UBS

April 2018
Chief Investment Office GWM
Independent Investment Research

The road to cashless societies

Shifting Asia

Contents

Publication details

This report has been prepared by UBS AG.
Please see important disclaimer and disclosures at the end of the document.

Authors
Jonas David
Sundeep Gantori

Editor in Chief
Carl Berrisford

Desktop Publishing
Margrit Oppliger

Illustrations
Rodrigo Jimenez

Project Management
Aaron Kreuscher
Nidhi Mishra*

Cover photo
iStock

Contact
ubs.com/cio

* An employee of Cognizant Group.
Cognizant staff provides support services to UBS.

Foreword

Min Lan Tan

Dear reader,

The story of Asia today is one of change. Across the region, countries are embracing digital forms of commerce and connectivity with profound implications for investors, governments and society at large. Examining the consequences of these themes forms the basis of our *Shifting Asia* series.

The focus of our fourth edition is "The road to cashless societies." This is an exciting topic that not just touches the lives of many in the region, but is having significant ramifications for all of Asia's stakeholders. With the proliferation of mobile options, Asia with its digitally savvy population and high proportion of millennials is increasingly replacing wallets with smartphones.

This has allowed countries in the region to leapfrog from cash to digital payments, bypassing traditional banking and helping many gain access to financial services for the first time. Emerging Asia will likely remain the fastest-growing region globally for cashless payments, with its share of global non-cash transactions reaching around 30% by 2020.

There are clear benefits of this trend: better customer experiences, higher operational efficiency for businesses, financial inclusion of previously un- and underbanked people, and higher transparency and accountability. But there are also costs which should not be overlooked such as the loss of privacy and the risk of fraud and cybercrime.

A key reason for cash's resilience is its universally established acceptance, and others range from access barriers over the role of the informal sector to the loss of anonymity. So even as a structural shift is clearly underway, truly cashless societies are still years away. It's more likely that Asia will move more toward a "less cash" society, rather than a "cashless" one, in the foreseeable future.

In this report, we highlight the potential implications for society and investment opportunities. Certain fields in traditional finance in particular could face greater disruption than others, making this an important topic for investors to follow. Companies at the forefront of the fintech wave appear well positioned to benefit from the cashless journey.

The next time you use your mobile phone to buy groceries or send money, it's worth pausing to reflect on the momentous shift toward cashless that is underway. We hope you enjoy reading this report and welcome any thoughts that you might have.

Min Lan Tan
Head of APAC Investment Office

Executive summary

Jonas David, CFA

Sundeep Gantori, CFA, CAIA

- A cashless transition is happening in Asia: The Indian government advocated for a cashless society during its demonetization drive of INR 500 and INR 1,000 banknotes. The South Korean central bank has been promoting the concept of a cashless society and plans to no longer mint coins by 2020. The Thai government launched the National e-Payment Master Plan to promote digital payments. And on 15 February 2018, Chinese New Year's Eve, 688 million people[1] – roughly half of China's population – used WeChat to send and receive virtual hongbao (traditional red packets used to gift cash). The country is an example how to leapfrog to mobile payments, with more than two-thirds of internet users using smartphones for payments.[2]

- Asia's cashless journey is at an inflection point for various reasons. First, technological innovation, high smartphone penetration, and unique structural factors like demographics and urbanization are driving adoption. Second, digital solutions have the potential to provide hundreds of millions of un- and underbanked people and businesses access to financial services they previously lacked. Filling this gap would create positive social impact and economic opportunities for a broader consumer base. Third, mobile payments are enabling countries to leapfrog over credit/debit cards. Also, they are often embedded in a broader ecosystem like e-commerce, fintech, and social networks. Fourth, government policy and regulation have been supportive.

- Nonetheless, cash use remains remarkably persistent throughout Asia, particularly for low-value transactions. Various factors impede progress towards a cashless society, ranging from access barriers over the role of the informal sector to security concerns and the loss of anonymity. Trust and privacy, in particular, are powerful features of cash and could inhibit the widespread acceptance of cashless solutions. Although a digital ecosystem will make physical money increasingly obsolete for payments, we think cash is unlikely to disappear in the foreseeable future.

- More fundamental disruption could come from technologies based on blockchain, but a range of bottlenecks limit the potential for broad adoption in day-to-day payments at this stage. Still, we can imagine a rising relevance in the coming years.

- According to our interviewees, the world is moving toward a "less cash" society, while Asia is leading the race to cashless. This shift means better, cheaper and faster access to money for people across Asia. Technology is an ideal tool to facilitate financial inclusion, thereby creating economic benefits. Data will be the key commodity in the future of digital payments in China. Outside of China and India, Southeast Asia is also rapidly embracing digital payments. And a cashless economy can have important implications for monetary and fiscal policy.

- Asia's cashless transition, we believe, offers significant investment opportunities across financials, technology, retail and other sectors. Conversely, we think incumbent financial companies that fail to adapt and embrace technology are at a risk of major disruption during the ongoing transition. Investors will be best rewarded by investing in a diversified list of fintech companies, in our view, as we believe they are at the forefront of digital innovation. Our recent Longer Term Investment theme "Fintech" is a way to position for this transition. Given the diverse business implications, we think it will be crucial to position for an evolving cashless ecosystem in the coming years.

[1] Tencent/WeChat, as of February 2018

[2] CNNIC, as of January 2018 (data refers to December 2017)

Money revisited

Money has a dynamic history. People have reinvented the exchange of goods and services several times over the past millennia, moving from bartering to using coins and paper money and recently to digital payments. Changes to the form of money were often the result of new innovations – some failed or disappeared, but several continue to influence our world today. Meanwhile, the basic functions of money have barely changed – Francis A. Walker once nicely summarized it as "money is that money does."

Back to basics: Functions of money[3]

- Medium of exchange for goods and services. The alternative would be direct exchange through bartering, but this system is inefficient as it requires matching goods in terms of value and need – money solves this issue.
- Common measure of value for goods and services in an economy.
- Store of value over time. Other assets could fulfill this function, but they often don't offer the liquidity that money offers.

[3] The definition goes back to William Stanley Jevons "Money and the Mechanism of Exchange" (1875), where he also explicitly mentioned the standard of value as a function. Like several later textbooks, we don't mention this function separately here.

The evolution of money in a nutshell

Source: Getty Images

Source: Getty Images

Source: Getty Images

Very long time ago

Early man bartered goods like livestock and crops
The idea is simple: direct exchange of goods without using a medium of exchange. It's tough to match these transactions due to the double coincidence of needs. Bartering for goods can still play a role in times of crisis (e.g. hyperinflation, war).

Around 800-900

First paper money in China
In the Tang dynasty (618–907), people started to use early forms of paper money that were easier to handle than coins. In the 11th century, the so-called Jiaozi appeared in the Sichuan province and is widely regarded as the world's first paper money. The familiarity with paper and related printing methods facilitated this process. Over time, however, excessive paper money creation resulted in massive inflation.

1871

Money transfer service through telegraph
Western Union started to offer money transfers in the US, using its extensive network and leading position in the telegraph business.

500BCE CE 500 1000 1500

Source: Dreamstime

Source: Getty Images

Around 600BCE

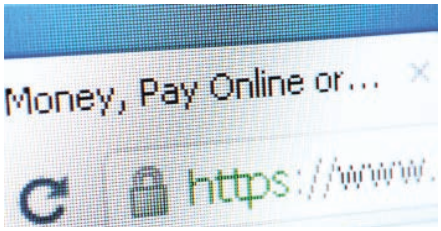
Coinage and the first official currency
The world's first official currency is believed to have been minted in Lydia, in present-day Turkey. Made of a gold and silver alloy, the coins were too valuable to be used in daily transactions. Already, people in China started using small replicas of goods and coin-like objects that were easier to exchange than goods. For a long time, cowrie shells were widely used as a medium of exchange. The traditional Chinese character 貝 originates from a shell and is often used in the context of money and exchange.

1661

Banknotes in Europe and the world's first central bank
In Sweden, Stockholms Banco issued the first real banknotes in Europe to replace heavy copper coins. The banknotes became increasingly popular due to their convenience, but excessive money printing resulted in falling value, a loss in confidence and bank failure. In 1668, the Sveriges Riksbank was founded – the world's oldest central bank.

This overview was created to the best of our knowledge. Certain historical developments are controversial and we cannot guarantee that events unfolded as described.
Sources: Ancient History Encyclopedia, Goetzmann and Rouwenhorst "The Origins of value: The Financial Innovations that Created Modern Capital Markets", Sveriges Riksbank, Western Union, Diners Club, Hyman "Debtor Nation: The History of America in Red Ink", Barclays, RBR (www.rbrlondon.com), Federal Reserve History, Financial Times Lexicon, Cronon "Banking and Finance on the Internet".

Source: Getty Images



Source: Getty Images

Source: UBS

1950

First credit card
Motivated by its founder Frank McNamara's aim to pay in restaurants, Diners Club introduced the first general charge card, thereby paving the way for credit cards. A few years before, John Biggins launched the "Charge-it" plan in Brooklyn, New York, which was the first bank-issued charge card.

From 1980's

Rise of online banking and payments In the early 1980s, the first banks in the US started to offer early versions of online banking services. The advent of the internet made online banking and payment services popular in the 1990s and 2000s.

In recent years

Mobile payments and wallets
Several large technology companies have started to offer mobile payment solutions, developing into a fast-growing market.

1950 1960 1970 1980 1990 2000 2010 2018

Source: Getty Images

Source: Getty Images

1967

First cash machine in London
On 27 June, Barclays installed the first cash machine in Enfield, north London. The idea for this early version of an automated teller machine (ATM) came from John Shepherd-Barron, after he arrived late at his bank to withdraw money. There were 3.3 million ATMs worldwide in 2016, with more than half in the Asia-Pacific region.

1971

End of Bretton Woods System
On 15 August, US President Richard Nixon announced the suspension of the dollar's convertibility into gold. This marked the end of the Bretton Woods System and the start of a fiat-based monetary system. Fiat money has little or no intrinsic value and is made legal tender by order of the government.

January 2009

Bitcoin was launched
The first popularized cryptocurrency – Bitcoin – is launched following the release of a paper titled "Bitcoin: A Peer-to-Peer Electronic Cash System" by someone writing under the pseudonym Satoshi Nakamoto. However, it's debatable whether cryptocurrencies can fulfil the basic functions of money.

Cashless on the rise

cashless
Using or operating with credit and debit cards and electronic systems, not money in the form of coins or notes.

society
A large group of people who live together in an organized way, making decisions about how to do things and sharing the work that needs to be done. All the people in a country, or in several similar countries, can be referred to as society.

Cambridge Advanced Learner's Dictionary, Cambridge University Press

What cashless means
We view a cashless society as one that has moved beyond cash, by storing and exchanging currency in digital form.[4] Cashless transactions include digital forms of exchanging money, including new innovation like mobile payments but also credit/debit cards, whereas cash transactions are made in physical coins and banknotes.

People can choose between various cashless options which are based on the digitalization of value storage and exchange. Most of these are based on transfers of fiat money and often linked to a traditional bank account in some form. Meanwhile, the rise of cryptocurrencies adds an additional dimension to this digital world.

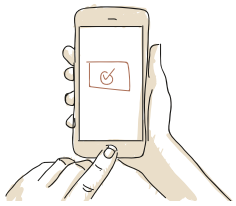
[4] An extreme form could be the abolishment of physical money, but we see this as highly unlikely in the foreseeable future. In this report, our focus is on payments that involve individuals, but several considerations are also applicable in a broader context.

Blockchain-based technologies

Besides the change in "how we pay," a more fundamental disruption could come from technologies based on blockchain like cryptocurrencies. A range of bottlenecks, however, like inefficiency in transactions and high volatility, limit the potential for broad adoption in day-to-day payments at this stage. Eventually, such technologies – whether cryptocurrencies in the current forms or any potential asset-backed tokens – have to compete with other systems in terms of costs, speed, and scalability.

Cash
Physical coins and banknotes

Traditional
- Credit/debit cards
- Online banking
- Bank transfer
- Checks



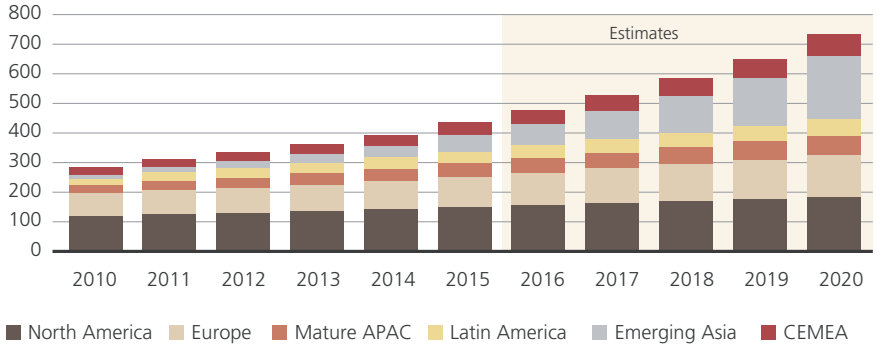
New innovations
- Mobile wallet and other app-based payment solutions
- Contactless payments using cards or mobile devices
- Cryptocurrencies

Where Asia stands

A cashless transition is happening in Asia. This shift has been catalyzed by access to technological innovation like real-time payments using mobile devices, high smartphone penetration, the entrance of new innovative market players outside of traditional banking, the rise of e-commerce, and favorable government policy and regulation. The result has been greater convenience and the creation of a digital lifestyle. Digital solutions provide un- and underbanked people and businesses access to financial services they previously lacked, thereby fostering financial inclusion. In this context, the use of mobile devices to transact payments has allowed people in many emerging markets to leapfrog over credit/debit card use – China is the most prominent example of this.

Cashless transactions on the rise…

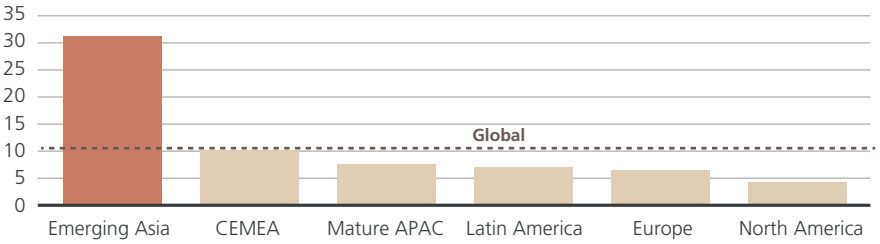
Number of worldwide non-cash transactions (in bn)



Source: Capgemini & BNP Paribas

…especially in emerging Asia

Growth of non-cash transactions (in %, compound annual growth rate from 2015 to 2020)



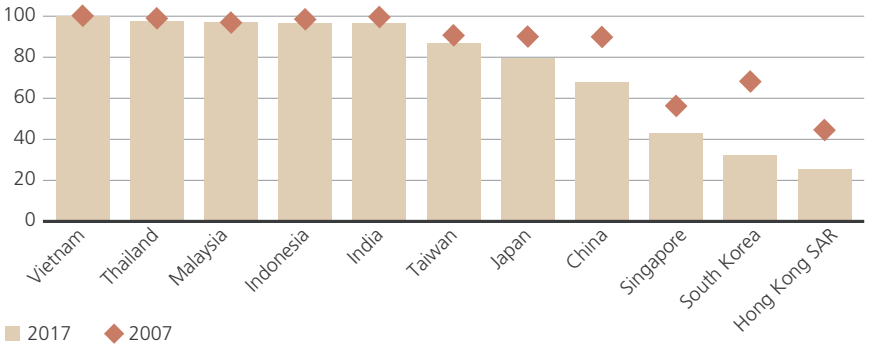
Estimates from 2016 onwards
Source: Capgemini & BNP Paribas

The popularity of cashless payments is rising globally. According to the latest World Payments Report[5], the number of global non-cash transactions reached 433.1 billion in 2015, mainly driven by strong growth in developing markets, and is expected to reach 725.8 billion by 2020. Emerging Asia, thanks to China and India, should remain the fastest-growing region and has the potential to double its share of global non-cash transactions to around 30% by 2020. Still, the vast majority of transactions in Asia are in cash, which suggests further growth potential but also indicates certain obstacles to adoption.

[5] Capgemini and BNP Paribas "World Payments Report 2017"

Still, a vast share of transactions is cash-based in many parts of Asia

Consumer payments in cash (as % of total transaction volume)



Source: Euromonitor Passport, UBS

Market players and facilitators

The transition to digital payments is an interplay of technology, innovative business models, government policy and regulation. The ecosystem around consumers and retailers is being mainly constructed by the following market players and facilitators, while overlaps exist in certain areas (for instance, major technology companies and fintech).

Market players and facilitators

Established **credit/debit card providers**	Oversee large part of the traditional payment infrastructure and launched new innovations like contactless payment options in recent years.
Incumbent **retail and commercial banks**	Maintain traditional bank accounts and foster innovation, but tend to lack the agility to cope with new market entrants and related disruption.
Major **technology companies**	Disrupt the market with innovative solutions (e.g. digital wallets) as part of their broader ecosystems with large user bases.
Fintech firms and start-ups	Develop new innovations with the potential to disrupt the established landscape.
Telecom operators	Provide mobile phone infrastructure and related technologies.
Institutions, including governments, regulators, and central banks	Define the policy and regulatory framework in digital innovation and financial services.

What's next?

We believe Asia's cashless journey is at an inflection point due to a confluence of demand and supply factors. This structural shift has already started, and we expect it to last for more than five years.

Gettyimages

Demand side

Rising urbanization coupled with the improving purchasing power of millennials, who are more digitally savvy, should drive increased demand for cashless transactions. Asia accounts for more than half of the world's millennials; out of the 2.3 billion millennials globally, 1.3 billion reside in Asia – almost twice the combined population of the US and Western Europe. We estimate that Asian millennials generate a sizeable annual income of USD 4.3trn, equivalent to Japan's current GDP. Asian millennials will likely constitute more than half of the total workforce in the region for the next 5–10 years, and we estimate that their yearly earnings will rise to USD 11.7trn by 2025 (equivalent to China's current GDP). Their role as a key influencer of the region's economic direction cannot be ignored, especially as the group exhibits many common traits and collectively shapes some of the key future trends in the region.

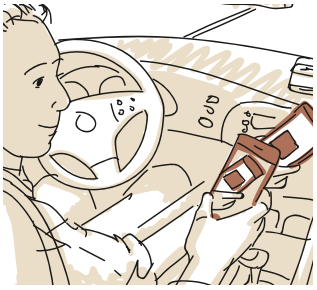
Millennials

"Millennial" is the term used to define a cohort of people that came of age at the turn of the 21st century. In Asia Pacific, the millennial generation is expected to have the largest spending power of any generation ever, with an estimated disposable income of USD 6trn by 2020, according to September 2016 data from Accenture.

For further reading, refer to CIO report on Millennials – the global guardians of capital, published June 2017.

Scan code or click here

Contactless card payment: Buying MTR tickets in Hong Kong



Mobile payment using QR code: Paying for a taxi ride in Beijing

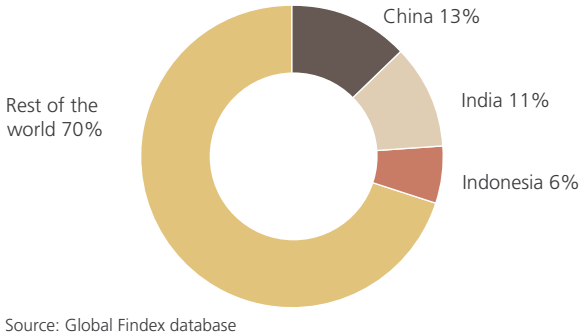
Online payment: Ordering a gift through online marketplace Taobao

Contactless credit card: Buying groceries in the supermarket

About 1.7 billion adults globally do not have an account with any financial institution or mobile money provider.[6]
A large share of these people are in Asia, with China, India, and Indonesia being among key countries due to their population size and Indonesia also due to its relatively high share of people without an account.
In recent years, there has been some notable progress in financial inclusion, especially in India due to policy initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY) that promotes bank accounts. The relatively low cost and ease of cashless technologies like mobile payments/banking should continue enabling greater financial inclusion in Asia, thus accelerating the region's transition toward less-cash economies.

Distribution of the world's unbanked population

Adults without an account (in % of global, 2017)



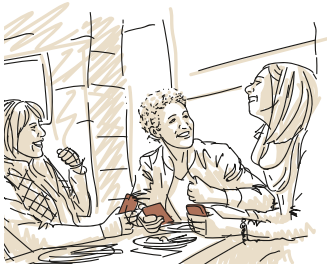
Source: Global Findex database

[6] World Bank "The Global Findex Database 2017"

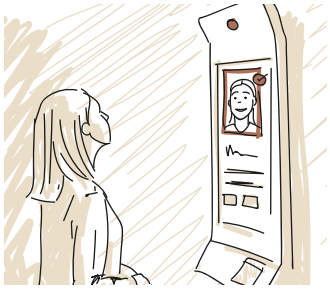
Supply side
We see four major supply drivers: a solid smart device ecosystem, fintech innovation, an abundance of capital and favorable policy and regulation.

Thanks to the proliferation of low-cost smartphones, Asia has become a mobile-first region. Driven by a desire to stay connected all the time and the need to efficiently multitask throughout a busy day, most of us have become "digital omnivores" and see smartphones as a necessity rather than a luxury. Unlike in developed markets, smartphones and tablets are the first computing device for many individuals in Asia. Most people in the region have never purchased a PC before due to lower purchasing power or weak IT infrastructure such as poor availability of broadband services. But with improved wireless coverage, thanks to increased availability of 3G/4G services, rising purchasing power and falling prices of smart devices, smartphone penetration in Asia has quickly caught up to the rest of the world – smartphone penetration in Asia Pacific stood at 66% in 2016, versus the global average of 65%.

Mobile apps have been a central driving force of the smart device revolution, given the significant enhancement they bring to the user experience. This smart device ecosystem plays an integral part of the cashless journey. Payment services like Apple Pay and digital wallets like Alipay and WeChat Pay today have become primary vehicles for digital payments in Asia.

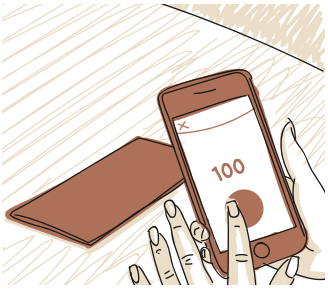


Peer-to-peer transfer:
Splitting the dinner bill among friends



Facial recognition:
Buying a meal at KFC in Hangzhou, China

Remittances via app:
Sending money home to the family



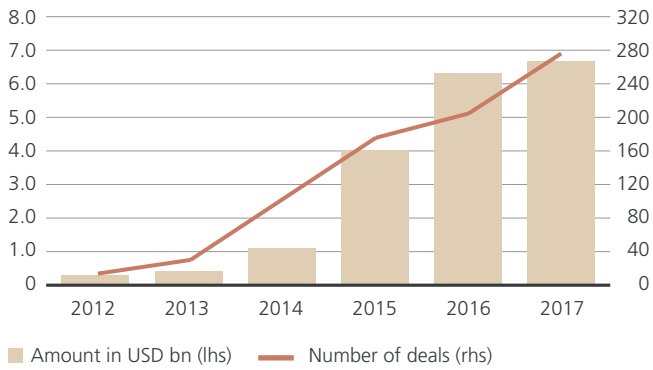
Mobile wallet:
Sending and receiving hongbao, traditional red packets used to gift cash

Asia, particularly China, is leapfrogging developed countries in the fintech space and creating a huge ecosystem in the process. The region's internet and banking companies are integrating their financial and technology capabilities to build vibrant fintech ecosystems. A case in point is Alibaba mentioning "ecosystem" 95 times in its 2016 annual report, and Ping An mentioning the words "integrated finance," "ecosystem," and "one-stop-shop" a combined 35 times.

As a result, more than 40% of global fintech capital has made its way to Asia, according to data from CB Insights. In 2016 alone, there were 213 fintech deals in the region, with payments attracting the most interest, followed by insurtech, online lending and new technologies like blockchain and artificial intelligence (AI).

Growth region for fintech

Annual financing to VC-backed fintech companies in Asia



Source: CB Insights, UBS

Finally, government policy and regulations have been supportive so far and will likely continue to facilitate a cashless transition. Many policymakers across the region have realized that the disruptive and attractive pricing nature of fintech services enable financial inclusion. For instance, the G20 Financial Inclusion Action Plan (FIAP) 2010 laid out a few principles to drive financial inclusion by using digital technologies. This has resulted in the role of regulators evolving to facilitators. Several G20 action plans provide an enabling and proportionate legal and regulatory framework for digital financial inclusion, expand the digital financial services infrastructure ecosystem, and strengthen digital and financial literacy and awareness.

India is an example where policymakers have orchestrated a push toward a cashless economy (see next chapter for details). Most regulators today like the Monetary Authority of Singapore or the Hong Kong Monetary Authority are promoting fintech innovation and aim to move toward cashless societies through the concept of sandboxes. A regulatory sandbox is an entity endorsed by regulators that enables temporary, limited-scale testing of a new product. The goal is to assess the potential benefits and risks by temporarily relaxing regulations for product launches.

While the financial services sector is heavily regulated, non-bank market entrants have benefited from relatively looser regulation in the past years. However, this approach might change as soon as certain companies reach a dominant market position and increasingly offer financial services. We think it's likely that scrutiny on these business activities will increase in order to ensure customer protection and to manage potential financial risks.

iStock

Technological innovation to continue

Smart devices for payments

The increasing proliferation of Internet of Things (IoT) devices, which can also potentially support cashless transactions, will further bolster the smart device ecosystem, in our view. IoT refers to a network of connected devices where everyday objects, like watches, wearables, refrigerators, and cars, are constantly sending and receiving data. For instance, you can order food directly from your refrigerator if something is missing or pay your fuel without leaving the car.

According to telecom equipment leader Ericsson, IoT units worldwide are expected to grow from 5.6 billion units in 2016 to 18.1 billion units in 2022, an average annual growth of 22%. Based on Ericsson's projections, with IoT units expected to surpass mobile devices for the first time in 2018, the industry looks set to soar in the coming years. Asia is a key growth driver behind IoT, and we believe payments will be further integrated into everyday objects like wearables and smart cards.

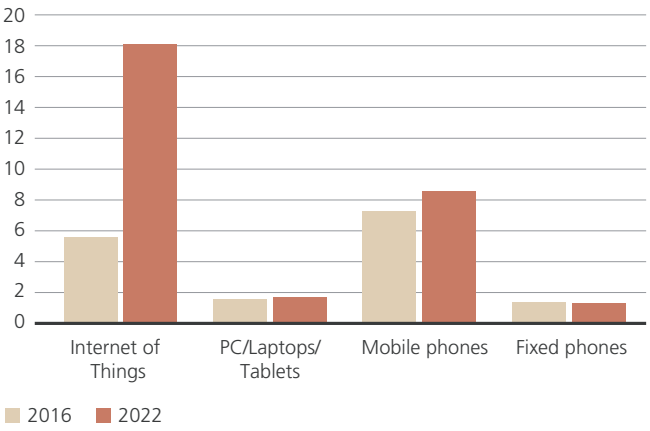
Blockchain at early stage

We can imagine a rising relevance of blockchain technologies in the coming years.[7] For instance, cross-border remittances are an area where some promising applications have already evolved, and further innovation in blockchain-based applications can complement the existing payment ecosystem.

In our view, however, blockchain-based cryptocurrencies are very unlikely to replace existing currencies issued by governments. They currently lack the necessary stability in value and general acceptance for day-to-day transactions, and there are scalability limits. This might change, and theoretically new forms of digital currencies might at some point fulfil the basic functions of money: medium of exchange, common measure of value, and store of value. Reportedly, some institutions have started to explore the option of cryptocurrencies backed by central banks, but fundamental questions about related specifications (e.g. stability, coexistence with fractional-reserve banking, implementation of monetary policy, public acceptance and anonymity) require careful consideration – these and related efforts are still at an early stage. China is a country to watch closely in this regard, as it has the potential to be at the forefront of digital currency innovation.

IoT devices on the rise with expected annual average growth of 22%

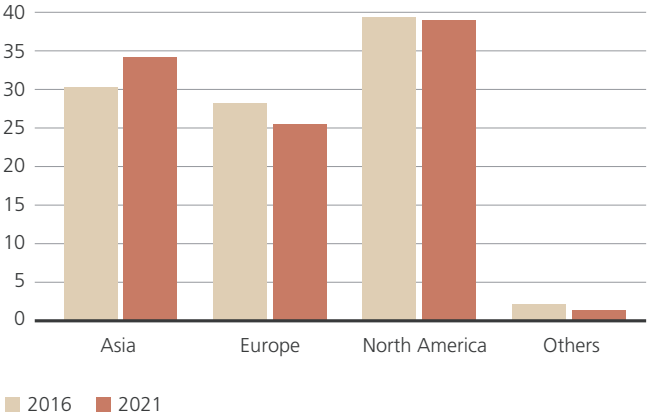
Units (billion)



Source: Ericsson, UBS

Asia is a key growth driver behind IoT

IoT revenue breakdown by region, in %



Source: Zinnov, UBS

[7] For details, please refer to our note "Cryptocurrencies: Beneath the bubble", published 10 October 2017

How Asia moves cashless

Gettyimages

Chinese giants: 支付宝 vs 微信

What's the story?

China has been the most dynamic digital payment market in the past years, with Alibaba's Alipay (**支付宝**) and Tencent's WeChat Pay (**微信**) at the forefront. Alibaba and Tencent, China's two technology giants, have revolutionized payments by embedding them into a broader ecosystem of e-commerce, fintech, and social networks. Moreover, they have been able to leverage their large user bases amid rising smartphone penetration; and it's an interesting case how non-bank companies have broken into financial services. Meanwhile, user-friendly technology and impactful promotional campaigns have created a digital lifestyle among old and young in China. The option to use facial recognition as credential for payments was on the MIT Technology Review's list of breakthrough technologies in 2017.

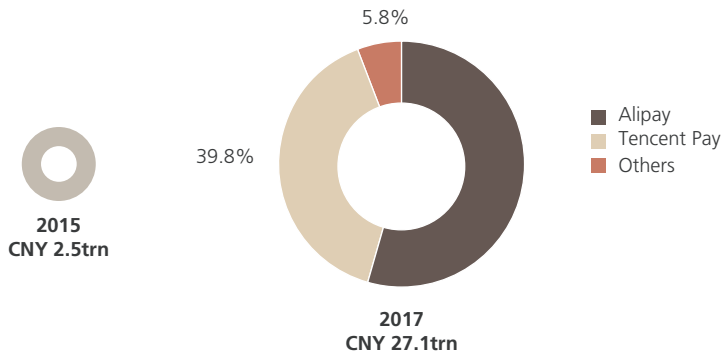
How big is the market potential?

Given the size and growth of the Chinese economy and mobile internet users of more than 750 million[8] , the market potential of mobile payments is large. Based on expectations of UBS Investment Research, the transaction value of third-party payments in China should reach around CNY 300trn in 2020 (USD 47.6trn at the current exchange rate), triple the amount from 2016; mobile payments are expected to account for more than 70%, from around 50% in 2016. Key drivers are improved retailer coverage and promotional campaigns. Moreover, a further broadening of financial services, like lending and wealth management, is likely. In this context, the enormous amount of data collected is a pivotal enabler of fintech services and related revenue sources. After the domestic success, an expansion to other countries has already started and will likely continue. Already today, for instance, WeChat users can use the payment function in several countries in the region and Alipay also established a range of global partnerships to offer its services in Europe, the US, and elsewhere besides Asia. At this stage, however, their main target group is Chinese users traveling overseas.

[8] CNNIC, as of January 2018 (data refers to December 2017)

Competition in China's growing mobile payment market

Market share and transaction value in third-party mobile payment market (2Q17, including comparison to market size in 2Q15)



Source: iResearch, UBS

What are the challenges?

The rise of non-bank market players weighs on the transaction volumes and related revenues of established banks. After supportive regulation in the past years, the strong market position of the two major companies could result in closer scrutiny. Last year, China's central bank set up Net Union, a new clearing entity, to handle online payments by non-bank providers. Besides related fees and potential changes to the operating model, the competitive edge of individual firms in data analytics might be diluted. Meanwhile, other international market players like Apple Pay struggle to gain market share in China due the dominance of existing solutions and related user benefits in their country-specific ecosystems.

Who is set to benefit?

Both solutions, Alipay and WeChat Pay, are well positioned to benefit from the cashless trend that they initiated and have fostered over the past years. Despite solid gains in market share, WeChat Pay still lags in usage on average to Alipay. Also, Alipay has an edge in financial services beyond payments (see box on Yu'E Bao), but Tencent has gained momentum here too. The growing ecosystems created by these two companies are driving China's transition toward a cashless society.

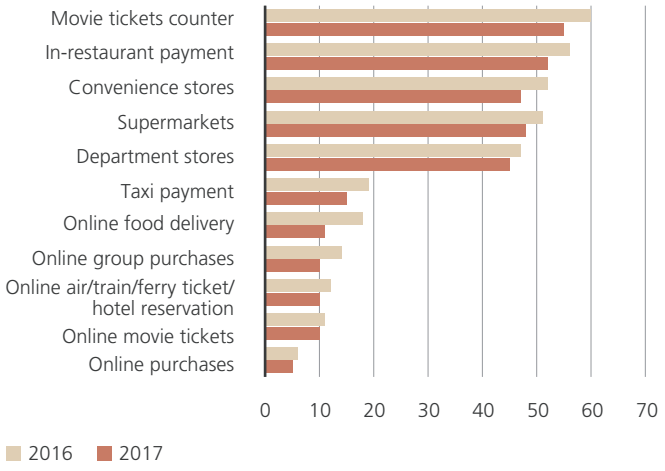
Yu'E Bao

Launched in 2013 by Alibaba, Yu'E Bao – meaning leftover treasure – has become the world's largest money market fund with more than USD 230bn invested assets, which accounts for about one-quarter of China's total money market fund industry[9]. Users can invest their unused cash in the fund, thereby earning interest, and can withdraw their money when needed. However, the service has become so popular that limits were imposed and the growing fund size is under scrutiny. Meanwhile, similar services are also offered by other companies, including Tencent's Licaitong.

[9] Fitch Ratings, as of December 2017 (data refers to September 2017)

Use of cash has declined across the board, but is still high in several areas

Usage of cash in different scenarios in China (2016 versus 2017)



Source: UBS Evidence Lab

Shutterstock

Cashless India

It's correct that a 100 percent cashless society is not possible. But why don't we make a beginning for a less-cash society in India? We can gradually move from a less-cash society to a cashless society.

Narendra Modi, Prime Minister of India, November 2016[10]

iStock

What's the story?

In November 2016, the demonetization of INR 500 and 1,000 banknotes, accounting for around 86% of the value of banknotes in circulation, was a major and controversial step for India. The objective was to undermine the shadow economy and illegal activities. At the same time, Prime Minister Narendra Modi advocated for a cashless economy. The policy approach is widely seen as holistic, including the digital identity scheme (Aadhaar) as well as a unified payments interface (UPI) and related solutions like the Bharat Interface for Money (BHIM).

How big is the market potential?

With more than 1.3 billion people, India's population is the second largest globally. Mobile phone penetration is high, with more than 1 billion active subscribers, around 30% of whom are smartphones users[11] – a good starting point for further growth in mobile payments. Meanwhile, the number of point-of sale terminals for cashless transactions more than doubled to three million in less than 1.5 years.[12] While the growth rate is

[10] Reuters "India's Modi calls for move towards cashless society", published 27 November 2016

[11] Telecom Regulatory Authority of India, as of February 2018 (data refers to December 2017)

[12] Reserve Bank of India, as of February 2018 (data refers to December 2017)

among the highest globally, the number of terminals per inhabitant is still among the lowest, suggesting further catch-up potential. Also, the potential for further financial inclusion is significant with 19% of the population still unbanked.[13] In combination with a government that fosters the cashless economy through policy measures, we think India will remain among one of the most dynamic digital payment markets in the coming years. Moving toward a less-cash economy has the potential to yield economic benefits, with the cost of cash at 1.7% of GDP and foregone tax revenue from the shadow economy at 3.2% of GDP, according to estimates from Visa.[14]

What are the challenges?

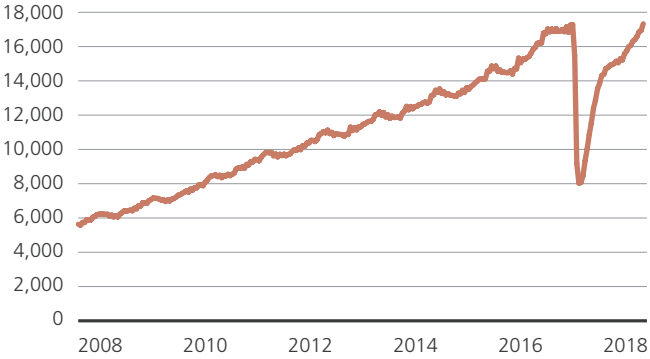
Despite the government efforts to provide the necessary ingredients for a digital transition, the use of cash is persistent. In 2015, the year before the demonetization drive, banknotes and coins in circulation accounted for an above-average 12.3% of GDP and the ratio relative to narrow money supply (cash in circulation and transferable deposits held by non-banks) was among the highest compared to emerging market peers.[15] The decline of cash following the demonetization was remarkable, but cash levels are now back to earlier levels. Cash accounts for about two-thirds of the total consumer payment transaction value, while this number is above 95% when looking at the number on transactions.[16] In order to evolve further, the digital payment ecosystem has to be easy to access, cheap and convenient for everyone. Therefore, lower complexity and a better understanding of the value proposition are pivotal for adoption. In a recent survey, 88% of respondents indicated a preference for cashless payments over cash, while security concerns and lack of awareness were identified as major barriers.[17]

Who is set to benefit?

Benefits can be realized across the economy, including consumers, businesses and the government. For consumers, the main benefit is the convenience of frictionless transactions. Also, the unbanked part of the population can get access to basic financial services. Businesses can grow their revenues, ranging from merchants to companies focused on data analytics. Also, digital innovation can facilitate better access to credit for consumption and investments. The government is expected to continue acting as an enabler, through supportive regulations and policies, and can benefit from a formalization of the economy and efficiency in tax collections.

Cash back to earlier levels…

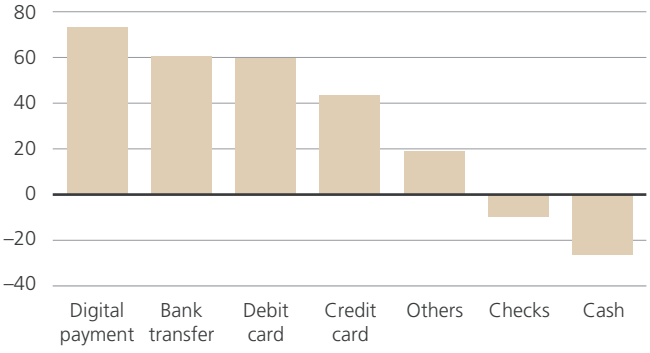
Currency with the public in India (in INR bn)



Source: Reserve Bank of India

…but payment habits are changing to digital

Change in payment habits over the past two years, in % – India



Source: UBS Evidence Lab

[13] ASSOCHAM and EY, as of July 2017

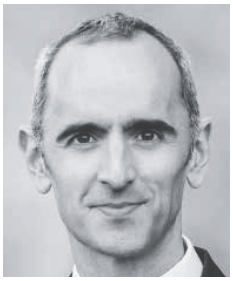
[14] Visa "Accelerating The Growth of Digital Payments in India: A Five-Year Outlook", published in October 2016

[15] Bank for International Settlements, as of October 2017

[16] Euromonitor Passport, as of March 2018 (data refers to 2017)

[17] KPMG "Digital payment – Analysing the cyber landscape", published in April 2017

"Asia is leading the race to cashless"



Zennon Kapron
Director of Kapronasia

Zennon Kapron is the Director of Kapronasia, one of Asia's leading financial technology research and consulting firms. Prior to Kapronasia, Zennon was the Asia Pacific Financial Industry Manager for Intel and previously was the Chief Information Officer for Citibank Portugal. He has been involved in the industry for over 20 years and is the author of the book "Chomping at the Bitcoin". Zennon holds a Bachelors in Computer Science from Syracuse University and an MBA from INSEAD.

Zennon, how far is Asia away from becoming cashless?

Led by China and India, Asia is leading the race to cashless. For billions of people across the region, this means better, cheaper and faster access to money. In developed markets, this facilitates e-commerce and everyday retail transactions. In developing markets, digital payments can provide critical financial infrastructure for individuals and businesses which may not have other options. Although Asia is leading the way, challenges around infrastructure, socio-economic habits, and general access to technology are still limiting non-cash transactions, but over the next 5–10 years we should see a continued shift as governments and regulators continue to develop these pre-requisites for a better digital payment environment. Although it may be decades before Asia goes completely cashless, the region is getting closer by the day.

What is unique about the region's payment ecosystem compared to the US or Europe?

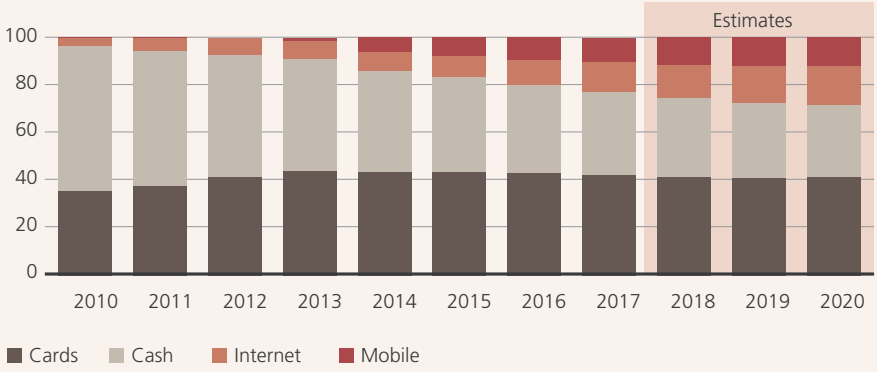
Asia is an incredibly diverse region which makes regulations and cooperation around payments challenging. In Europe, the Single European Payment Area (SEPA) has allowed the region to move ahead with basic infrastructure as well as move advanced open banking and API initiatives that just are not possible in Asia at the moment. However, we are starting to see cohesion in Southeast Asia, where the governments and regulators are coming together to provide the basis for change. We have seen this already with real-time cross-border payments between Singapore and Thailand, and we expect this to continue.

In China, why were Alipay and WeChat Pay so successful and where will digital payments move from here?

A decade ago, there was a tremendous amount of friction in China's payment industry. E-commerce payments were

Diminishing cash usage amid digital payments

China retail consumption by payment type (% of total payments value)



Source: Kapronasia

mainly cash on delivery, which led to fraud, and card-present retail payments were slow, with transactions often needing a swipe, a PIN, and a signature. Although near-field communication (NFC) technology was seen as an opportunity for mobile payments to grow, there was disagreement about the standard. This left an opening for Alipay and WeChat Pay to develop hardware-independent QR-code payments as well as seamless e-commerce and m-commerce payments that removed a significant amount of friction from existing payment methods and drove adoption. Data will be the key commodity in the future of digital payments in China as the tech giants increasingly provide a wider array of financial and lifestyle products through the platforms that Alipay and WeChat Pay wallet have become.

Where do you see potential challenges?

Incumbent market players face huge challenges amid Asia's shift to a cashless society. In 2016, traditional banks and payment processors lost an estimated USD 30 billion in fees to mobile payment giants Alipay and WeChat Pay. These were fees that would have been captured had the transactions gone across the traditional card network. Although the loss in payment fees hurts, the pain from the loss of data is much more acute as data really is the oil of the future as payment revenue models shift away from fees toward platformed products and services.

Looking across Asia, which other countries are moving toward cashless transactions?

Outside of China and India, Southeast Asia is also rapidly embracing digital payments. Thailand, Malaysia and Indonesia have all seen a rapid increase in non-cash transactions. The uptake is initially driven by m-commerce as consumers get used to shopping on their phone and then by improving infrastructure. Real-time payment is a big trend at the moment in Asia-Pacific, with Australia and Thailand moving onto real-time payments in 2017, while Hong Kong, Malaysia and Indonesia are in the planning stages. Often, the shift to real time necessitates the upgrade of existing legacy technology, which can be an excellent way to innovate with real-time infrastructure providing the base on which to build.

What impedes a similar dynamic in the laggard countries?

Socioeconomic factors, such as customer habits, are typically the biggest reasons why consumers still hold cash. Trust is a key element in any transaction and it is difficult to beat the immediate trust that is available through a cash-in-hand transaction, so that is still a big impediment. Additionally, many countries are making the shift to digital in different ways. In Australia, for example, most transactions are "tap and go" card payments which are very quick and convenient, faster even than cash. When you have such a seamless use case, it becomes difficult for even something as frictionless as mobile payments to make headway. Australia is by no means a laggard in adopting non-cash payments, but it is doing it in an entirely different way compared to China.

Who benefits from the cashless transition? Who doesn't?

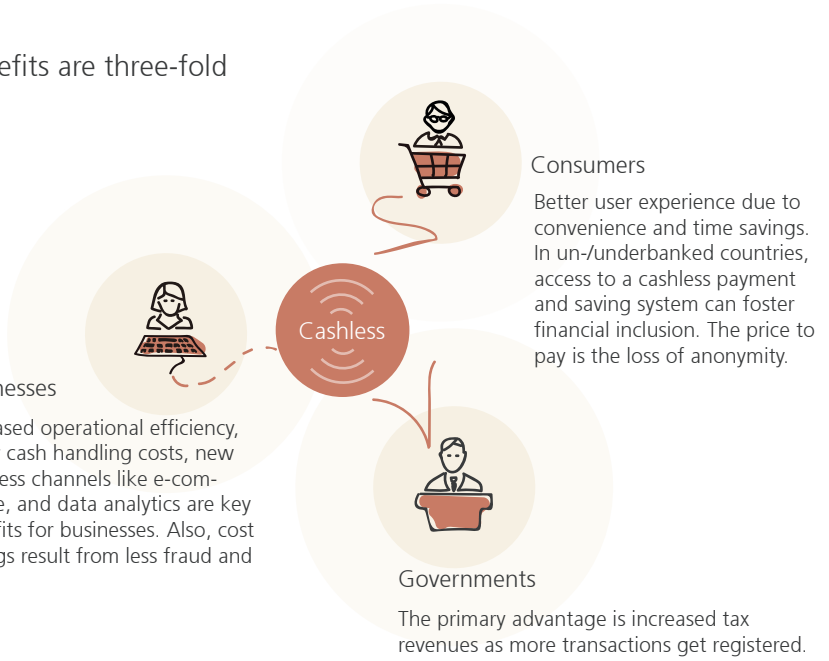
Moving cashless benefits nearly everyone in the value chain. Governments save costs by not printing money and have better control and insight into how their currency is being used. Consumers have a safer, more transparent way of holding and spending money. Merchants do not need to deal with storing cash securely or going to the bank. Finally, digital transactions allow organizations to address a segment of the market that may not have been serviceable in the past because of the potential profitability of the customer or the actual business model itself. This brings individuals into the economic fold as well as provides the potential for a democratized access to a wide range of financial products and services like credit scoring, lending, wealth management, insurance, etc.

A holistic perspective

While the opportunities appear diverse and a cashless society has a range of benefits, it also faces certain obstacles that have to be considered too. Meanwhile, the progress on adoption is a complex interplay of various factors.

Gettyimages

Benefits are three-fold



Consumers

Better user experience due to convenience and time savings. In un-/underbanked countries, access to a cashless payment and saving system can foster financial inclusion. The price to pay is the loss of anonymity.

Businesses

Increased operational efficiency, lower cash handling costs, new business channels like e-commerce, and data analytics are key benefits for businesses. Also, cost savings result from less fraud and theft.

Governments

The primary advantage is increased tax revenues as more transactions get registered. Additional benefits include improved governance due to higher transparency and lower administrative costs. If the formalization of the economy is successful, governments are one of the main beneficiaries of a cashless society.

Benefits

Customer experience is a common denominator of most digital payment solutions. Indeed, cashless transaction are often more convenient, cheaper and faster than traditional cash payments – this operational efficiency creates benefits for consumers and retailers alike. We all experience long queues at an ATM or in a convenience store, where the person in front wanted to pay the exact amount in coins. For governments, transparency and more effective tax collection are key considerations when advocating a cashless economy, especially in countries with a large informal sector. Moreover, security expenses can be lowered by using less cash. Cash also plays an important role in the context of crime, terrorism financing and corruption. The link between cash and illegal activities offers potential for extensive analysis, but most of these transactions cannot be traced – that's why cash is used. It is unlikely that such activities will disappear in a cashless economy, but it's fair to assume that they could become more difficult without cash.

The economic costs of cash are controversial and related studies usually rely on a wide range of assumptions. Several of them suggest that a cashless economy can reduce costs and create overall benefits, but to varying degrees. A quite consistent finding is that the costs of cash are higher in emerging markets compared to developed markets, suggesting that the benefits of a cashless economy should be higher too. Generally, cash is widely perceived as cost-free, but the actual costs range from production and distribution, handling and processing to storage. The use and maintenance of an ATM and branch network, retailers' cash management and security provisions, and fraud or theft all incur costs. The complexity increases further when considering foregone taxes from the informal sector or economic costs related to people being excluded from the financial system. At the same time, however, a cashless economy incurs other costs like the provision and maintenance of a digital infrastructure, including state-of-the-art payment devices and prevention against cybercrime.

A key consideration is whether people simply move from a traditional form of cashless payments (e.g. debit or credit card) to new innovative solutions, or get access to financial services for the first time. Digital technologies can lower the traditionally high entry barriers for certain parts of the population and thereby facilitate financial inclusion, which is especially relevant in emerging markets.

FOCUS: Fostering financial inclusion

Financial inclusion is universal access, at a reasonable cost, to a range of financial services for everyone needing them, provided by a diversity of sound and sustainable institutions.

Her Majesty Queen Máxima of the Netherlands,
UN Secretary-General's Special Advocate for Inclusive Finance for Development (UNSGSA), September 2010

The World Bank estimates that about 1.7 billion adults don't have an account.[18] With meaningful parts of the global population being unbanked[19] or underbanked, accessible financial services remain an important goal. An inclusive payment infrastructure can facilitate this process. For instance, people without a bank account can use new solutions to access basic financial services and more actively participate in the economy through savings and transactions. This is especially pertinent in emerging markets. However, the availability of payment solutions does not necessarily mean that they are adopted and certain parts of the population (e.g. people who live in rural areas, don't have access to mobile phone services, and lack financial literacy or digital savvy) face obstacles, which might even increase if the rest of the society moves cashless. As policymakers see financial inclusion as a priority and companies offer accessible solutions, we think technological innovation will promote financial inclusion and create economic benefits, including higher productivity and investment. Looking at emerging economies, a recent study estimated digital finance could provide a USD 3.7 trillion boost to GDP by 2025, mainly from raised productivity, which is 6% more than in the status-quo scenario.[20]

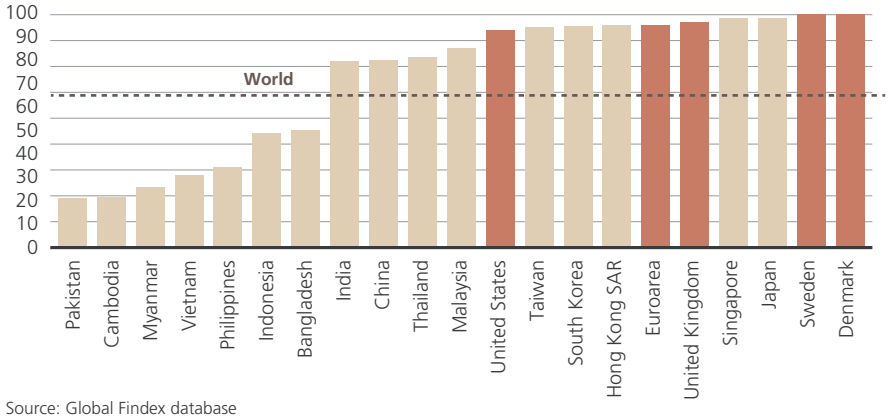
[18] World Bank "The Global Findex Database 2017"

[19] Unbanked refers to people without any access to basic financial services (e.g. bank account); underbanked to people with access to some basic financial services (e.g. bank account), but without debit/credit card or other electronic payments systems

[20] McKinsey Global Institute "Digital Finance for All: Powering Inclusive Growth in Emerging Economies", published September 2016

Share of population with an account

Adults with an account (in %, 2017)



Source: Global Findex database

Interview – Drew Propson

Drew Propson
Project lead
World Economic Forum

Drew Propson currently leads the World Economic Forum's Promoting Global Financial Inclusion project (PGFI). PGFI facilitates public-private collaborations to expand inclusive digital financial services in emerging markets and explore solutions to the unique inclusion challenges encountered in developed economies.

Drew, how can technology enable financial inclusion?

To begin to answer this, it is worth reflecting on what financial inclusion really is. Financial inclusion comprises access to a range of affordable, quality, financial products and services for the excluded and underserved. Additionally, these products and services need to be consumer-centered so that they are used once available. And lastly, the products and services must be commercially viable, in order to ensure their longevity.

Technology is an ideal tool to facilitate all of the above. With recent advances, closing the gap for the financially excluded – estimated to be 1.7 billion – is within reach, and the many more millions with limited access are seeing expanded offerings.

How does financial inclusion boost economic prospects?

Financial inclusion certainly has the potential to reduce poverty and boost economic growth. Inclusion provides the ability to safely send and receive money, or to plan for regular expenses, such as school fees. Additionally, financial inclusion helps consumers build savings, which allows individuals and families to better manage cash flows, build seed capital and acquire long-term assets.

For SMEs, financial inclusion promotes capital investment by increasing access to financing, thus aiding owners in growing their businesses. Through the adoption of insurance products, financial inclusion can also contribute to the management of expenses related to unexpected events such as medical emergencies or natural disasters. Finally, financial inclusion further boosts economic progress by identifying new viable markets for financial services providers.

What is required to realize these benefits? At the same time, where do you see the biggest obstacles?

As a first step, more cooperation between the private sector, regulators and civil society is needed to fully build out an enabling ecosystem. We also need to invest in financial literacy and consumer protection. Another key ingredient, as was noted earlier, is customer-centric approaches in product and services design. Usage is just as important as access.

Regarding obstacles, perhaps the greatest of these is building trust with the end-user – whether you are a bank, fintech company, telco, or government – as this is essential to adoption. Very much related, another major challenge is risk mitigation for cashless or cash-light environments. Digital financial services offer many benefits to the traditionally underserved, however these solutions are vulnerable to infrastructure failures. Preventing, and preparing for, such events is important.

What's the best way to measure progress?

Between 2014 and 2017, 515 million additional adults became financially included according to the World Bank, which is valuable and encouraging. Nonetheless, this metric does not tell the full story. To further advance financial inclusion, we also need demand-side insights that focus on customer behaviors, aspirations and challenges, and a higher emphasis on the actual use of financial services.

In addition, it is critical to keep in mind that financial inclusion is a means to an end. The real goal here is to generate shared prosperity and financial health at the base of the pyramid. Moving forward, we need to reframe financial inclusion toward the wellbeing of the consumer, measuring progress in terms of how individuals are better off from being financially included.

Obstacles
Despite the ongoing digitalization progress, large parts of consumer transactions are still cash-based and cash in circulation is stable to increasing in several economies. This raises fundamental question about challenges in cashless societies and bottlenecks in adoption.

Cash is well known, universal in use and most people trust it. Cash is often the preferred payment option for small transaction amounts – think about a taxi ride in Hong Kong, a lunch at a hawker center in Singapore, or one of the many night markets across the region. When digital payment infrastructure is not fully established or difficult to access and use, cash is usually the easier payment option. In certain countries, the role of the informal sector is also an important aspect for using cash.

Moreover, there is a range of concerns about a cashless society – one of the most important ones is privacy. Cash usually means anonymity, which is seen as beneficial by a lot of people, even if all their transactions are fully legal. Essentially, every digital payment is traceable in some form, either by companies or authorities, and the related data allows the creation of comprehensive user profiles. This information can be used for marketing purposes or credit scores, but also surveillance. Users therefore have to weigh related aspects depending on individual circumstances. For instance, for somebody un- or underbanked who wants to borrow and invest to expand their business, a digital footprint can create an opportunity. On the other hand, for someone who values privacy highly, such a digital profile might be seen as a concern. Besides this increased transparency, other issues are potential fraud, scams and cybercrime. Therefore, a skeptical view prevails in parts of the society, which is also affected by established habits and a lack of familiarity with new technologies.

As mentioned earlier, trust is pivotal for money and some intangible forms of it still have to build a track record. In times of economic crises, emergencies, or when the technology infrastructure breaks down (e.g. electricity, internet, networks), the expression "cash is king" will probably hold true. Greece in mid-2015, when capital controls were introduced and daily withdrawals at ATMs were limited to EUR 60, is a quite recent example of such a crisis.

Finally, the "freedom of cash" should not be underestimated in a society. Imagine, for instance, a scenario of a dominant market player that essentially owns the backbone of a cashless society, sets the terms, and knows everything about your spending habits – wouldn't cash be a nice alternative at times?

Factors for progress
There is a wide range of factors that have to be considered for progress toward cashless societies

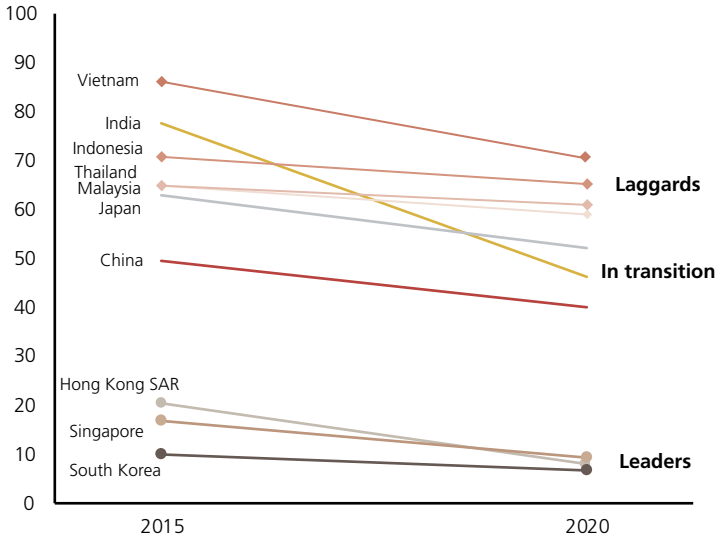
Factors relevant for readiness and progress toward a cashless society in Asia

Readiness	Progress on adoption
Availability of payment infrastructure (e.g. devices, internet connectivity, electricity) and frictionless access (e.g. mobile phones, contactless point-of-sale terminals)	Economic and market conditions (e.g. role of established banking system, rising middle class, financial inclusion, role of informal sector)
Government policy and regulation	Further innovation in technology
Basic awareness, education and financial literacy	Mindset (e.g. culture, lifestyle, experience with crises)
	Policy measures
	Trust in institutions and banking sector

in Asia. Having a digital payment infrastructure doesn't necessarily mean that it will be widely used; for instance, if it's too complicated or there is some more fundamental attachment to cash due to economic or cultural factors. On the one hand, an advanced retail banking system could facilitate payment innovation, but could also reduce the need for it. On the other hand, a less advanced retail banking system could be a barrier for adoption, but could also offer huge potential for innovative payments solutions to fill this gap. Clearly, there are different roads on the journey. For example, a cashless China might look different than a cashless Singapore, which is discussed below, and will most likely be different to some of the almost cashless countries in Scandinavia which are at the forefront globally. Meanwhile, Japan is an interesting example where cash is still widely used; it's among the countries with the highest cash in circulation relative to GDP globally, despite the high availability of technology and an advanced banking system.

Progress differs significantly across Asia

Consumer transactions in cash (as % of total payment transactions value)



Estimates for 2020
Source: Euromonitor Passport, UBS

FOCUS: Singapore ready to move further

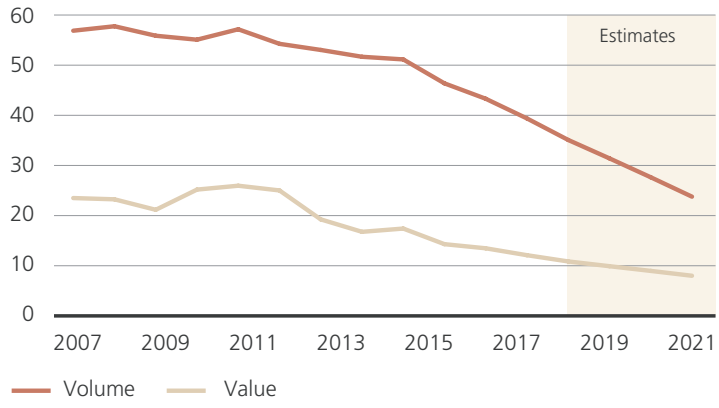
In Singapore, we too have e-payments, but we have too many different schemes and systems that do not talk to one another.

Lee Hsien Loong, Prime Minister of Singapore, August 2017

Based on various measures, Singapore is well positioned on the road to a cashless society. The country regularly ranks high in comparative studies due to its advanced digital and financial infrastructure as well as supportive government policies. Despite progress, cash in circulation has consistently increased over the past years and more than 40% of consumer transactions were still in cash last year. Inefficiencies and the wide range of payment options have been obstacles for a broader adoption of digital payments, but we think recent initiatives are moving the country into a cashless direction, with cash soon drifting below 10% of consumer transaction value compared to more than 20% in 2012.

Cash use is expected to decline further in Singapore

Consumer transactions in cash (as % of total payment transactions volume/value)



Source: Euromonitor Passport, UBS

Payment solutions are a policy priority in Singapore's Smart Nation vision. For instance, the wide range of contactless payment methods for public transportation, including mobile phones and wearables, make the daily life of commuters more convenient. Moreover, the PayNow service allows efficient peer-to-peer money transfers for customers of the seven participating banks, just by using the mobile phone number of the recipient. The underlying FAST (Fast and Secure Transfers) technology is an important building block to grow electronic transfers of funds.

As efficiency improves and adoption of digital payments broadens, we expect the transition toward a cashless society to continue in Singapore. More fundamentally, it is also an innovative case how to create a digital ecosystem on a city level, which will be a priority for policymakers throughout the region due to rising urbanization.

Urbanization

In 2014, more than 50% of the global population lived in urban areas, according to the UN. By 2050 this number is expected to increase to 66%, with Asia remaining among the fastest-urbanizing regions, although growth rates have started to slow. India, China and Indonesia together account for 30% of the almost 2.5 billion expected increase in urban population in the coming decades.[21] This growth creates opportunities and challenges, but will make sustainable urban development and the provision of efficient infrastructure more important than ever.

[21] United Nations "World Urbanization Prospects – 2014 Revision"

Thinking ahead

Asia is well positioned to further advance toward a cashless society, as many of the relevant ingredients are in place and the region is expected to be at the forefront of this transition globally. In this context, technological innovation will remain a pivotal enabler and the related digital payment ecosystem will make physical cash increasingly obsolete across the region, in our view. Similar to China, several countries can leapfrog intermediate steps like credit cards, moving directly to mobile payments and broadening financial inclusion. These developments have important business and investment implications that we outline in the next chapter.

Based on certain characteristics of cash like its universal nature, however, we think cash is unlikely to disappear in the foreseeable future. As cash becomes increasingly obsolete as a medium of exchange, it will mainly play a backup role in less-cash societies. For instance, in times of economic crises, emergencies, or when the technology infrastructure breaks down, the expression "cash is king" will probably hold true.

While cryptocurrencies dominated headlines in the past year, we think it's premature to consider them as a replacement of the established payment solutions at this stage. However, we believe the underlying blockchain technology offers considerable potential and related innovations might increasingly complement the building blocks of a cashless ecosystem in the coming years.

As we outlined, there is a range of benefits in a cashless society. But challenges will emerge along the way, and they must be considered carefully. Therefore, we encourage everyone to think critically about this topic and weigh the pros and cons. Individual considerations might differ, but eventually we should ask ourselves: Do we want to live in a cashless society? Do we understand what this means? And is there a way back on this road?

A "less cash" society

Professor
Kenneth Rogoff
Harvard University

Kenneth Rogoff is Thomas D. Cabot Professor at Harvard University. From 2001–2003, Rogoff served as Chief Economist at the International Monetary Fund. His recent book "The Curse of Cash: How Large-Denomination Bills Aid Crime and Tax Evasion and Constrain Monetary Policy" explores the past, present and future of currency, from Kublai Khan to crypto-currencies, including implications for monetary policy and pubic finance. His monthly syndicated column on global economic issues is published in over 50 countries. Rogoff is an elected member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the Group of Thirty.

Prof Rogoff, what is your view on the challenges and opportunities for the world's consumers, businesses and governments to shift toward a cashless society?

To be precise, the world is moving towards a "less cash" society not a cashless one. We probably will – and should – retain some form of physical currency indefinitely, particularly because of privacy concerns. At the same time, however, governments need to make it difficult for individuals to engage in frequent, large-scale anonymous transactions for purposes of tax evasion and crime. This probably means both restricting the maximum size of cash payments as well as phasing out large-denomination notes. Obviously, for the same reason, governments in advanced economies will eventually crack down on pseudonymous cryptocurrencies such as Bitcoin, though of course the blockchain technology will be used in many other uses.

What will be the implications for the formation and implementation of monetary and fiscal policies in a cashless society?

Setting important privacy issues aside, the move to a less-cash society would help both monetary and fiscal policy. In the 2008 financial crisis, virtually every major central bank would have engaged in a (temporary) negative nominal interest rate policy if they could have, in order to boost demand and raise inflation (such policies would drive long-term interest rates up, not down). The arguments were first laid out by John Maynard Keynes, who highly recommended the idea in a crisis but argued that it was impossible because negative interest rates would force a run into cash. In today's highly electronic payments world, however, there are fairly straightforward ways to discourage this. Perhaps the simplest would be to get rid of large notes; that should be sufficient to pension funds, insurance companies and financial firms from shifting to cash until interest rates become negative 3% or lower. But it is also possible to create a moving exchange rate between paper and electronic currency that mimics negative interest rates, at least for the wholesale market, allowing for much deeper negative interest rates. Today, that may be unthinkable but as cash becomes increasingly marginalized in the legal economy, the political obstacles should fade. As for fiscal policy, a move away from cash would likely lead to higher tax revenues more than sufficient to offset the lost benefits of seigniorage (not to mention the cost savings from a marginally lower crime rate). The financial industry would likely gain some of the business the government loses by moving away from cash, unless governments themselves issued a digital currency, which they likely will at some point.

As the former Chief Economist at IMF, what would be your perspective on growth, inflation, and exchange-rate policies in a cashless society? Any investment implications?

There is actually no first-order implication, except that both monetary and fiscal policy would become more efficient, for reasons discussed above. There could arise some exchange-rate issues in a transition period where some countries have gone "less cash" but others have not. For example, if Korea had the capacity to engage in deep negative interest rate policy in a global financial crisis, but Japan did not, the Korean central bank would be able to push the won down against the yen, which could be to Korea's advantage in a situation where global demand is weak.

Do you see any other implication from a social development perspective of a cashless society, such as the reduction of crime and poverty or income inequality?

Regardless of how society decides to regulate cash, governments should devote more attention to increasing financial inclusion. India, of course, has demonstrated one path through its Aadhaar system, which has succeeded in providing virtually free debit accounts to the poor at extremely low costs. Some advanced economies, including Denmark and Sweden, have created free debit card accounts for low-income individuals that are then used for government transfers. The efficiency savings alone go a long ways toward covering the modest cost of the accounts. The poor are also far more often victims of fraud and corruption. Studies in both the context of the United States and India have shown the benefits to the poor of switching to electronic payments to be considerable.

What will be the role of cryptocurrencies in a cashless society?

The long history of currency shows that innovations almost invariably come from the private sector. But in the long run, the government regulates and appropriates. I realize that some cryptocurrency evangelists believe that government-issued currencies will fall by the wayside. This is nonsense. In the currency game, the governments make the rules and will always keep changing them until they win. They will do this by making (cryptocurrency) payments in retail and financial transactions illegal, thereby rendering cryptocurrencies illiquid at best, and possibly worthless. Importantly, digital currencies that have the capacity to be 100% compliant with anti-money laundering laws will be able to adapt and survive.

Any particular view on the different dynamics of the evolution toward a cashless society for the world's two largest economies: the US and China?

A very good question. More likely it will go faster in China, given the strength of the very small but vocal cash lobby in the United States.

Investment and business implications

iStock

Investment perspective
We believe the cashless transition offers significant investment opportunities across financials, technology, retail and other sectors. Investors will be best rewarded by investing in a diversified list of fintech companies, in our view, as we believe they are at the forefront of digital innovation.

Our recent Longer Term Investment theme "Fintech", published in April 2018, is one play on this transition and highlights a range of companies in Asia. Despite significant changes during the past few years, we believe global financial services are at an early stage of a major fintech-driven digital transformation. Fintech is a confluence of financial and technological innovation that provides banking and financial services. We identify fintech services as "new" ones like digital (mobility, cloud, analytics and social) and emerging (artificial intelligence (AI) and blockchain) technologies; examples of "old" services include banking software and data centers.With strong growth expected across fintech verticals over the next few years, we are still in the early stages of adoption. We expect global annual fintech industry revenues to rise from USD 120bn in 2017 to USD 265bn in 2025, making it one of the fastest-growing areas in both technology and financial sectors and industries globally. Driven by superior growth, as highlighted in our Longer Term Investment theme, we expect fintech companies to generate low-to-mid single-digit outperformance versus the MSCI World Index over the next decade.

Fintech provides both opportunities and risks to existing incumbents. We believe companies that embrace technology and are flexible at adjusting their business models should relatively outperform their peers. With more than 10% revenues growth and moderate margin expansion due to rising scale benefits, we expect fintech companies

to report low-double-digit earnings growth over the next few years.

Investors, in our view, will be best rewarded by investing in a diversified selection of companies, with a focus on payment industry leaders, technology companies launching disruptive services and incumbent financial companies with a clear fintech strategy. Additionally, companies that are able to create platforms with network effects around emerging technologies like AI, blockchain and analytics are also potential winners.

For further details, refer to CIO Longer Term Investments theme on Fintech, published April 2018

Business perspective

The business implications are diverse too. We have categorized them into success factors, market potential and areas of disruption. In our view, it will be crucial for businesses to position for an evolving cashless ecosystem in the coming years – embracing related opportunities will be a differentiating factor along the value chain.

Success factors

Companies that address a gap in the market and make life more convenient find success. In this context, technology is an important enabler, as are access to a large user base and a "more than payment" approach. In the past, payments were often seen as the settlement of transactions and not part of the core business. Today, they are increasingly embedded into a broader ecosystem of e-commerce, fintech, or social networks – this has created a lifestyle component and has become a crucial part of the value chain.

Market potential

– *Data analytics:* Digital payments are more than just financial transactions – they also create a vast amount of insightful data. In our view, the coinciding rise of big data analytics will allow companies to deploy this information (e.g. market trends, consumer spending analysis, credit scoring) and create business opportunities.

– *Financial inclusion:* Making use of innovative solutions to provide unbanked or underbanked people access to financial services offers vast potential, as it broadens the potential client base.

– *Global expansion:* A range of companies have developed into dominant players in certain countries (e.g. China) or market segments (e.g. the credit card business). Broadening this reach to new markets, either geographically or along the value chain, can create further business opportunities.

Areas of disruption

Disruption is created by innovative business models, technology and related solutions. Major technology companies and fintech firms tend to be more agile than incumbents. Also, they attract a lot of interest from venture and private capital investors, allowing them to explore and launch new innovation. We expect this trend to continue, especially as more traditional financial services firms enter this realm. Financial institutions will continue to play an important role by providing access to the established payment system (e.g. bank accounts, settlements) and in developing and scaling new solutions; but they have to broaden their scope amid changing market dynamics.

All these developments have to be considered in an evolving regulatory framework, with more market players outside of traditional banking offering financial services. Generally, regulators have been supportive of cashless innovation as long as security standards and customer protection are ensured. Besides the creation of trust, other important areas are compliance and efficiency like the interoperability of different systems.

Disclaimer

Research publications from Chief Investment Office Americas, Wealth Management, formerly known as CIO Wealth Management Research, are published by UBS Wealth Management and UBS Wealth Management Americas, Business Divisions of UBS AG or an affiliate thereof (collectively, UBS). In certain countries UBS AG is referred to as UBS SA. This publication is for your information only and is not intended as an offer, or a solicitation of an offer, to buy or sell any investment or other specific product. The analysis contained herein does not constitute a personal recommendation or take into account the particular investment objectives, investment strategies, financial situation and needs of any specific recipient. It is based on numerous assumptions. Different assumptions could result in materially different results. We recommend that you obtain financial and/or tax advice as to the implications (including tax) of investing in the manner described or in any of the products mentioned herein. Certain services and products are subject to legal restrictions and cannot be offered worldwide on an unrestricted basis and/or may not be eligible for sale to all investors. All information and opinions expressed in this document were obtained from sources believed to be reliable and in good faith, but no representation or warranty, express or implied, is made as to its accuracy or completeness (other than disclosures relating to UBS). All information and opinions as well as any prices indicated are current only as of the date of this report, and are subject to change without notice. Opinions expressed herein may differ or be contrary to those expressed by other business areas or divisions of UBS as a result of using different assumptions and/or criteria. At any time, investment decisions (including whether to buy, sell or hold securities) made by UBS and its employees may differ from or be contrary to the opinions expressed in UBS research publications. Some investments may not be readily realizable since the market in the securities is illiquid and therefore valuing the investment and identifying the risk to which you are exposed may be difficult to quantify. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS, into other areas, units, divisions or affiliates of UBS. Futures and options trading is considered risky. Past performance of an investment is no guarantee for its future performance. Some investments may be subject to sudden and large falls in value and on realization you may receive back less than you invested or may be required to pay more. Changes in FX rates may have an adverse effect on the price, value or income of an investment. This report is for distribution only under such circumstances as may be permitted by applicable law. Distributed to US persons by UBS Financial Services Inc. or UBS Securities LLC, subsidiaries of UBS AG. UBS Switzerland AG, UBS Deutschland AG, UBS Bank, S.A., UBS Brasil Administradora de Valores Mobiliarios Ltda, UBS Asesores Mexico, S.A. de C.V., UBS Securities Japan Co., Ltd, UBS Wealth Management Israel Ltd and UBS Menkul Degerler AS are affiliates of UBS AG. UBS Financial Services Incorporated of Puerto Rico is a subsidiary of UBS Financial Services Inc. UBS Financial Services Inc. accepts responsibility for the content of a report prepared by a non-US affiliate when it distributes reports to US persons. All transactions by a US person in the securities mentioned in this report should be effected through a US-registered broker dealer affiliated with UBS, and not through a non-US affiliate. The contents of this report have not been and will not be approved by any securities or investment authority in the United States or elsewhere. UBS Financial Services Inc. is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule") and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule.

UBS specifically prohibits the redistribution or reproduction of this material in whole or in part without the prior written permission of UBS. UBS accepts no liability whatsoever for any redistribution of this document or its contents by third parties.

Version as per September 2017.