard) for the card and transaction type; and
- The payment network requests authorization from the issuing bank. If approved, this authorization is transmitted back to the merchant.

Other payment methods have similar functional levels, for which Figure 1 provides a typology. As we set out below, it is helpful to identify the functional level at which an innovation works in order to assess its competitive impact.

Figure 1: Functional Levels of Payment Supply Chains

Functional Level (a)	Role in Payments System (b)
Consumer point-of-sale (Consumer POS)	The means by which consumers verify their payment method and identity to a merchant (i.e., physical credit card).
Merchant point-of-sale (Merchant POS)	The system used by merchants to record transactions/process orders.
Merchant terminal/gateway	The physical equipment in a merchant’s premises that accepts a consumer’s POS payment details.
Payment gateway	The online equivalent of a terminal. This is the software/infrastructure that securely receives a consumer’s payment details and passes it on for authorization.
Payment processor/switch	The payment network that routes the transaction to the appropriate party for verification and notifies the merchant whether a payment has been accepted or declined.
Acquiring	Arranges the ability for merchants to accept payments by establishing connections to payment networks such as the credit and debit card schemes.
Payment network	Establishes networks between issuing and acquiring banks to enable secure verification and settlement of payments.
Issuing	Provides consumers with a means of transacting at POS by issuing cards. Verification of fund availability to allow transactions to complete.
Funding	Consumers need to fund their method of payment in some way, e.g., through a bank account with their issuer or paying a credit card bill.

Payments Function on Platforms and Platforms Have Unique Economics

A payment rail, such as the payment card networks described above, serves as a platform that connects multiple sides of a market, hence the description of those platforms as two- (or multi-) sided markets. A payment card network connects merchants and cardholders.

U.S. courts have considered the antitrust implications of two-sided markets in the payments space, most notably the U.S. Supreme Court’s decision in *Amex*. Concepts such as the chicken-and-egg problem (the need for payments methods to be accepted at merchants to be attractive to customers and to have a customer base to be attractive to merchants), price structures (a schedule of price and who pays them), multihoming (platform participants being able to connect to multiple platforms), and tipping (the potential for a platform market to “tip” towards a dominant platform) are now well-known by antitrust practitioners in the industry. Even two decades ago, the *United States v. Visa* decision referred

to the chicken-and-egg problem as one of the reasons why Visa and Mastercard possessed market power.¹¹

Antitrust Analysis of Payments in the Time of *United States v. Visa*

In 1998, the DOJ filed a complaint against Visa and Mastercard alleging conspiracy to restrain trade under Section I of the Sherman Act by implementing rules “prohibiting member banks from issuing cards on the American Express or Discover/Novus networks.”¹² In other words, the DOJ alleged that by preventing banks that issue a Visa or Mastercard from issuing cards from other networks, competition would be limited to the detriment of consumers.

In assessing this claim, the court adopted two relevant market definitions:

1. The general-purpose card market (i.e., the issuance of credit and charge cards).
2. The general-purpose card network services market (i.e., infrastructure).

The general-purpose card market was limited to credit cards and charge cards.¹³ Alternative payment methods raised in the case include cash, checks, debit cards, and private label cards.¹⁴ The court decided general purpose cards were differentiated from other payment methods by their credit function (vs. debit cards), merchant acceptance (vs. checks), and consumers’ preferences for not carrying cash to make large purchases.

The general-purpose network services market was described as the market where “Visa, MasterCard, American Express and Discover compete.”¹⁵ The court ruled this constituted a product market “because merchant consumers exhibit little price sensitivity and the networks provide[d] core services that cannot reasonably be replaced by other sources.”¹⁶

The court ruled that Visa and MasterCard had market power in the general-purpose card network services market for the following reasons:¹⁷

- **Merchant Acceptance:** Merchants testified that they “cannot refuse to accept Visa and MasterCard even in the face of significant price increases because the cards are such preferred payment methods that customers would choose not to shop at merchants who do not accept them.”¹⁸
- **Ability to Price Discriminate:** The defendants charged different interchange fees to different types of merchants, e.g., catalog and internet merchants vs. brick and mortar merchants.¹⁹
- **Investment Costs:** The decision cited high investment and expenditures associated with establishing a network as barriers to entry.
- **Chicken-and-Egg Problem:** The decision describes two chicken-and-egg problems: (1) “developing a merchant acceptance network without an initial network of cardholders who, in turn, are needed to induce merchants to accept the system’s cards in the

first place,” and (2) “software developers have no incentive to write applications for a piece of hardware that does not have wide distribution.”²⁰

Having found that Visa and Mastercard had market power in the network services market, Judge Barbara S. Jones ruled, in a decision issued on October 9, 2001, that the defendants’ exclusionary rules and practices had an adverse effect on competition. The decision prohibited the defendants from “enacting, maintaining, or enforcing any by-law, rule, policy or practice that prohibits its issuers from issuing general purpose or debit cards in the United States on any other general purpose card network.”²¹

Innovations in Payments and Their Potential Competitive Impact

Almost 20 years after the decision in *United States vs. Visa*, the same four firms remain the only general-purpose credit card networks in the United States, and their market shares of credit transactions have remained relatively stable.²² At the same time, the number of non-prepaid debit card transactions in the United States has grown proportionally faster than the number of credit card transactions. There was a close to nine-fold increase in the number of transactions between 2000 and 2018, from 8.3 billion to 72.7 billion.²³ The increase in the use of debit cards provides an example of how the use of payment technology can evolve, which is salient in light of recent discussions of potentially emergent alternatives consumers may use in lieu of existing card networks.

Since the *United States v. Visa* decision, OTT payment services and innovations for traditional products, such as contactless card payments and mobile wallets, have developed. Outside of the United States, methods of payments have evolved differently, with different timing of adoption, e.g., earlier adoption of contactless cards outside of the United States and the development of new government payment rails in China.²⁴ Perhaps the most fundamental shift that is occurring is the ability to make payments using a mobile phone in place of a plastic card. Although most such payments initiated today simply substitute the mobile phone for the plastic card and then route the payment over the same network, this transition and the flexibility inherent in mobile devices potentially opens the door to non-traditional methods of payment gaining consumer acceptance. This is because the consumer experience of making a payment may no longer differ depending on the underlying rail over which a payment is transmitted.

The innovations brought about by digitization can be classified in terms of how they interact with the existing payment rails. For many years, the main available rails were the credit and debit card networks discussed earlier, and the interbank settlement network. Recent innovations in payments can be classified into three groups: (1) improvements of existing rails, (2) new payment rails, and (3) OTT innovations. Below, we describe these three innovation groupings and antitrust considerations associated to each of them.

Improvements to Existing Rails May Blur the Competitive Boundary Between Bank Payments and Credit Cards. Bank transfers and card payments have not traditionally been considered substitutes for each other as bank transfers do not occur in real time. This lag in payment processing has made it difficult to develop products that could utilize the bank transfer network as a commercially desirable method of payment at the point of sale. However, advances in real-time payments (RTP), which allow bank transfer payments to be completed in real time,²⁵ are making bank transfer more “card like.” That is to say, we are now approaching a point where third-party products—typically smartphone applications—can facilitate payments between bank accounts that happen in real time.

The ease of transacting is further improved by developments in bank application program interfaces (APIs) that allow software developers to write apps that connect to the bank network and that can issue instructions for payments to be made. This materially streamlines and simplifies the process of making a bank-to-bank payment.

For example, Zelle is a peer-to-peer (P2P) payments application (owned by a consortium of large banks) that uses the bank transfer network²⁶ to allow people to split bills and pay people directly to their bank account in near real time. If Zelle extended its business model and product functionality to enable broader consumer to business payments (it currently allows small businesses to accept payments),²⁷ it might start to compete with traditional payment cards.

Similarly, Plaid facilitates direct connections between consumer bank accounts and merchants’ accounts via ACH.²⁸ As already noted, the DOJ’s theory of harm was that Plaid, by nature of facilitating payments via ACH instead of a traditional card payment network, offered an alternative to debit card transactions. An interesting issue that is unresolved since the Visa/Plaid transaction was abandoned is the extent to which Plaid’s business model is replicable, given it essentially builds on top of the existing bank payments network, rather than building an entirely new network.

These recent innovations to the bank transfer platform—and potentially other improvements to existing platforms or new platforms altogether—could reduce the entry barriers of OTT innovations and enhance the “contestability” of the payments market. Entrants, such as Affirm, which offers a buy-now-pay-later product and had its IPO on January 13, 2021,²⁹ described its competition in its SEC Form S-1 filing as including legacy payments methods, such as debit or credit cards.³⁰

It may take some time for entrepreneurs to develop products to take full advantage of the recent roll out of real-time payments, but a flourishing ecosystem of products and services that take advantage of platform improvements could potentially rebalance the competitive forces in the payments industry.

New, Differentiated, Rails? Digital currencies are potential competitors for both fiat currencies and the traditional

banking system. Cryptocurrencies, such as Bitcoin, serve as “decentralized digital private money” which does not require a trusted third-party intermediary (e.g., a credit card network) to transmit value online. The value of cryptocurrencies may be market driven, and transactions may be performed pseudonymously.³¹ This makes it possible for individuals to transact outside of traditional payment networks, potentially anonymously. Cryptocurrencies differ in characteristics, including transaction speed, the extent to which they are convertible into fiat currency, whether they can be used as a medium of exchange, whether they were initially offered by an identifiable entity or person, and whether they are pseudo-anonymous or anonymous.³² The decentralized nature of cryptocurrency raises questions about whether or how compliance requirements, such as anti-money laundering requirements, would apply,³³ which could create differences in the costs of operating businesses that use or do not use cryptocurrencies.

Digital currency is not necessarily limited to anonymous or pseudo-anonymous transactions outside of the traditional financial system. Various central banks are exploring the possibility of central bank digital currency, which could both compete with other virtual currencies and the traditional banks, as individuals might keep their deposits in central bank digital currency in lieu of in deposit accounts.³⁴

From an antitrust perspective, the key question is whether cryptocurrencies, which completely bypass existing payment networks, will pose a competitive constraint on existing payments networks. For this to be the case, cryptocurrencies would likely need to be broadly accepted by both merchants and consumers (the chicken-and-egg problem already discussed) as a means for conducting transactions in real time at the point of sale. Trends towards the use of digital wallets and mobile payments may ease the acceptance of cryptocurrencies as a method of payment, but it is as yet unclear whether there will be widespread uptake. Furthermore, Bitcoin (the most prominent cryptocurrency) has raised concerns around the resource cost of processing transactions (i.e., the sheer amount of electricity required to operate the network).³⁵ This may mean that Bitcoin at least is an expensive form of transacting suited to large transactions but not small value consumer point of sale transactions. There are however alternatives to Bitcoin that don’t suffer from this high transaction cost, but they have yet to gain as much traction.³⁶

OTT Innovations: Downstream or Potential Competitors? Developers of mobile payment apps leverage the widespread use of smartphones to provide new ways to connect to and build on existing financial services. Some of these developers work for financial institutions while others work on third-party apps.

Venmo is one example of an OTT application and payment service that has gained some customer acceptance and attention from the U.S. Federal Trade Commission.³⁷ Venmo is a U.S.-based payments application, launched in

2009, that allows P2P transactions.³⁸ Venmo routes all the transactions between Venmo users within its own network, but Venmo relies upon existing payment infrastructure (e.g., ACH, debit and credit networks) to fund the network.³⁹ In other words, Venmo users can transact independently of existing payment networks, but they must use existing networks to get money in or out of the Venmo network. Zelle, described earlier, operates a similar service to Venmo except for the fact that transactions are routed via the bank payment network (ACH), rather than occurring within a separate network.

From a consumer's perspective, an OTT payment service may appear to serve a similar function to a traditional payment service. For example, one can reimburse a roommate his share of utilities using a check or a P2P payment service like Zelle or Venmo. While checks are part of traditional payments networks, Venmo runs OTT of traditional payment platforms and facilitates payments that mix and match platforms (e.g., one user on Venmo may fund her account with funds drawn from a credit card account using a payment card network and a second user may fund his account with funds drawn from a bank account using the ACH platform. Venmo's distinct infrastructure facilitates payments between those users). In these types of situations, some may claim that OTT products are downstream because they build on existing networks, while others may claim that OTT innovations are potential entrants in network markets.⁴⁰

Even though OTT applications typically rely on existing payment platforms today, many such products are developing technologies and customer bases that could enable those products to turn into true network competitors under certain circumstances. For example, as noted above, Venmo users often rely upon credit or debit card networks to fund their accounts. However, the developments with real-time payments, APIs, the ubiquity of smartphones, and significant customer scale may allow OTT applications like Venmo and Venmo users to bypass the payment card networks altogether, providing an alternative payment system independent of the payment card networks. In other words, OTT applications leveraging new platforms—such as Bitcoin—or recently improved platforms—such as the ACH—could become a threat to established networks (like the payment card networks) that have had a large and durable share for years.

For example, some OTT products have been able to overcome the chicken-and-egg problem inherent to the two-sided nature of payment platforms by leveraging their existing user base for a different product to enter into P2P or consumer to merchant payments. This has occurred in China, where OTT payments services AliPay and WeChat Pay grew out of an online commerce platform and social media platform respectively.⁴¹ While AliPay and WeChat Pay transactions could initially run entirely within their own networks, as of 2018, the Chinese central bank mandates that AliPay and WeChat Pay route transactions through

the newly created China Nets Union Clearing Corporation (NUCC) clearing house. A potential motivation for this mandate was to level the playing field between banks and non-bank. As an analyst states, "The central bank aims at placing the non-banking transactions under supervision to avoid potential money laundering and other illegal practices."⁴²

What's Next?

The payments industry has seen much innovation over the past 20 years, particularly with the rise of mobile technology. Visa's proposed acquisition of Plaid, and the ensuing attention from the DOJ, illustrates new concerns about competition in markets in which market power of a few dominant firms was presumed. Furthermore, Affirm's registration statement illustrates that new fintech entrants do perceive their competitors to be incumbent financial services providers. With innovations and new entrants, this could mean that concerns about market power (i.e. the court's concern in *United States v. Visa*) could lessen. This also means that we are likely to see additional scrutiny of acquisition of new, innovative players, particularly given concerns about "killer acquisitions."⁴³

In a highly regulated industry, there are still open questions about who regulates fintechs in the United States,⁴⁴ let alone how they will be regulated, which raises questions about whether fintechs may face different regulatory burdens than traditional financial services firms with which they may compete.

Innovations in payments are being developed by firms, governments, and decentralized systems, while traditional payment technologies continue to operate. The existing regulations and platforms differ between jurisdictions, as likely will responses to innovation. While analysis would be specific to a payments ecosystem at a point in time, a helpful framework for evaluating competition in payments continues to be the economics of platforms. ■

¹ Michael Murray, Deputy Assistant Att'y Gen., Antitrust Div., U.S. Dep't of Justice: The Muscular Role for Antitrust in Fintech, Financial Markets, and Banking: The Antitrust Division's Decision to Lean In, Remarks as Prepared for Discussion at Univ. of Mich. Law School (Oct. 14, 2020), <https://www.justice.gov/opa/speech/file/1327491/download>; U.S. Dep't of Justice, *Financial Services, Fintech, and Banking Section* (Jan. 5, 2021), <https://www.justice.gov/atr/about-division/ffb-section>.

² Complaint ¶ 76, *United States v. Visa Inc. & Plaid Inc.*, No. 3:20-cv-07810, ECF No. 1 (N.D. Cal. Nov. 5, 2020).

³ Press Release, U.S. Dep't of Justice, Visa and Plaid Abandon Merger After Antitrust Division's Suit to Block, (Jan. 12, 2021), <https://www.justice.gov/opa/pr/visa-and-plaid-abandon-merger-after-antitrust-division-s-suit-block>.

⁴ *United States v. Visa U.S.A. Inc.*, 163 F. Supp. 2d 322 (S.D.N.Y. 2001).

⁵ Payment rails are the physical or virtual channels through which payments and information travel to settle a transaction.

⁶ See The Clearing House, *Real-Time Payments for All Financial Institutions*, <https://www.theclearinghouse.org/payment-systems/rtp> (last visited Feb. 16, 2021); Jillian Friedman, *Cryptocurrency: Bitcoin and Blockchain Technology*, in *ELECTRONIC PAYMENT SYSTEMS: LAW AND EMERGING TECHNOLOGIES*

- 123–27 (Edward A. Morse ed., 2018); Erin Fonte, *Mobile Wallets/Mobile Payments and Peer-to-Peer Payments*, in *ELECTRONIC PAYMENT SYSTEMS*, *supra*, at 84–85, 88–90.
- ⁷ Ohio v. Am. Express Co., 138 S. Ct. 2274 (2018).
- ⁸ The ACH system is a nationwide network for electronic transfers, such as direct deposit for payroll and Social Security payments. See Bd. of Governors for the Fed. Reserve Sys., *Automated Clearinghouse Services* (Sept. 28, 2020), https://www.federalreserve.gov/paymentsystems/fed_ach_about.htm.
- ⁹ Jean-Charles Rochet & Jean Tirole, *Must-Take Cards: Merchant Discounts and Avoided Costs*, 9 J. EUR. ECON. ASS'N 462 (2011).
- ¹⁰ Carol C. Benson, Scott Loftness & Russ Jones, *PAYMENTS SYSTEMS IN THE U.S.: A GUIDE FOR THE PAYMENTS PROFESSIONAL* (3d ed. 2017).
- ¹¹ *United States v. Visa*, 163 F. Supp. 2d at 342.
- ¹² Complaint ¶ 160, *United States v. Visa U.S.A., Inc.*, No. 98cv.7076, ECF No. 1 (S.D.N.Y. Oct. 7, 1998), <https://www.justice.gov/sites/default/files/atr/legacy/2015/01/27/1973.pdf>.
- ¹³ Charge cards differ from credit cards insofar as “[a] charge card requires the cardholder to pay his or her full balance upon receipt of a billing statement from the issuer of the card.” *United States v. Visa*, 163 F. Supp. 2d at 331.
- ¹⁴ E.g., a card that only be used at a specific merchant. An example in the United States is a Sears card.
- ¹⁵ *United States v. Visa*, 163 F. Supp. 2d at 333.
- ¹⁶ *Id.* at 338.
- ¹⁷ *Id.* at 341–43.
- ¹⁸ *Id.* at 340.
- ¹⁹ *Id.* at 341.
- ²⁰ *Id.* at 343, 397. While the decision acknowledges the chicken-and-egg problem that is a key issue in platform economics, this decision pre-dates much of the literature on multi-sided markets. What is understood to be the seminal paper on platform economics “started circulating around 2000.” See David S. Evans & Richard Schmalensee, *The Antitrust Analysis of Multi-Sided Platform Businesses* 3 (Working Paper 18783, Nat’l Bureau of Econ. Research, Feb. 2013), <http://www.nber.org/papers/w18783>.
- ²¹ *United States v. Visa*, 163 F. Supp. 2d at 410.
- ²² Complaint ¶ 5, *United States v. Visa Inc. & Plaid Inc.*, No. 3:20-cv-07810; Nilson Report, *General Purpose Cards—U.S. 2019* (Feb. 17, 2020), <https://nilsonreport.com/mention/472/1link/#>.
- ²³ NILSON REPORT, *supra* note 22.
- ²⁴ Robert Armstrong, *At Last, US Banks Are Introducing Contactless Cards*, FIN. TIMES (Jan. 7, 2019), <https://www.ft.com/content/445a308c-02f3-11e9-9d01-cd4d49afb3e3>; Jinshan Hong, *How China’s Central Bank Is Clamping Down on the Mobile Payments Industry*, FORBES (Aug. 18, 2017), <https://www.forbes.com/sites/jinshanhong/2017/08/18/how-chinas-central-bank-is-clamping-down-on-the-mobile-payment-industry/?sh=6e167f0550be>; CHINA BANKING NEWS, *NetsUnion Clearing Corporation* (July 23, 2018), <http://www.chinabankingnews.com/wiki/netsunion-clearing-corporation/>.
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- ²⁷ Early Warning Systems, LLC, *Zelle Frequently Asked Questions*, <https://www.zellepay.com/support/im-small-business-using-zelle> (last visited Feb. 16, 2021).
- ²⁸ Plaid Inc., *ACH Payments Can Improve Your Bottom Line*, <https://plaid.com/solutions/ACH-start/> (last visited Feb. 16, 2021).
- ²⁹ Orla McCaffrey & Peter Rudegeair, *Affirm Stock Skyrockets After IPO*, WALL ST. J. (Jan. 13, 2021), <https://www.wsj.com/articles/affirm-shares-skyrocket-in-trading-debut-11610561819>.
- ³⁰ Affirm Holdings, Inc., Registration Statement 27 (Form S-1) (Nov. 18, 2020), https://www.sec.gov/Archives/edgar/data/1820953/000110465920126927/tm2026663-4_s1.htm.
- ³¹ Friedman, *supra* note 6, at 123–26.
- ³² Robby Houben & Alexander Snyers, *Cryptocurrencies and Blockchain, Legal Context and Implications for Financial Crime, Money Laundering and Tax Evasion*, EUROPEAN PARLIAMENT (July 2018), <https://www.europarl.europa.eu/cmsdata/150761/TAX3%20Study%20on%20cryptocurrencies%20and%20blockchain.pdf>.
- ³³ Friedman, *supra* note 6, at 135–48.
- ³⁴ THE ECONOMIST, *Will Central-Bank Digital Currencies Break the Banking System?* (Dec. 5, 2020), <https://www.economist.com/finance-and-economics/2020/12/05/will-central-bank-digital-currencies-break-the-banking-system>.
- ³⁵ James Vincent, *Bitcoin Consumes More Energy than Switzerland, According to New Estimate*, THE VERGE (July 4, 2019), <https://www.theverge.com/2019/7/4/20682109/bitcoin-energy-consumption-annual-calculation-cambridge-index-cbeci-country-comparison>.
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