Fighting poverty, profitably

Transforming the economics of payments to build sustainable, inclusive financial systems

BILL & MELINDA GATES foundation

SPECIAL REPORT ANNEX:
Country-specific data on payments systems and financial inclusion, September, 2013

About the Gates Foundation's Financial Services for the Poor program

Poor people do not live in a static state of poverty. Every year, many millions transition out of poverty by successfully adopting new farming technologies, investing in new business opportunities, or finding new jobs. At the same time, large numbers of people fall back into poverty due to health problems, financial setbacks, and other shocks. However, it is costly to serve poor people with financial services, in part because most of their transactions are conducted in cash. Storing, transporting, and processing cash is expensive for banks, insurance companies, utility companies, and other institutions, and they pass on those costs to customers.

The Gates Foundation's Financial Services for the Poor program aims to play a catalytic role in broadening the reach of digital payment systems, particularly in poor and rural areas, and expanding the range of services available on these systems. Until the infrastructure and customer base are well established, this might involve a combination of mobile money services that are accessible via cell phones and brick-and-mortar stores, where subscribers can convert cash they earn into digital money (and vice-versa).

Our approach has three mutually reinforcing objectives:

- Reducing the amount of time and money that poor people must spend to conduct financial transactions
- Increasing poor people's capacity to weather financial shocks and capture income-generating opportunities
- Generating economy-wide efficiencies by digitally connecting large numbers of poor people to one another, to other consumers, to financial services providers, to government services, and to businesses.

We are not focused on a particular product or distribution channel, but rather on innovative ways to expand access and encourage markets. At the same time, we are aware that interventions in this and other areas too often involve technologies that are made available to the intended users, but are not adopted. To address this demand-side challenge, we are supporting research and product design experiments to identify design features, price incentives, and marketing messages that will encourage poor people to adopt and actively use digital financial services. We are also supporting policymakers as they work
to develop policies and regulations that facilitate these developments.

We believe that the combined effect of interventions to expand and encourage markets will accelerate the rate at which poor people transition out of poverty and decrease the rate at which they fall back into poverty. Our strategy also recognizes that countries are at different stages in developing an inclusive digital financial system, and that we must tailor our interventions accordingly.

About this document

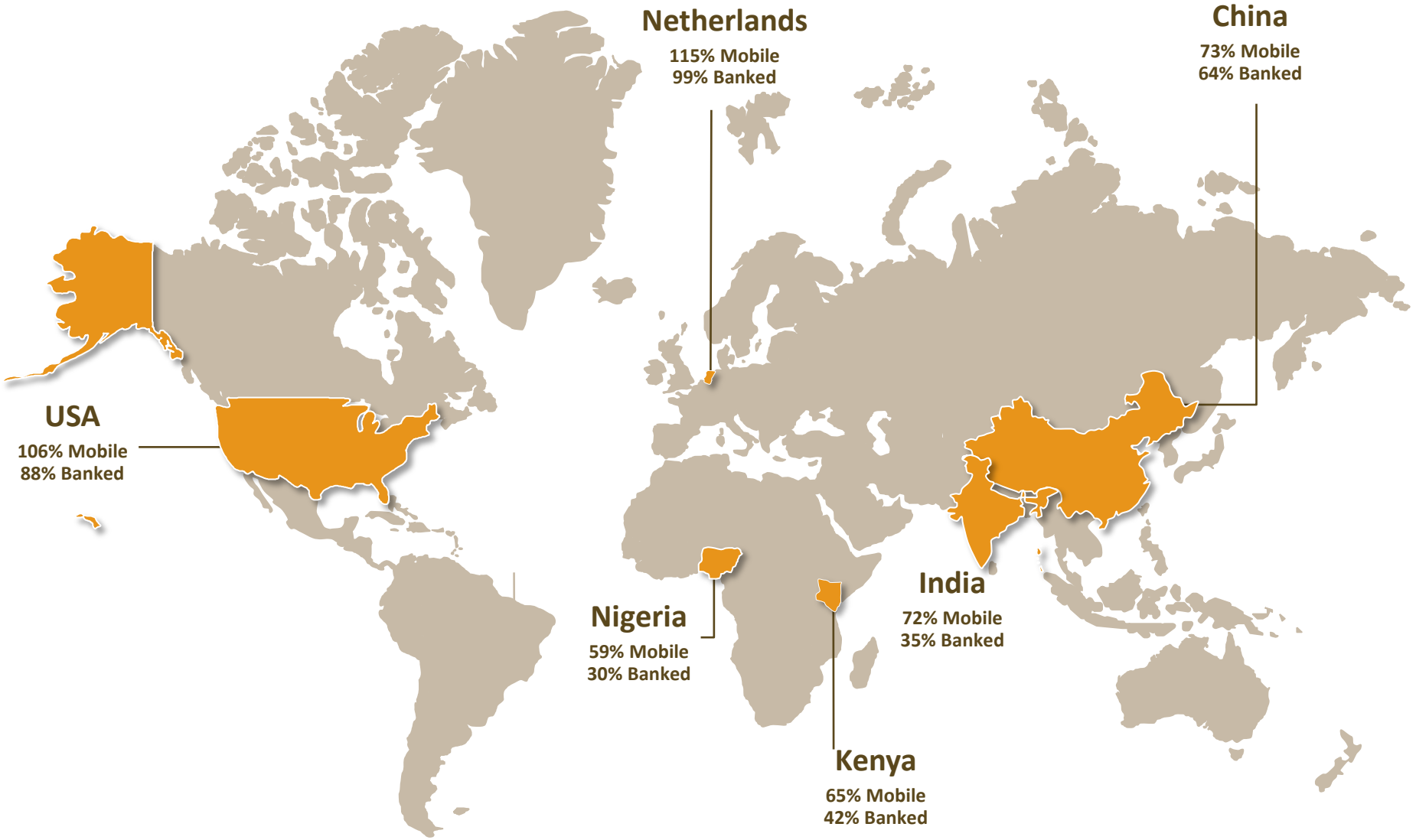
Our goal: create a holistic view of payment system economics. The Gates Foundation's Financial Services for the Poor program conducted this research because we believe that there is a gap in the fact base and understanding of how payment systems can extend digital services to low income consumers in developing markets. This is a complex topic, with fragmented information and a high degree of country-by-country variability. A complete view across the entire global payment system has been missing, limiting how system providers, policy makers, and regulators (groups we refer to collectively as *financial inclusion stakeholders*) evaluate decisions and take actions. With a holistic view of the system, we believe that interventions can have higher impact, and stakeholders can better understand and address the ripple effects that changes to one part of the system can have. In this report, we focus on the economics of payment systems to understand how they can be transformed to serve poor people in a way that is profitable and sustainable in aggregate.

Factors to keep in mind as you consider this report. The data available to evaluate individual payment systems is limited. Even in highly advanced economies, complete and comparable information is difficult to obtain. In the developing world, much of this data simply does not exist. Given that there are limited examples showing how providers make money from providing financial services to the poor at scale, we looked at payment systems in both the developed and developing worlds, and tried to learn how to apply lessons from both to reach the poor. In this report, we present a complete set of analyses and estimates based on the strongest collection of data that we could assemble. Readers should understand this base of data as a "best efforts" attempt to provide a full picture of payment system costs and revenues, rather than a definitive source. We have focused on evaluating formal payment flows that have available data and benchmarks. We recognize that there are large payment flows over informal channels, such as unlicensed money transmitters, that are outside the scope of our analysis.

What we analyzed. As part of our work, we conducted a thorough assessment of the payment systems in six significant economies – Nigeria, Kenya, India, China, the U.S., and the Netherlands – to understand their elements, changes over time, and the economics for providers. McKinsey & Company's Global Payments Map – a structured and consistent dataset on payment systems – provided a critical pillar. We also interviewed more than 100 industry experts across the countries profiled.

Structure of this pack. This pack summarizes our findings across the countries we analyzed. For each country, we provide an overview of the payment system and the level of financial inclusion, followed by specific country analyses pertaining to the four main elements of the payment system: accounts, cash in-cash out (CICO), transactions, and adjacencies.

Countries in our analysis



Account at a formal financial institution (% age 15+): Global Findex 2011.
Mobile cellular subscriptions (per 100 people). Sources: International Telecommunication Union, World Telecommunication/ICT Development Report and database, and World Bank estimates.

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The payment system in China

Characteristics

- **An extensive foundation of banking and core infrastructure** allows for an effective legacy platform to reach most consumers in urban and rural areas, with fall-off in quality of access in township and village areas
- **Government and regulators guide development effectively** across the system through direct control of infrastructure (e.g., China UnionPay credit card company), major distribution players (e.g., Postal Savings Bank), and influence on other actors (e.g., Big Four banks)
- **Government policy objectives are visible in corporate strategy** and guide investment choices by major players; widespread acknowledgement of government goals and importance of CSR goals
- **A utility-based payments system** provides widespread access to high-quality services with controlled costs (e.g., regulators set interchange, interest rates, payment fees); profitability of payments is low to negative, while adjacent profits drive incentives
- **The under-banked have significant needs, and many do not access the system despite its reach and relatively low cost**; while access to services is high, major segments – rural poor, urban migrants – have challenges accessing the system; there is a common perception that available services lack relevance and require time to access
- **The non-bank payment sector is growing** rapidly from online commerce into more mainstream payment applications (e.g., bill payment, money transfer, POS payments); while the sector focuses on affluent consumers in urban markets, it recognizes the potential for rural consumers

Implications for financial inclusion

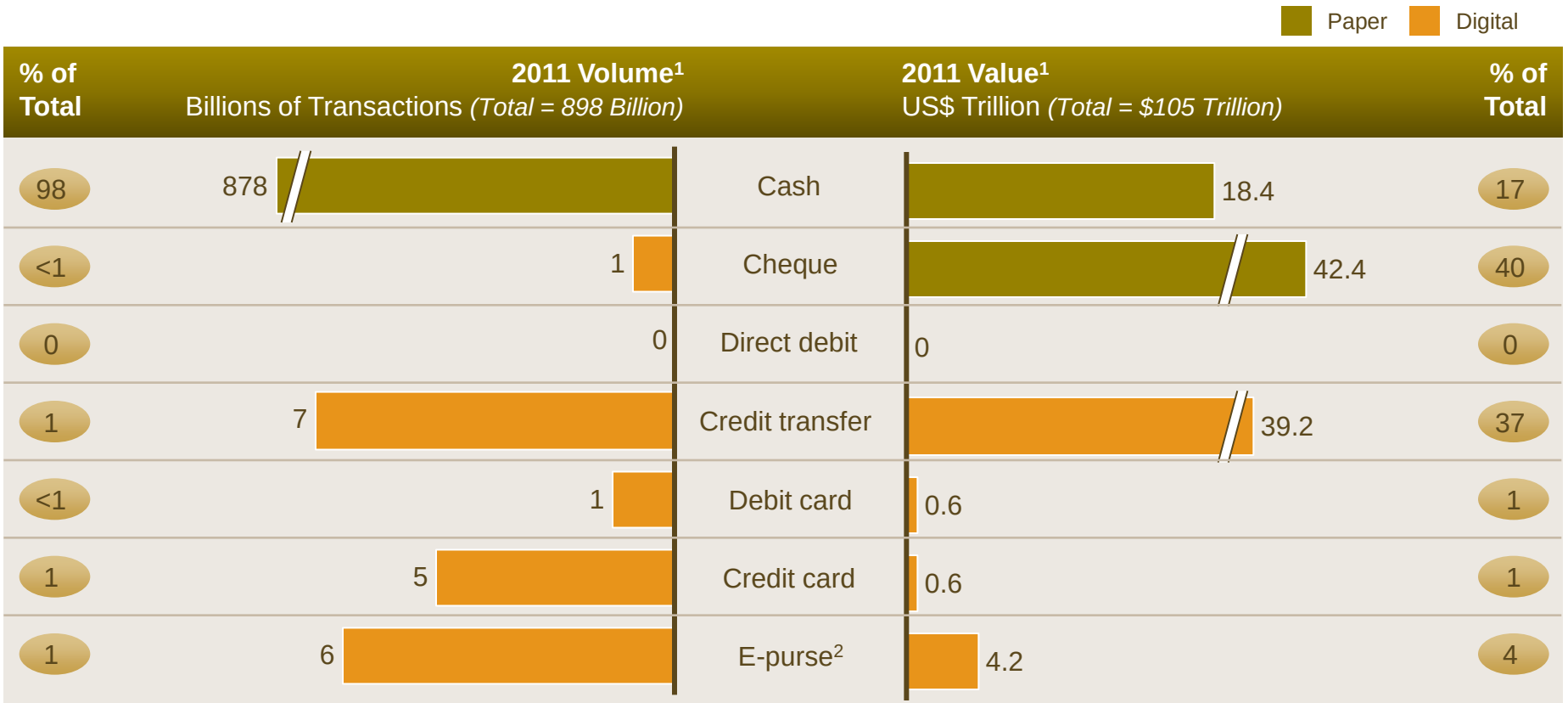
- **Coordinated government programs can be highly effective.** China's government steers the system through multi-pronged efforts and exerts direct and indirect controls
- **Mobile not likely to have disruptive impact on low-income segments**; because traditional infrastructure is already serving many core needs. Mobile is likely to play an important complimentary role for specific payment transactions (e.g., bill payment, remittance)
- **Improved cash access and convenience** are seen as critical areas for improvement; leveraging ATMs, POS, and mini-branches for greater access and convenience
- **Network extension and collaboration** will expand reach; China's systems are working together to expand services (e.g., Postal Savings Bank is disbursing to rural areas, online players are linking to bank branches)

Payments in China by the numbers

Usage & Inclusion	Instrument usage	**Highly cash dominated with growing card and credit transfer volumes.** Percentage of payments made via digital or mobile channels by value: 61% C2C, 39% C2B, 87% B2C
	Financial inclusion	**Medium-to-high with limited access for specific geographies** ▪ Formal access: 64% of population (based on Findex data) acknowledged access to an account; formal barriers to accounts are low (virtually free, wide infrastructure) however relevance to daily uses can be low for low income consumers
Payment system	Network infrastructure	**Centralized** ▪ CNAPS (China National Advanced Payment System) has been replacing older EIS system since 2001 for ACH ▪ China UnionPay (CUP) is sole, state influenced, card network (formed in 2003) and also settles account-to-account trxns
	Regulation	**Highly Active** ▪ Led by People's Bank of China (PBC), the Ministry of Finance (MoF) and the China Banking Regulatory Commission (CBRC); China deploys an effective regulatory regime capable of guiding the system; however, responsibilities overlap
Environment	Banking system reach	**High reach per capita, but highly variable across geographies** ▪ Branches: 15 branches per 100K (~210K total) ▪ ATMS – 25 ATMs per 100K (334K total) ▪ POS – 359 per 100K (4.8M total)
	Mobile & telecoms	**Very high penetration in urban areas-less so in rural areas** ▪ Rapidly growing market, with 3 major providers China Mobile (66%), China Unicom (20%), China Telecom (13%) ▪ Mobile users: 66% of population (90%+ penetration in urban areas)
	Other market infrastructure	**Advanced – strong basic infrastructure, expanding into low income areas** ▪ Well-developed core market infrastructure – electricity, transport, education – as state planning drives economy and investment in infrastructure has been a major policy goal for decades
	Economic environment	**Middle and low income** ▪ GDP per capital (PPP): $8,500 (2011) ▪ GINI coefficient of 48 (2009)
	Demographics & geography	**Mixed urban and rural, aging and urbanizing** ▪ 50% of population is urbanized – China is rapidly urbanizing, experiencing the largest, fastest migration of rural-to-urban population in history

SOURCE: Findex Global Database; China Household Finance Survey p 70 (http://chfs.swufe.edu.cn/); China Union Pay; PBC; Expert Interviews, CGAP China Working Paper on Inclusiveness No. 7; CIA Fact Book

Cash dominates payments in China by volume, while significant value is exchanged through cheques and credit transfers



- The vast majority of payments by number are in cash
- Cheques account for 40% of transactions by value - vast majority of these (>99%) are used in B2B, in corporate banking
- Credit transfers account for nearly 37% of payment value – most such payments are B2B but a significant fraction of salary payments by value are also done via transfers

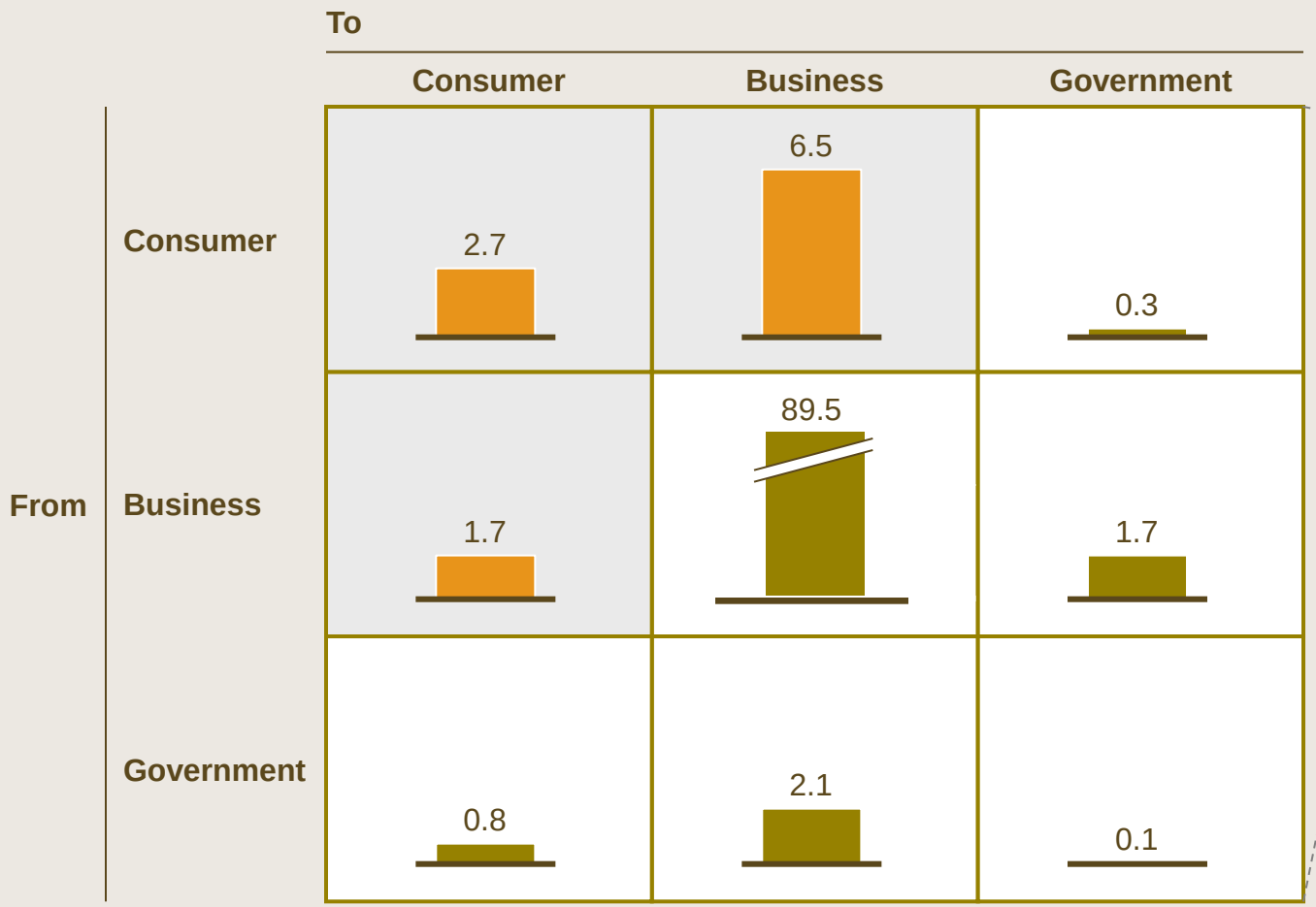
1 Only includes interbank transactions
2 E-purse denotes Internet payments that run though non-bank payment providers (e.g., Alipay)

SOURCE: McKinsey Payments Map, 2011

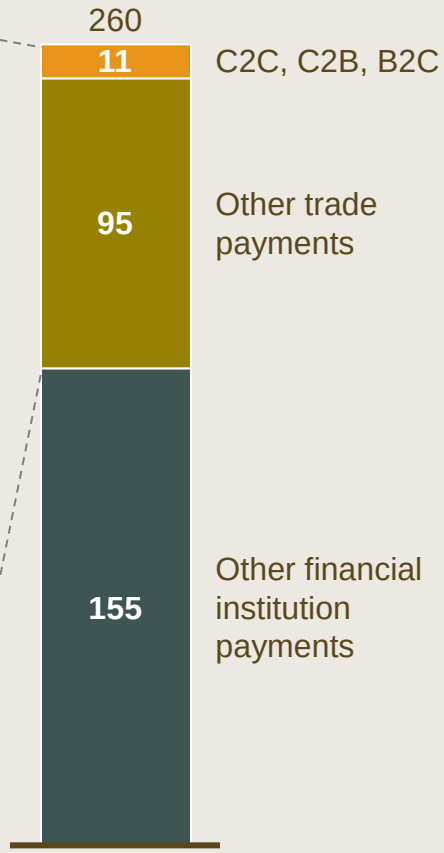
The transactions most strongly impacting Chinese consumers account for about $11 trillion of payment flow

Area of focus

Trade payments in China by transaction parties, 2011
US$ Trillion



Total trade payments by value, 2011
US$ Trillion

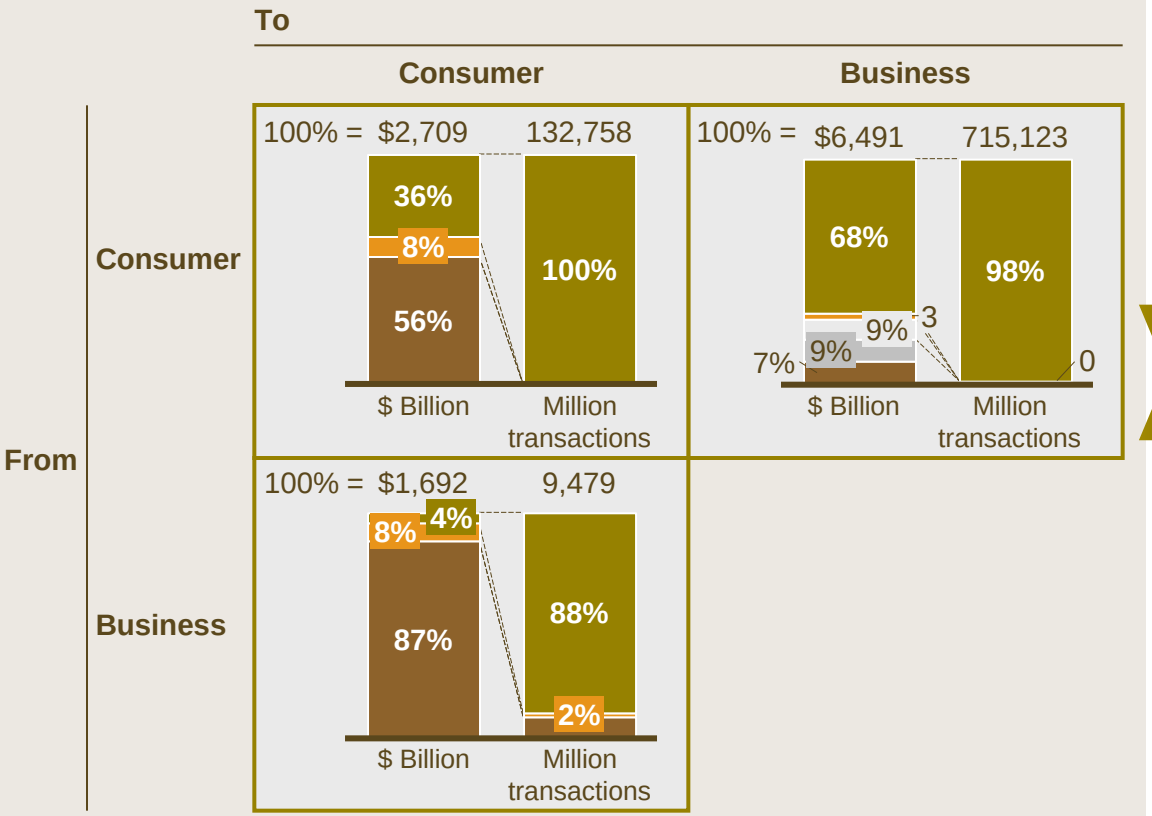


SOURCE: McKinsey Payments Map, 2011; IMF

Cash and credit transfers are the most commonly used retail payments instruments in China; there is also some card use

$ = High value (>20% use)
# = High volume (>20% use)

Trade payments in China by transaction parties, 2011[1]
Value in US$ Billions, Transactions in Millions



Major instruments used by transaction type

	C2C	B2C	C2B
Cash	$ #	#	$#
Cheque			
Direct debit			
Credit transfer	$	$	
Debit card			
Credit card			
E-purse			

1 Only includes interbank transactions

SOURCE: McKinsey Payments Map, 2011

Financial inclusion in China

Overall financial inclusion performance: Medium

Percent with an account at a formal financial institution

- Overall -- 64%
- Bottom 40% -- 47%
- Women -- 60% have formal financial accounts

Payment services access

- Debit card access -- 41%
- Credit card access -- 8%
- Receive wages in a formal account: -- 19%

Distribution access (per 100,000 people)

- Bank branches -- 15; varies by province
- ATMs -- 25
- POS terminals -- 359
- Mobile access -- 66% of population

Additional comments

Four main groups have trouble accessing financial services:

- **Rural households** are often in very remote areas, and own little to no possible collateral (350-450 M1 people)
- **Low-wage migrant workers** may have difficulty opening accounts where they do not have resident status and have little collateral (150-250 M2 people)
- **Private MSMEs**[2] have no implicit state banking and often financed through the informal market
- **Unemployed individuals** have few options for credit to start a business

Key takeaways

- **Rural areas are served by core banking** infrastructure fairly well until township level; village level access drops off sharply, with limited access and daily relevance. 2,300 towns and townships have no physical outlet[1], out of 30,000-40,000 total
- **Rural branch coverage fell in the early 2000s** as the Agricultural Bank of China became a publicly-traded company
- **The government provides strong backing of financial inclusion initiatives** as part of policies to develop rural communities, and helps align private sector to these goals
- **Findex estimates account penetration at 39%** for the lowest quintile of earners[1] (other estimates set this figure higher)
- **Limited access to payments infrastructure at the town level is a barrier to financial inclusion** but has been improving
  - Rural institutions have their own automated clearing house (focused on remittances), which has driven use
  - Competition to serve users in rural areas, particularly through remittance services, has increased in the past 5 years

1 35% of HHs are rural and live on less than $2.50/day; 71% of rural workers are in farming, forestry, animal husbandry, or fishery (Grameen, CGAP)
2 Medium, small, and micro-enterprises

SOURCE: Findex Global Database; China Household Finance Survey p. 70 (http://chfs.swufe.edu.cn/); CGAP China Papers on Inclusiveness No. 7; "Payment Systems: From the Salt Mines to the Board Room" (2008); Grameen; China Union Pay; PBC; Expert Interviews

The particular circumstances in China have enabled profitable interest-based models for banks

1 **High personal savings rate**	▪ China has the highest savings rates in the world, particularly among low income earners (~31% of household income for families with monthly income of 1,500 Rmb or $895 annually) ▪ High savings rates ensure a significant deposit base, leading to interest income
2 **Stable interest rate spread**	▪ State mandated spread of ~300 bps allows for stable profit on savings accounts; newly instituted tiered capital requirements ▪ Estimated interest income from lowest income earners is ~$27 ($895 x 3%), enough to cover the cost of a bank account before accounting for any transaction income
3 **Heavy intra-bank transfer volumes**	▪ Many transfers to rural areas are done via the intra-bank system, reducing costs (e.g., in the US inter-bank cheque and credit transfer costs are 20-40% more expensive; in China, as a proxy, banks charge customers 10 bps less per transaction for intra-bank payments) ▪ Large volumes of intra-bank transfers may go along with some efficiencies - more accounts per person and higher rates of account dormancy (up to 40% for some banks vs. 8% in the US)
4 **Limited customer acquisition costs**	▪ Banks work to win employers as customers and then require that employees open a dedicated account for salary payments, saving on marketing costs to consumers themselves ▪ Similarly, banks work to convert those who send money to the rural poor (e.g., urban relatives, government) rather than the rural poor themselves ▪ Government has provided easy means of compliance with KYC by issuing IDs universally (an ID is the only requirement to open an account)
5 **Government disbursements go to bank accounts**	▪ People must have a bank account to register for a pension (~325 Million rural residents registered) ▪ Government pensions are paid into a bank account (~$213 Billion in 2012, of which $10 Billion went to rural recipients), increasing likelihood that savings are held with a bank

SOURCE: IMF; Credit Suisse China Survey, 2011; Expert Interviews; 2010 McKinsey ACH benchmark, 2011 Cheque benchmark; Bank websites; Ministry of Human Resources and Social Security PRC

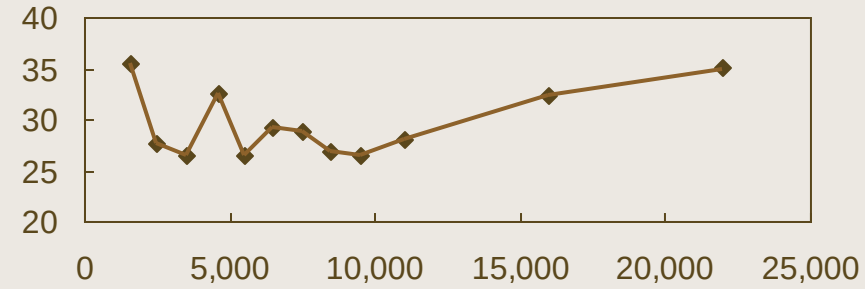
Savings rates are higher in China than in other developing markets and are largest in poor and rural households

Savings ratio among emerging markets[2]

Savings as percent of household income

Savings rate in China at different incomes levels[2]

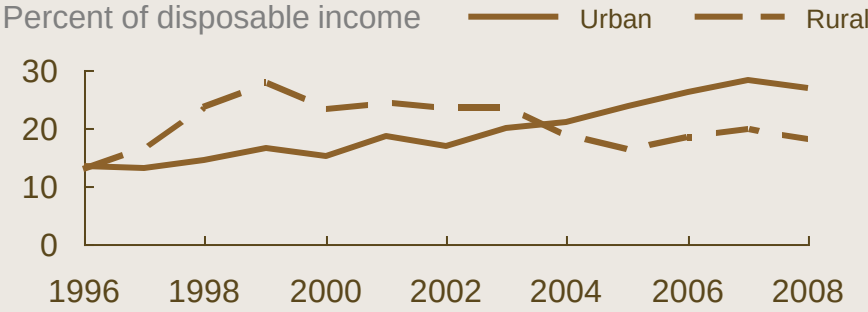
Household savings ratio %



Monthly household income, Rmb

Urban/Rural savings rates in China[1]

Percent of disposable income



1 Savings rates calculated based on per capita income and consumption. For the urban series, the measure of income used is disposable income per capita, while for the rural series the measure used is net income per capita (IMF;http://www.imf.org/external/pubs/ft/wp/2011/wp11223.pdf)

2 Based on household-level estimates (Credit Suisse China Survey 2011)

SOURCE: IMF, Credit Suisse China Survey, 2011

Four main players provide financial services in rural areas, where the majority of poor people live

	Description	Role in payments	Reach: Total branches (Thousands)	Reach: Total rural HH loan value (Billions RMB)	Reach: Total rural borrowers (Thousands)
Rural Credit Co-operatives	▪ Long history of serving rural communities ▪ Provide savings, credit and remittances services ▪ There are 2 to 3 thousand total, with large variance in size and number of outlets[1]	▪ 30 of the largest RCCs set up clearing house to process remittances	77	314	73,000
Agri-cultural Bank of China	▪ One of "big 5" banks and highly influenced by government ▪ Withdrew from serving traditional rural base in the lead into its 2010 IPO but has been encouraged to return recently	▪ Offers tiered pricing for transactions, particularly remittances, depending on recipients bank and location (i.e., non-ABC / non-local)	24	99	5,800
Postal Savings Bank of China	▪ The postal service has provided savings/remittances 1986- ▪ In 2007 government separated the financial services from post with goal of providing commercially viable loan products for rural enterprises, migrant workers, and farmers—may have plans to IPO	▪ 200M P2P transactions ($71B)[2] in 2009—90% are "intra-bank" transactions ▪ Offers low cost P2P service with an expansive network ▪ Charge 5 RMB for credit card	36	62	1,310
New rural Financial Institutions	▪ Have brought competition to rural areas oftentimes competing with RCCs by offering innovative loans and better service ▪ Collectively have only been marginally profitable (ROA ~ 0.5%) due to lack of deposit base[3]	▪ As of mid-2011 had no access to CUP for bank cards ▪ Use correspondent banking for access to clearing and settling-often result in poor service (e.g. no name of sender of remittance)	1	21	237

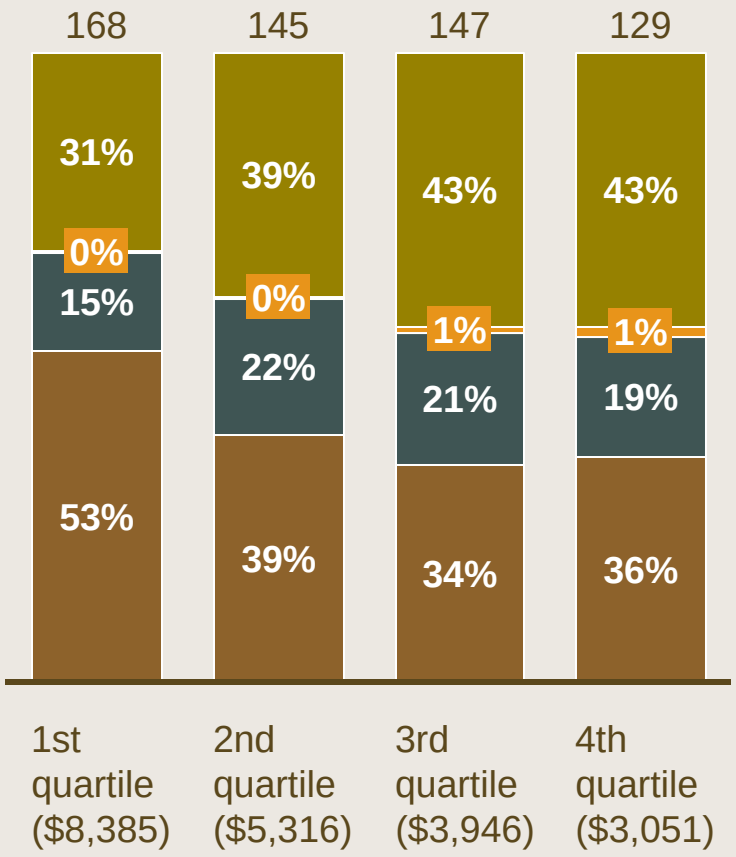
1 CGAP China working paper no. 7; 2 PSBC presentation, 3 CGAP working paper no 3 (VTBs)

SOURCE: CGAP China working papers no. 3 and no. 7; PSCB presentations

Rural Credit Cooperatives and the Postal Savings Bank are particularly present in poorer and more rural areas

Outlet type distribution provinces by GDP quartile

Percent of total, # of outlets per million (avg quintile GDP-USD)



Coverage by type of locality[1]

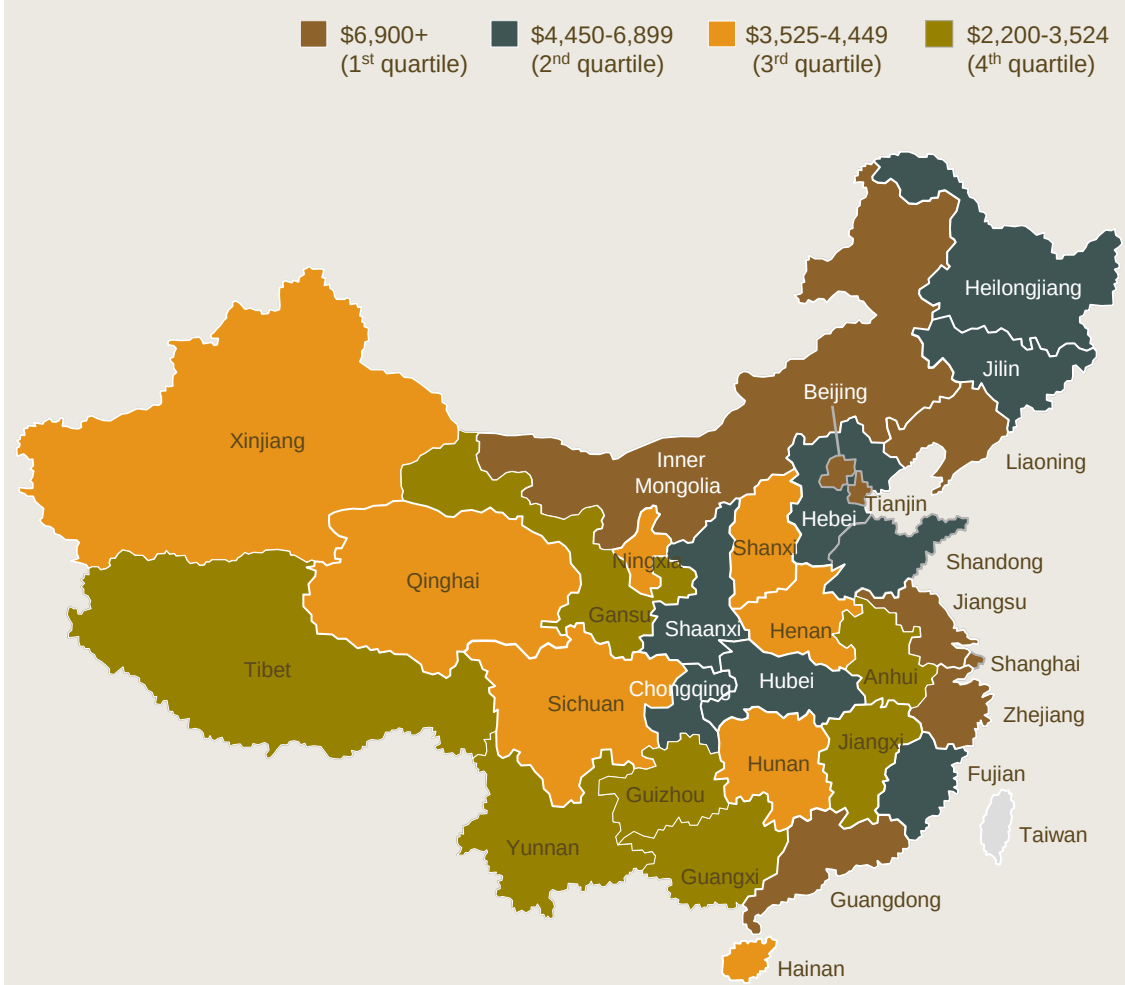
1st tier city	2nd tier city	County	Town	Village
		✓	✓	✓
		✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	
Urban		Rural		

1 Expert Interviews; 2 Traditional includes Agricultural Bank of China which has the most expansive rural network of the listed and joint stock banks

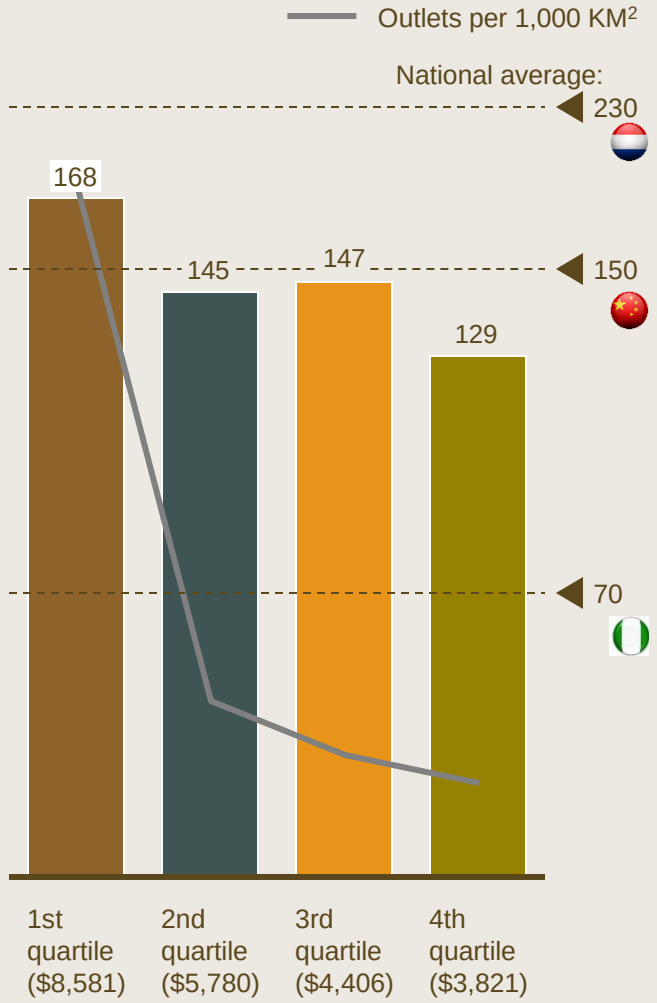
SOURCE: National Bureau of Statistics, http://en.wikipedia.org/wiki/Provinces_of_the_People's_Republic_of_China, PBOC; Expert Interviews

Traditional branch infrastructure is extensive throughout China, even in the poorest provinces

GDP per capita by province
GDP (USD)/capita

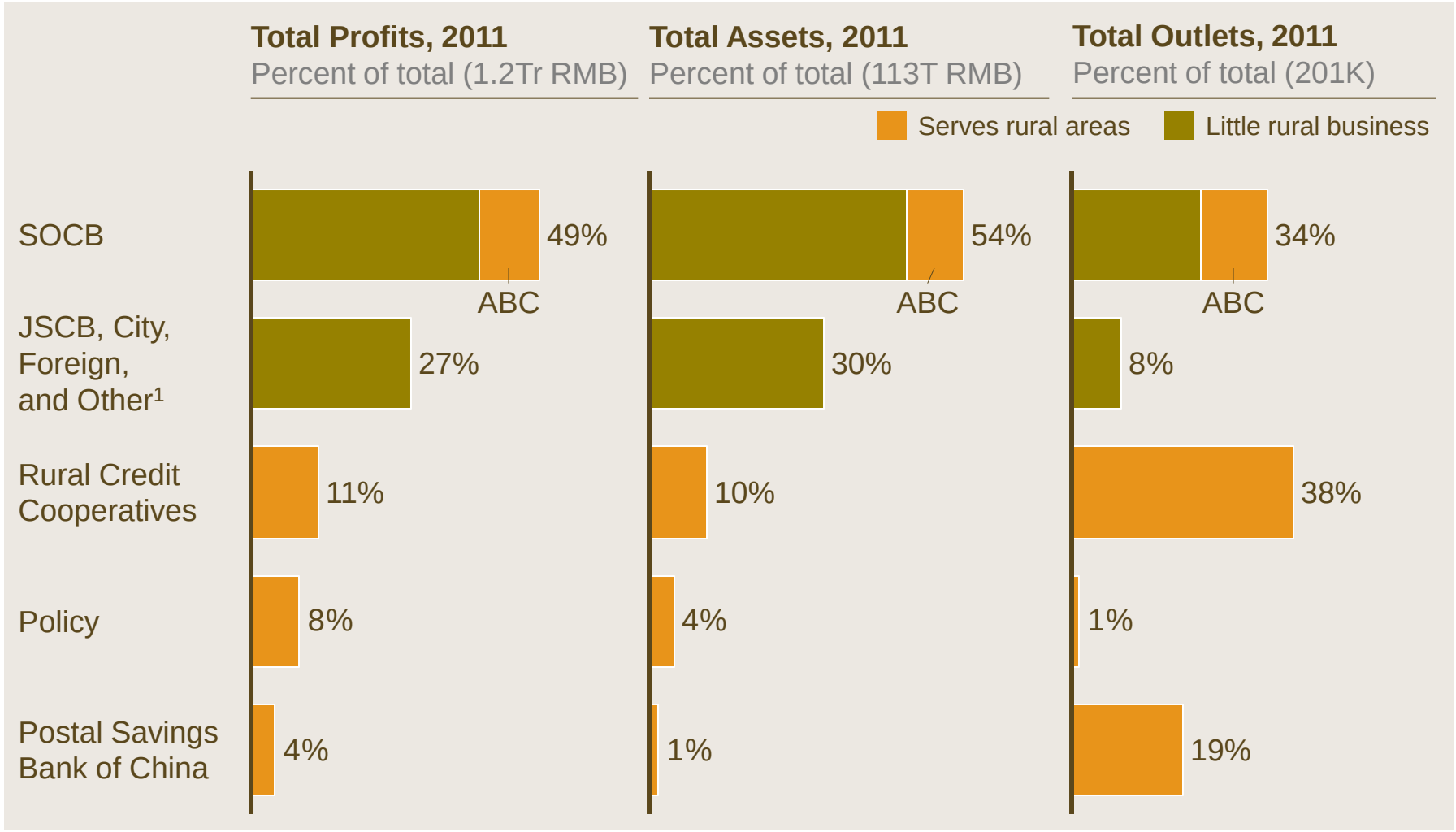


Outlets per inhabitants by GDP quartile
Outlets per million inhabitants (avg. GDP-USD/capita)



SOURCE: "National Bureau of Statistics; PBOC

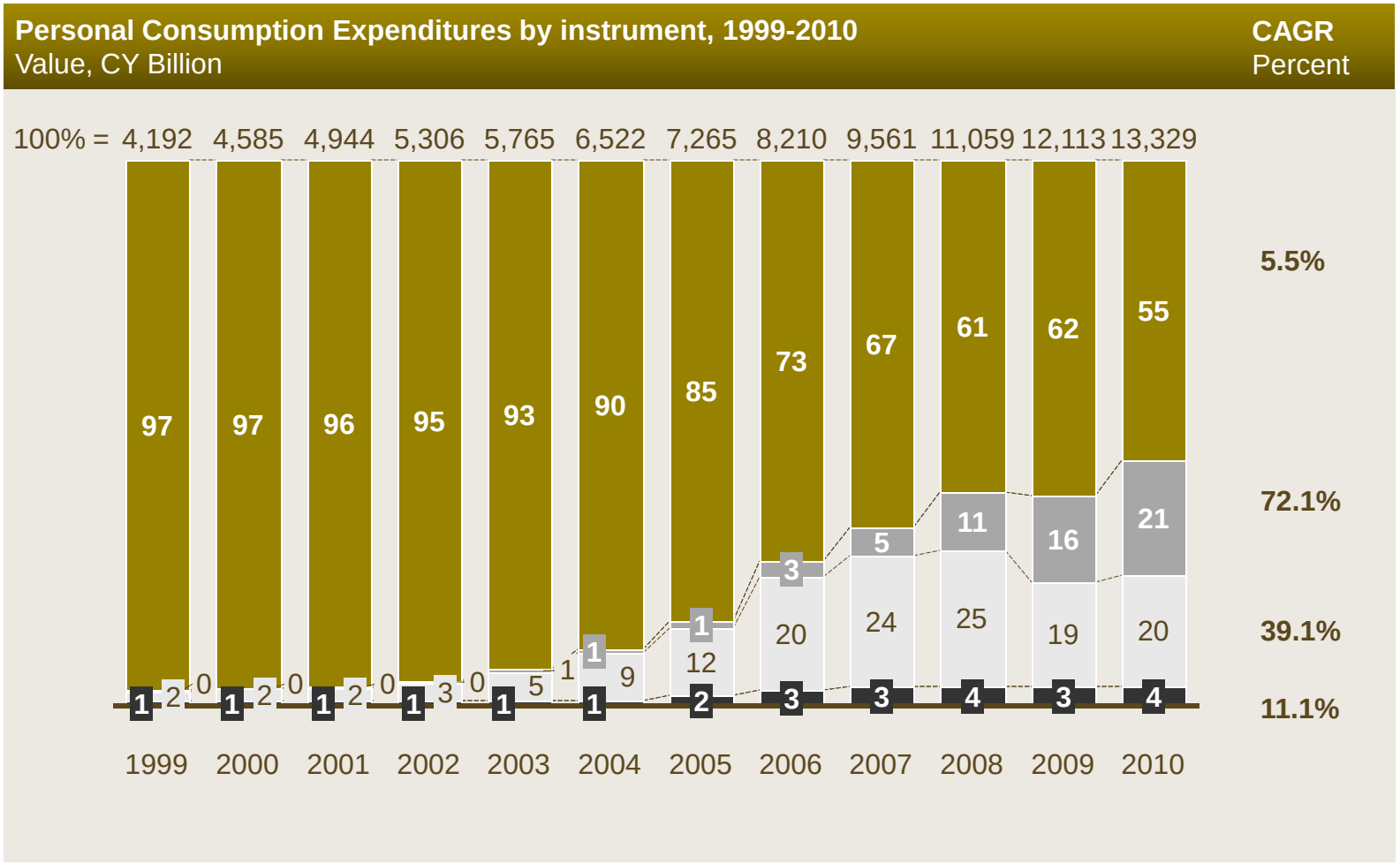
Smaller, less profitable, and potentially less efficient banks maintain the largest number of outlets



1 Includes New rural financial entities, Finance Company, Urban Cooperatives, Trust and other non-bank financialv

SOURCE: Annual reports, CBRC

Consumer card usage is increasing rapidly



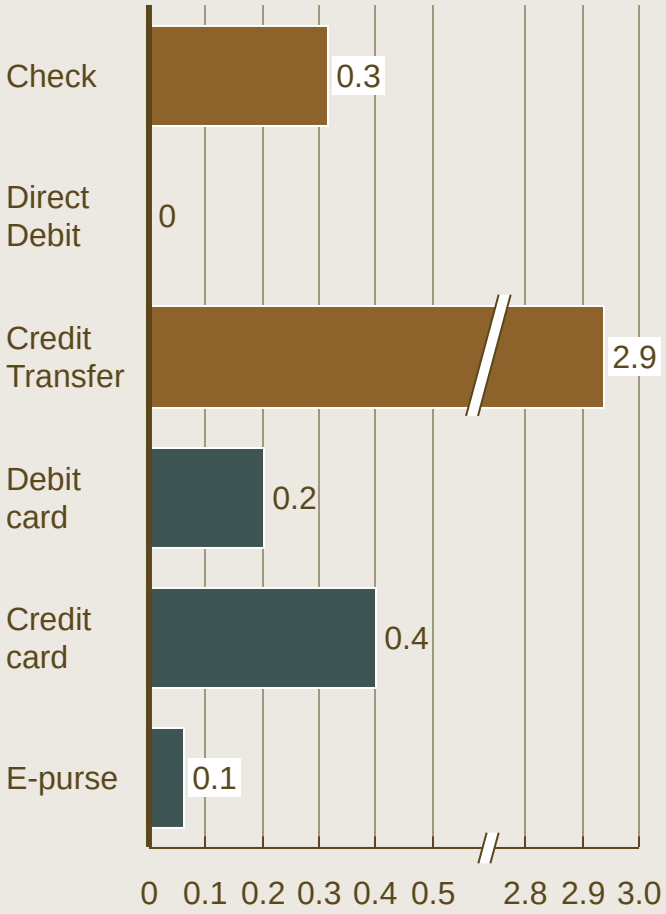
Note: PCE is an indicator used in measuring retail consumption—only includes cash and cards here (credit transfer payments are not measured). The volume is smaller than C2B payments because specific transactions are removed (e.g. wholesale consumption for individual businesses, real estate and automobile purchasing)

SOURCE: McKinsey Payments Map, 2011

Merchants pay for POS transactions, while payers pay for credit transfers and cheques

Net fees: Payer fee / Payee fee

Fees by payment instrument[1]
$/transaction



Fees per dollar transacted, BPS	**Description of fees**
<1	▪ **Consumer pays fee per cheque** (not sure if it is dependant on value or number of transactions)
n/a	▪ **No data on Direct Debit**
5	▪ **Consumer** pays fee to issuing bank for making the transfer ▪ **Merchants** pay fees for originating WIRE and ACH transactions
80[2]	▪ **Consumer** fees are "0" at the transaction level ▪ **Merchant** pays MDR to bank acquiring bank
80	▪ **Consumer** fees are "0" at the transaction level ▪ **Merchant** pays MDR to bank acquiring bank
250	▪ **Merchant** fees for transaction fees from online merchant services providers and gateways

1 Based on bank revenues; 2 Average MDR by volume of transactions is ~80 bps

SOURCE: McKinsey Payments Map, 2011; Expert Interviews

While cash still dominates C2B payments, debit cards are also used, buoyed by relatively low merchant fees and free terminals

C2B TRANSACTIONS

	Consumer						Merchant					
	Requires Bank Acct	Direct Fees (bps/RMB)	Indirect Fees	Benefits	Merchant Accept. (%)	Actual Use[1] (Val, %)	Consumer Access (%)	Requires Bank Acct	Direct Cost bps	Indirect Cost	Benefits	Sample use cases
Cash		-	ATM on-us) Theft/Loss	▪ Accessible ▪ Ubiquitous	100	68	100		-	▪ Cash handling	▪ Ubiquitous ▪ Immediate ▪ Unclear if avoid taxes or not	▪ Used almost exclusively for day to day spend
Cheque	✓	▪ N/A	▪ One off costs of cheque	▪ Convenient for large txs ▪ Float benefit	<1	3	<1	✓	-	▪ Transport		▪ Large expenses for wealthy
Credit Transfer	✓	40-50 bps (1-2 RMB min)	▪ N/A	▪ Convenient for large txs	N/A	10	64	✓	N/A	▪ …	▪ N/A	▪ Large value purchases, remittances
Direct Debit	✓	-	▪ N/A	▪ Convenient for recurrent pmts	N/A	0	N/A	✓	N/A	▪ …	▪ Convenient for cash mgmt	▪ Hardly used
Debit Card	✓	Annual: 0-10 RMB Issuing 5 RMB		▪ Convenient to carry	20	9	41	✓	Vary by industry and location 80 bps avg	▪ Free terminal	▪ Minimizes cash handling	▪ TBD
Credit Card	✓	Annual 10-50 RMB Issuing 10 RMB	▪ Penalties, interest, other charges	▪ Float and liquidity benefit	20	9	8	✓	Vary by industry and location 80 bps avg	▪ Free terminal	▪ Minimizes cash handling	▪ TBD
Prepaid		Initial cost from 10-20 RMB	▪ Money transfer charge	▪ Cashless	<5	<1	<3	✓	Vary by industry and location 150 bps avg	▪ Free terminal	▪ Minimizes cash handling	▪ Smart Pass
Mobile	✓	-	▪ Handset/ terminal	▪ Accessible ▪ Low cost	<1	<1	<1		Vary by carriers 30 bps avg	▪ Handset/ terminal	▪ Minimizes cash handling	▪ China mobile
E-Purse	✓	-	▪ Handset/terminal	▪ Cashless ▪ Low cost, eg transfer	<1	<1	<1		Vary by industry 30-50 bps avg	▪ N/A	▪ Minimizes cash handling	▪ Bank of China

SOURCE: Expert Interviews, Bank websites, McKinsey Payments Map, 2011; Findex

How the system works by payment instrument (1/2)

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Cheque	▪ Written by payer on paper provided by payer bank ▪ Rarely used by individuals –more commonly used in B2B and interbank transactions	▪ Cheque clearing houses receive cheques ▪ Majority of cheques are "on us" cheques – and routed to bank ▪ PBC and local clearning houses offer CIS (cheque Imaging services)	▪ "On us" cheques are settled internally ▪ Intrabank cheques are cleared in cheque clearing house and settled on the HVPS	▪ Payee receives cheque from payer and presents to bank ▪ Payee bank processes account credit. Sorts cheques and sends to cheque clearing house
Credit Transfer	▪ Payer enters bank information online/at bank ▪ Employer deposits salary into employee's account	▪ Intra-bank transfers dominate credit transfers—handled by internal bank processors ▪ Interbank transactions below CY 50,000 are processed through the BEPS ▪ Interbank transactions above CY 50,000 go through the ACH	▪ Intrabank transfers are settled according to internal bank system (sometimes instant, sometimes next day) ▪ BEPS sends batches sets of payments through HVPS for settlement ▪ ACH net settles daily through HVPS	▪ Payee bank
Direct Debit	▪ Very rare/almost not seen but similar to credit transfers	▪ Intra-bank transfers dominate and are handled by internal bank processors ▪ Interbank transactions below CY 50,000 are processed through the BEPS ▪ Interbank above CY 50,000 go through ACH	▪ Intrabank transfers are settled according to internal bank system (sometimes instant, sometimes next day) ▪ BEPS sends batches sets of payments through HVPS for settlement ▪ ACH net settles daily through HVPS	▪ Payee (more likely the payee's bank) determines when to process instructions to draw money from payer

SOURCE: IMF Country Report, "Payment Systems: From the Salt Mines to the Board Room" by Dominique Rambure and Alec Nacamuli

How the system works by payment instrument (2/2)

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Debit Cards Credit Cards Prepaid	▪ Payer presents card or details at POS or via phone, paper or online	▪ Payment processors (of which CUP is one) process the payment ▪ China Union Pay (has relationships with banks)	▪ China Union Pay handles the clearance of card transactions whose balances are settled on a net basis through the HVPS (High-Value Payment System) ▪ Estimated fee structure: 70% to issuer, 20% to acquirer, 10% to China Union Pay (average fee 55 bps)	▪ Payee swipes card at POS device or receives details ▪ POS device or internet gateway forwards details to card network for processing (CUP) ▪ Payment processors (e.g., First Data) may link merchant to CUP
Mobile	▪ SMS based – payer texts instructions	▪ Bank, CUP, or provider passes information along to network	▪ Clear and settle through credit transfer system (i.e. intra-bank, BEPS, or ACH)	▪ Payee needs to be a member of the system to receive funds
	▪ RFID / NFC used on-site	▪ Bank, CUP, or provider pass information along to bank	▪ Same settlement system for electronic (credit and debit)	▪ Specialized terminal required

SOURCE: IMF Country Report, Expert interviews

Government entities and China Union Pay, which is jointly owned by banks, undertake most clearing; settlement occurs through the public network HVPS

Public infrastructure | C Clearing | S Settlement

		Large Value Transfer System (Net settlement system)		Automated Clearing House		Card Payment Network		Cheque Clearing House		Volume
		Public[1]	Private	Public[1]	Private	Public	Private	Public	Private	
Network Design	Network	HVPS	N/A	ACH[2] BEPS (for values less than CY 50,000)	Intra-city RCBFCC CCCCB[3]	N/A	CUP Visa (int'l only)	PBC	N/A	
	Time to settle	30-60 sec		Variable	Variable		1 day	1-3 days		
	Net/Gross	Gross		Net	Net		Net	Net		
Clearing & Settlement by instrument	Cheque	S ← C								Cheque clearing houses process payments worth 7.4 times GDP
	Credit Transfer	S ← C; S ← C								ACHs process payments worth 2 times GDP BEPS processes payments 34% of GDP
	Direct debit	S ← C; S ← C								
	Debit card	S ← C								CUP card payment system processes payments worth 22% of GDP
	Credit card	S ← C								
	Prepaid	S ← C								

1 All public payment systems are under the broad umbrella of the Peoples Bank of China (PBC); 2 The Automated Clearing Houses are organized nationally and locally are delegated to local banks where no PBC branch exists; 3 Rural Credit Bank Funds Clearing Center and Clearing Center for City Commercial Banks

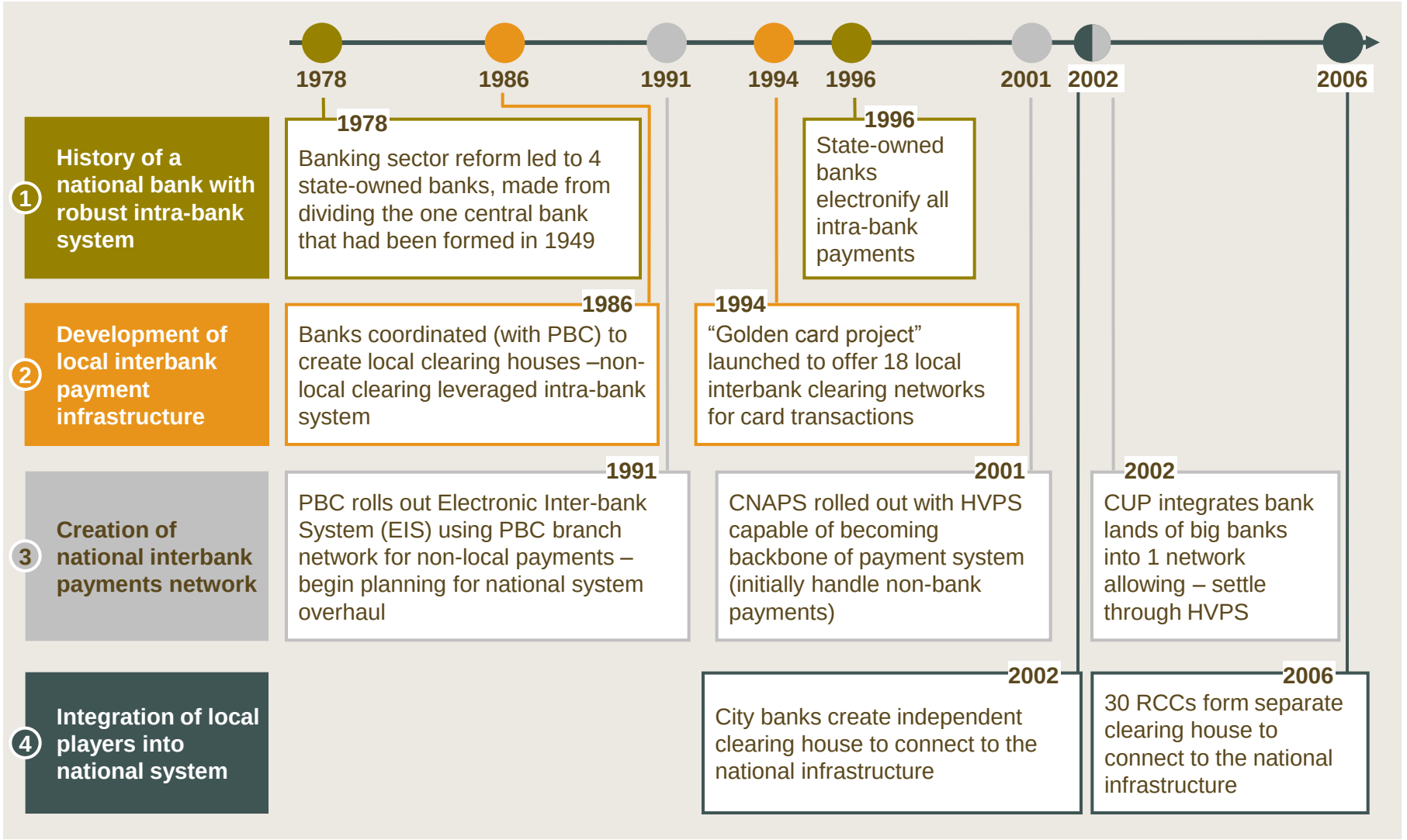
SOURCE: People's Bank of China, IMF Country Report

China's banking and payments system has developed over the past 35 years from a single government-run bank

1949 - 1978	**Single government-run bank** ▪ The People's Bank of China (PBC) was formed as functionally the only bank in China
1978	**Formation of state owned banks** ▪ Agricultural Bank of China (ABC): Rural and agricultural sectors ▪ Bank of China (BOC): Foreign trade and investment ▪ China Construction Bank (CCB): Construction and fixed-asset investment ▪ Industrial and Commercial Bank of China (ICBC): Business activities of the State Owned Enterprises (SOEs)
1984	**Increased competition among state owned banks** ▪ Loosened restrictions of state-owned banks, which begin to compete in some areas ▪ The PBC is made responsible for managing the funding of SOEs.
1993	**State-owned banks become commercial banks (state owned commercial banks – SOCB)** ▪ "Resolution on Financial System Reform", issued by State Council, removes mandated specialization for state owned banks, though they are still required to grant loans to SOEs ▪ Policy banks are created in 1994
1998	**Measures to ensure SOE profitability and reduce the burden of non-performing loans on the SOCBs** ▪ Creation of Asset Management Companies (AMCs) to take non-performing loans (NPLs) off SOCBs ▪ Swapped SOEs debt for equity and restructured SOEs to drive profitability
2001	**Accession to the WTO, contingent on several conditions** ▪ The banking system was to be fully opened to foreign FIs before end of 2006 and SOBC accounted for 65% of assets of deposit-taking institutions
2003-2010	**Big 4 banks restructure and IPO** ▪ 2003: SOCBs convert to joint stock commercial banks, receive capital injection and transfer more NPLs to AMCs ▪ 1998-2005: Increased operational efficiency – 50% reduction in number of branches and 20% in employees ▪ 2005-2010: ABC (2010) and CCB (2005) list in Hong Kong and BOC (2006) and ICBC (2006) list in both Hong Kong and Shanghai

SOURCE: "Banking System Reform in China"

The interbank payment infrastructure was developed on top of robust internal payments systems in the 4 big national banks



SOURCE: "Payment Systems: From the Salk Mines to the Board Room", "Press China to Keep Card Promises", "Taobao vs. Ebay China", "Banking System Reform in China"; IMF Country Report

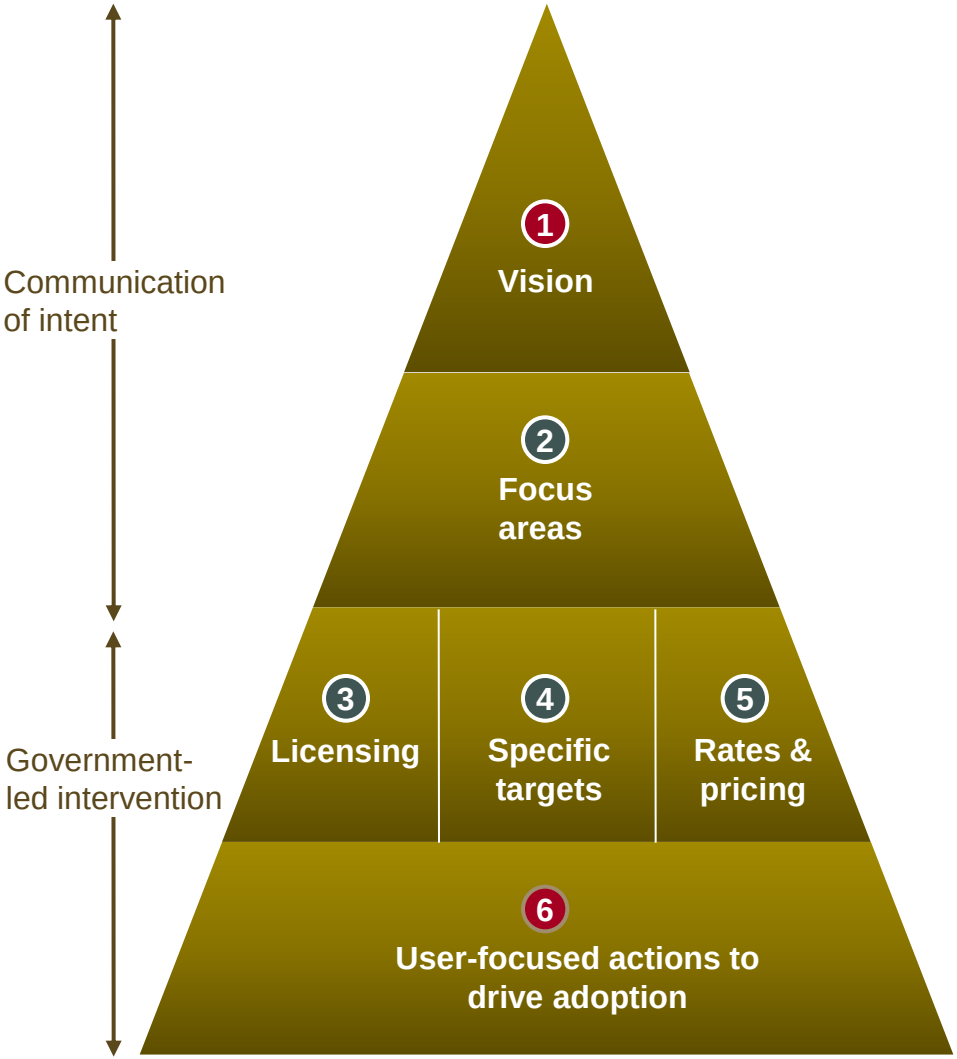
Payment instruments in China have developed in parallel with the interbank infrastructure

	1990-1999	2000-2004	2005-2010
Cash	▪ Cash is fundamental method of payment ▪ First ATM installed in 1987	▪ ATM usage becomes increasingly popular	▪ Cash is still used for the majority of POS transactions
Cheque	▪ Used for B2B transactions but seldom seen as a non-cash option for consumers—used for high value payments	▪ Cheque Imaging System improved efficiency and reduced cost of cheque payments	▪ Absolute cheque volume declined
ACH	▪ By 1986 large cities have interbank networks and a few economic hubs are linked together ▪ In 1991, government rolls out Electronic Interbank System (EIS) to enable non-local payments via PBC branch network ▪ By 1996, the big 4 banks replaced their intra-bank payment systems with electronic system ▪ Credit transfers are most common non-cash payment method (TBC) ▪ 8th 5 year plan (1991-1995): The PBC was to focus on promoting the computerization of payment systems	▪ CNAPS (China National Advanced Payment System) is announced to link the PBOC's national clearing center with all FIs ▪ CNAPS gradually replaces EIS	▪ Value and volume of payments processed through both the HVPS and the BEPS (both within the CNAPS) grows exponentially ▪ Credit transfers become commonplace for salaries, C2C and other non-retail transactions
Cards	▪ Each city had own clearing and settling system for their cards until 2002 (could not pay between cities with card) ▪ Debit cards begin to grow in popularity in urban areas but credit cards remain relatively unused	▪ BOC and CCB started accepting CC applications in 2001 ▪ Feb 2002 PBC announces plan to enable Big Four banks to process cards across cities and banks ▪ End of 2002-most banks are integrated with CUP and debit card use steadily increases	▪ Debit cards are associated with nearly all accounts ▪ Credit card usage grows significantly as awareness and education become more common

SOURCE: "Payment Systems: From the Salk Mines to the Board Room", "Press China to Keep Card Promises", "Taobao vs. Ebay China", "Banking System Reform in China"

In policy and regulation, market solutions guided by a government vision often work in tandem with explicit interventions

Payments/banking regulator-led # Involves non-banking/payments policy



1. **Vision:** Government makes broad goals known (e.g. promote equality between rural and urban)
2. **Focus areas:** Government identifies and announces particular areas of focus/levers in support of the vision; multiple stakeholders are brought into conversations to understand these areas of focus and government intent (e.g., MSME loans; rural financial inclusion)
3. **Licensing:** Providers are licensed based on activities they undertake and are subjected to prudential or other supervision depending on their class of license (e.g., licenses for 3rd party payments providers; tiered capital requirements)
4. **Specific targets:** Set specific targets for areas that will support the identified focus areas (e.g., numbers of POS terminals)
5. **Rates & pricing:** Fees will be capped or set, with the intent of furthering progress toward the vision, focus areas and specific targets (e.g., interchange)
6. **User-focused actions to drive adoption:** Use behavior and specific consumer facing polices to drive consumer behavior (e.g., National ID system)

SOURCE: Expert Interviews

Table of Contents

The payment system in India

Characteristics

- **The banking industry is fragmented,** across states and public and private institutions small and large
- **Networks of banking business correspondents** and non-bank providers of payments-related services are developing, but are dispersed and non-concentrated, with unproven economic models, particularly given uncertain and changing regulations
- **Banks largely target development of product offerings toward the growing urban middle class**
- **Government shapes development of financial tools and corresponding business models to serve the rural poor**, incrementally relaxing restrictions, but with varying degrees of consumer-centric judgment, and inconsistent concern for creating profitable models for providers
- **Government is spurring development** of a bank-owned centralized payments infrastructure, a universal ID scheme tied to payments systems, and digitalization of a large-scale government benefits program (more than $50 billion per year)

Implications for financial inclusion

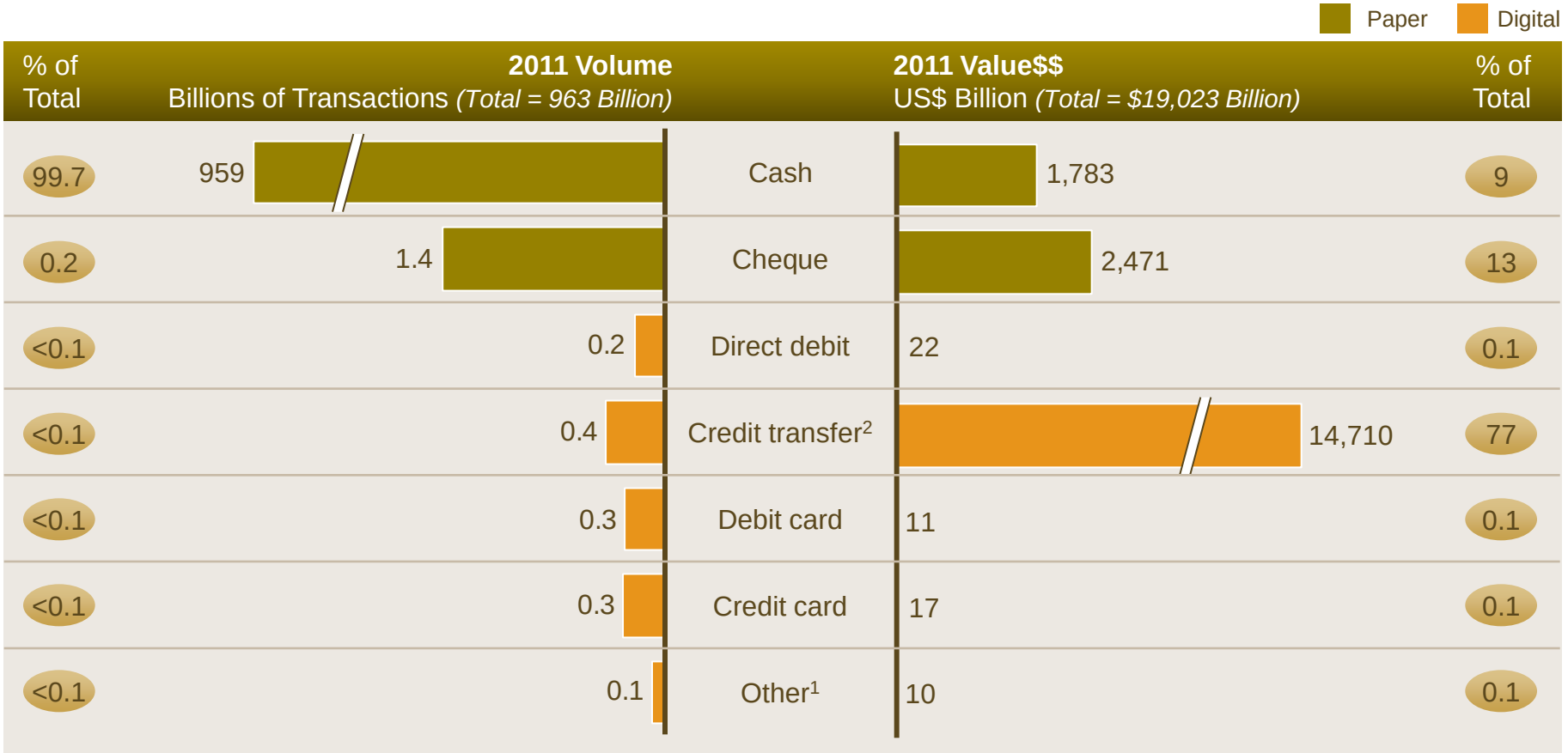
- **A combination of regulation, most retail banking under state control, and substantial G2P payments could be highly effective in spurring financial inclusion,** although it remains to be seen to what extent and in what timeframe
- **There is a strong tax rationale against small and medium-sized merchants accepting cards or e-payments;** this limits growth of C2B e-payments and outweighs common levers such as controls on the merchant discount rate (MDR)
- **Mobile is not likely to have a disruptive impact on low income rural segments** due to their use of local languages, basic phone illiteracy and limited mobile data coverage
- **Barriers to formal financial systems are ingrained**, even where people use informal financial instruments are regularly

Payments in India by the numbers

Usage & Inclusion	Instrument usage	**Highly cash dominated** ▪ Percentage of digital payments by value: 11% C2C, 13% C2B, 88% B2C ▪ Percentage of digital payments by volume: Less than 0.1% C2C, 0.3% C2B, 6% B2C
	Financial inclusion	**Low to medium, with limited access for specific geographies** ▪ Formal access: 35% of population (based on Findex data) acknowledged access to an account; formal barriers to accounts are low (free basic accounts are widespread) however relevance for daily uses can be low for low-income consumers
Payment system	Network infrastructure	**Centralized** ▪ Most new payments infrastructure is created and managed by NPCI (National Payments Corporation of India), a bank-owned non-profit conglomerate originally established by the RBI (Reserve Bank of India) ▪ RTGS and ECS (a soon-to-be phased out ACH) are still managed by the RBI
	Regulation	**Strong, widely respected regulator with a directive approach toward inclusion** ▪ RBI takes deliberate but cautious steps in expanding reach of financial service
Environment	Banking system reach	**Low reach per capita, concentrated in largest cities** ▪ Branches/BCs – 11 branches/BCs per 100K (96K total) ▪ ATMS – 8.8 ATMs per 100K (75K total) ▪ POS – 66 per 100K (577K total)
	Mobile & telecoms	**Very high penetration in urban areas, less so in rural areas** ▪ Fragmented market with 3 largest providers holding ~20% market share: Airtel, Vodafone, Reliance ▪ Mobile users: 72% of population
	Other market infrastructure	**Limited infrastructure** ▪ India has long-term challenges with adequate infrastructure for its quickly urbanizing population
	Economic environment	**Low income** ▪ GDP per capita (PPP): $3,700 (2011) ▪ GINI coefficient of 37 (2004)
	Demographics & geography	**Still mainly rural, but urbanizing; population is young** ▪ 30% of population urbanized – changing quickly at 2.4% annually, straining India's limited infrastructure even further ▪ 95% of population is under 65 years old

SOURCE: Findex Global Database; McKinsey Payments Map Release Q1-2012;

India's payments system is dominated by cash in volume, and by credit transfers in value



- An overwhelming majority of payments are made in cash, with relatively negligible use of other instruments
- Credit transfers account for nearly 80% of payment value; most such payments are B2B but a significant fraction of salary payments by value are also made via transfers
- Cheques account for 13% of transactions by value, followed by cash with 10%

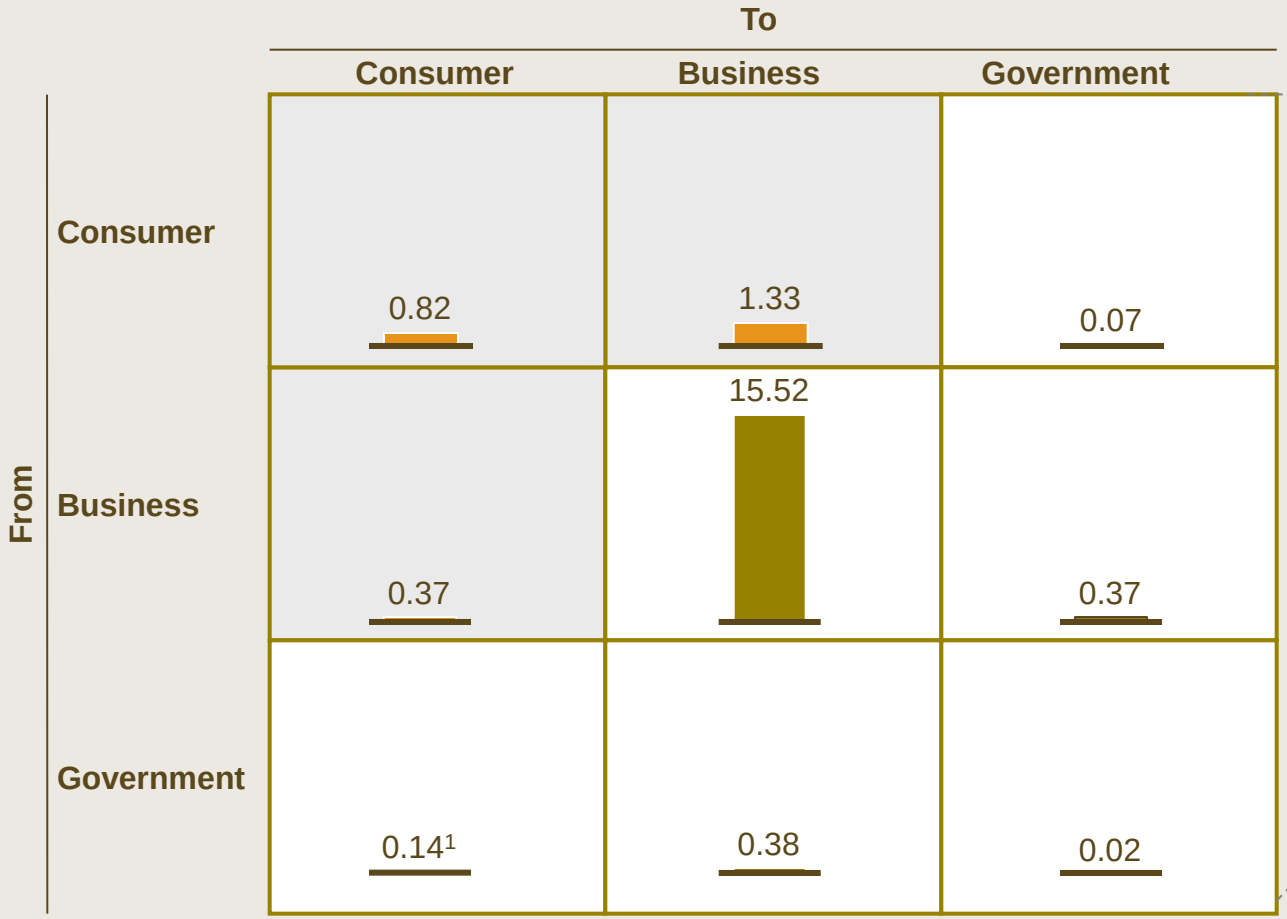
1 Primarily pre-paid cards; 2 Contains RTGS transfers

SOURCE: McKinsey Global Payments Map

The transactions most strongly impacting Indian consumers account for about $2.5 trillion of payment flow

Area of focus

Trade payments in India by transaction parties, 2011
US$ Trillion



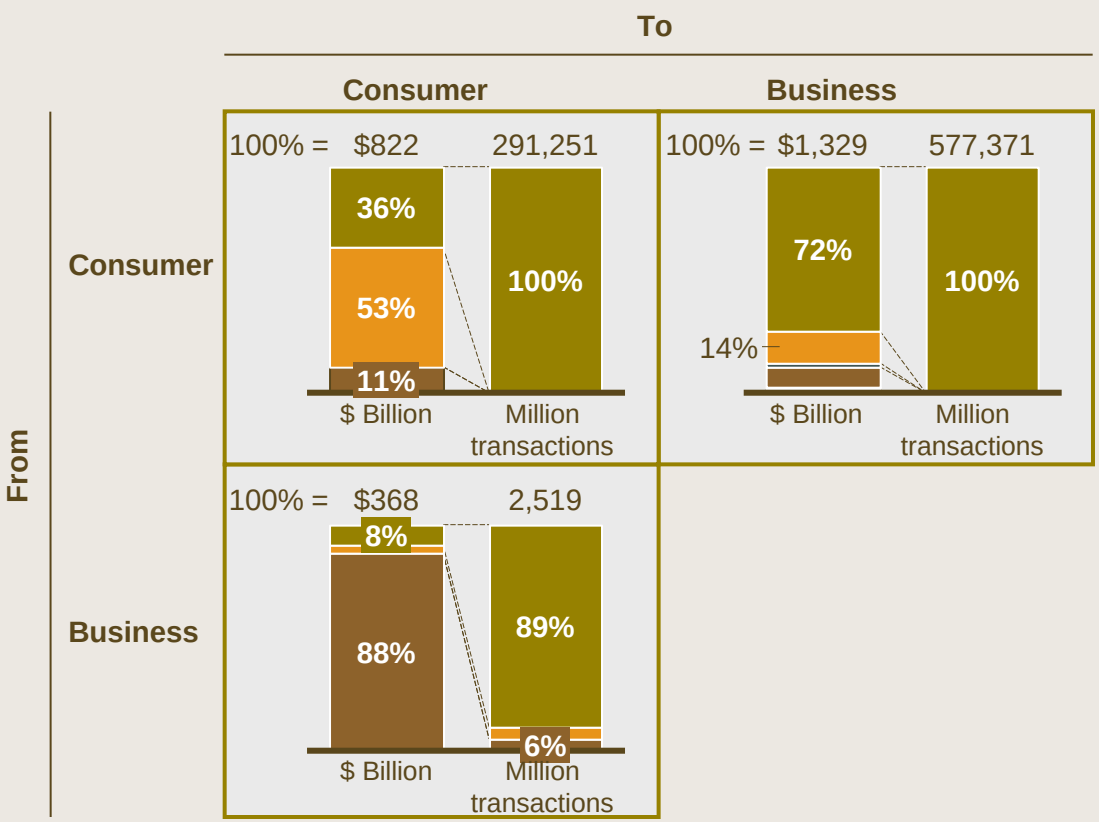
Total trade payments by value, 2011
US$ Trillion

1 Secondary area of focus; particularly relevant for the poor in India

SOURCE: McKinsey Global Payments Map

The Indian retail payments profile is dominated by cash, by volume, and by cash, credit transfers and cheques, by value

Trade payments in India, by transaction parties, 2011
Value in US$ Billions, Transactions in Millions



$ = High value (>20% use)
# = High volume (>20% use)

Major instruments used by transaction type

	C2C	C2B	B2C
Cash	$ #	#	$#
Cheque	$		
Direct debit			
Credit transfer			$
Debit card			
Credit card			
Prepaid card			

SOURCE: McKinsey Global Payments Map

Financial inclusion in India

Overall financial inclusion performance: low

Percent with an account at a formal financial institution

- Overall -- 35%
- Bottom 40% -- 27%
- Women -- 27% have formal financial accounts

Payment services access

- Debit card access -- 8.4%
- Credit card access -- 1.8%
- Receive wages in a formal account -- 8.3%

Distribution access (per 100,000 people)

- Bank branches -- 11
  (5.2% of villages have a bank branch)
- ATMs -- 8.8
- POS terminals -- 66
- Online penetration -- 7.5% of population
- Mobile (voice) penetration -- 72% of population
- Mobile (data) penetration -- 51% of population

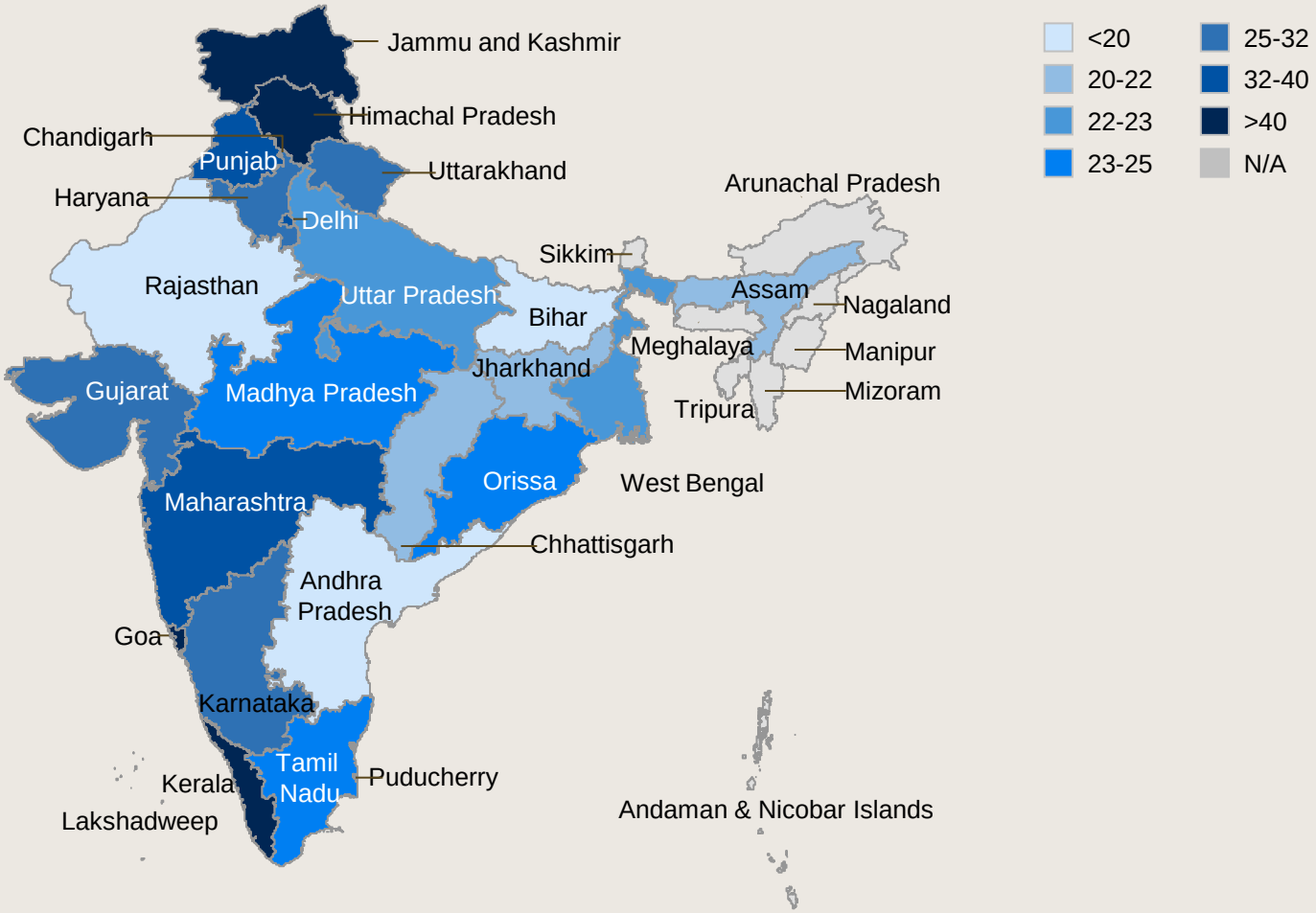
Key takeaways

- **Traditional bank branch networks are concentrated in urban areas,** and reach only a portion of the population
- **Business correspondent (BC) networks have grown quickly, giving rural areas access to banking services,** but account usage remains limited and the model has yet to be proven sustainable
- **Government initiatives to extend "basic savings accounts" to the poor (formerly "no-frills" accounts) have increased the banked population,** but actual account usage remains limited among the poor
- **Mobile (voice) penetration is high,** but mobile data penetration still covers only half of the country; moreover, mobile-based services face localization challenges given the hundreds of active dialects
- **Card usage remains extremely low, even in urban areas:** Ministry of Finance is seeking to expand card reach (e.g., via mandatory bank POS rollout) but use will be limited in the short term

SOURCE: Findex Global Database, Web search; EIU viewswire; Financial Services 360; Alternate Channel Benchmarking Survey 2008; AtoS Worldline Indian Payment Card Industry Survey 2011, Gartner

Nearly everywhere in India, fewer that 40 percent of people have bank accounts, but there is significant variation by state

Fraction of population with a bank account, by state
Percent[1]



1 Percent of total population, including people of all ages

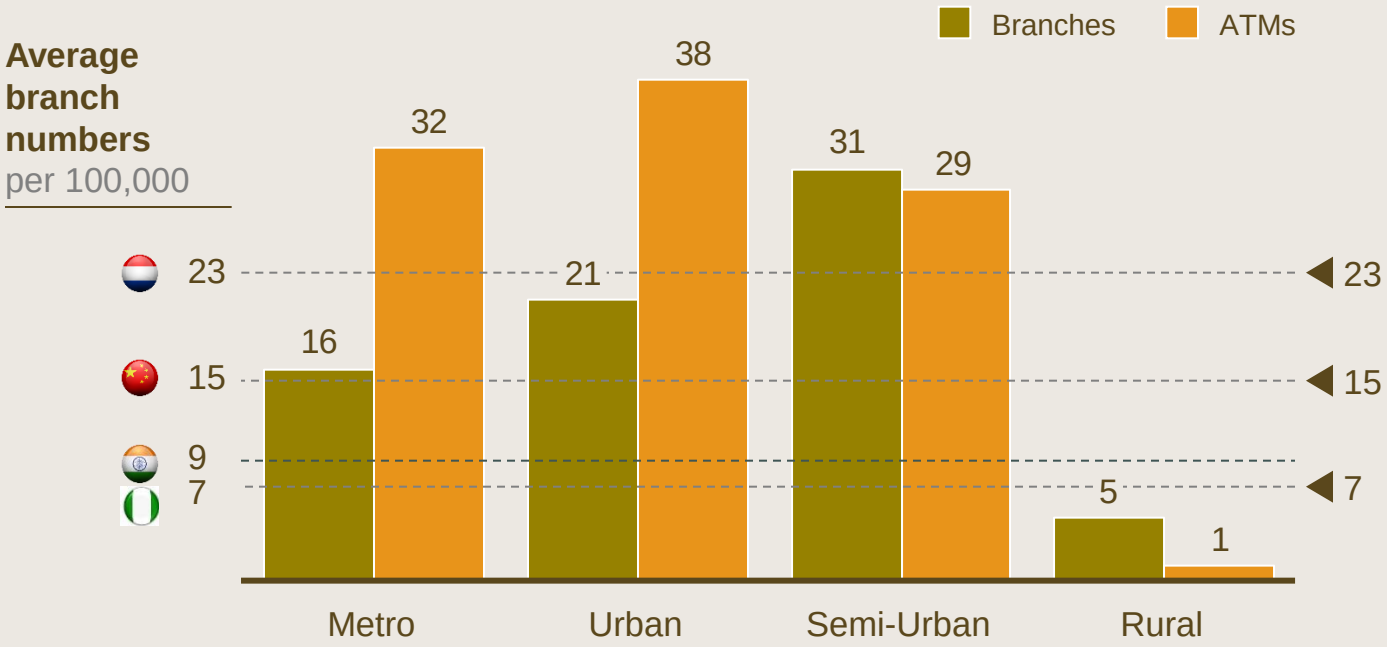
SOURCE: RBI

Conventional outlets do not reach the poor; new initiatives linked to traditional banking & payments infrastructure are attempting to do so

1 Conventional outlets	▪ Per capita coverage of rural areas by traditional outlets where people can **open accounts and withdraw and deposit cash** (ATMs and branches) is extremely limited, while metro to semi-urban areas are relatively well covered compared to other benchmark countries ▪ The actual number of rural branches is high (2x number of metro branches and 1.5x number of semi-urban branches) but does not cover the over 740 million people living in rural areas
2 Business Correspondents	▪ The Business Correspondent (BC) model enables banks to enlist agents to perform certain services on their behalf, including **facilitating account opening, CICO and some transaction services** (e.g., paying utility bill) ▪ Beginning in 2006, the RBI allowed the BC model; today there are ~90,000 BC agents in India, providing coverage for 120,000 villages previously without access to formal banking services; though BCs are rapidly spreading, 78 percent of villages remain uncovered ▪ With growth of BC, basic savings accounts have grown to ~100,000; this number remains small compared both to number of the unbanked and to the total number of BC agents ▪ RBIs regulatory approach with BCs illustrates a general trend in its approach: regulate more heavily at new initiative inception and relax rules as the project continues
3 Aadhaar universal ID scheme	▪ The Aadhaar national ID scheme, which intends to provide every Indian citizen with a unique ID number authenticated biometrically, offers potential significant benefits for **access, customer onboarding, and costs of accounts** ▪ Payments infrastructure built around Aadhaar and integrated with core central payments infrastructure will allow for benefits of scale in **providing transactions and allow people to authenticate payments** using only a finger-print ▪ Aadhaar enrolment has been growing rapidly since inception in 2010 (at ~300 million currently) but level use for financial-linked purposes remains unknown in these early stages
4 Traditional payments infrastructure	▪ Most forms of traditional **payments infrastructure** have been or are being shifted from the RBI to the auspices of the NPCI, a state-bank led (and regulator sponsored) payments governance structure and administrator of technology across multiple payments platforms

Coverage in rural areas is extremely limited, while coverage elsewhere is relatively high

Bank branch and ATM deployment in India
Number of end points per 100,000 inhabitants, 2012



Totals
(Thousands)

Branches	17	19	25	36
ATMs	35	33	24	9
Population (million)	108	88	82	742

- Even compared to semi-urban areas, banking infrastructure coverage is extremely sparse in rural India
- Branch density is greater in semi-urban versus metro areas, but lower population density in these areas implies each branch serves fewer customers
- There are as many branches in rural areas as in metro and urban combined, but ~4 times the population

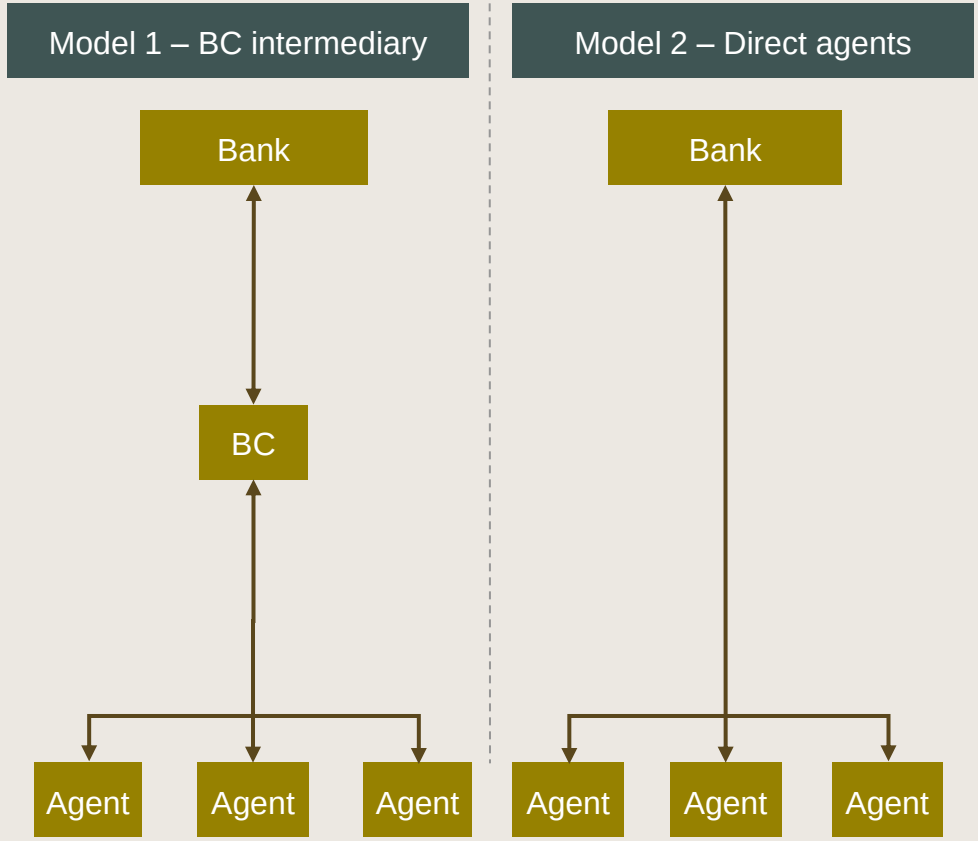
1 The RBI defines population groups based on village population. Rural- population <10,000; Semi-Urban: 10k-100k; Urban- 100k – 1M; Metropolitan- 1M+

SOURCE: RBI

Beginning in 2006, the RBI allowed business correspondent (BC) agents to act on behalf of banks to extend their reach in remote areas

The Business Correspondent (BC) model enables banks to enlist agents to perform certain services on their behalf

- Banks can either contract a BC to source and manage the independent agent network on their behalf (Model 1) or can do so independently (Model 2); Model 1 is significantly more common
- BCs manage recruiting, training and ongoing maintenance of agent networks on behalf of banks
  - Banks often have relationships with more than 1 BC for different geographical areas
  - Examples: FINO, Eko, A Little World, Airtel
- Agents are individuals acting on behalf of a bank and may conduct the following services: loan pre-screening and collection, facilitate account opening (excluding KYC), CICO activities
  - Also called CSPs (customer service points)
  - Sample agent types: shop-keepers, insurance agents, direct employees of a particular BC (e.g. FINO)



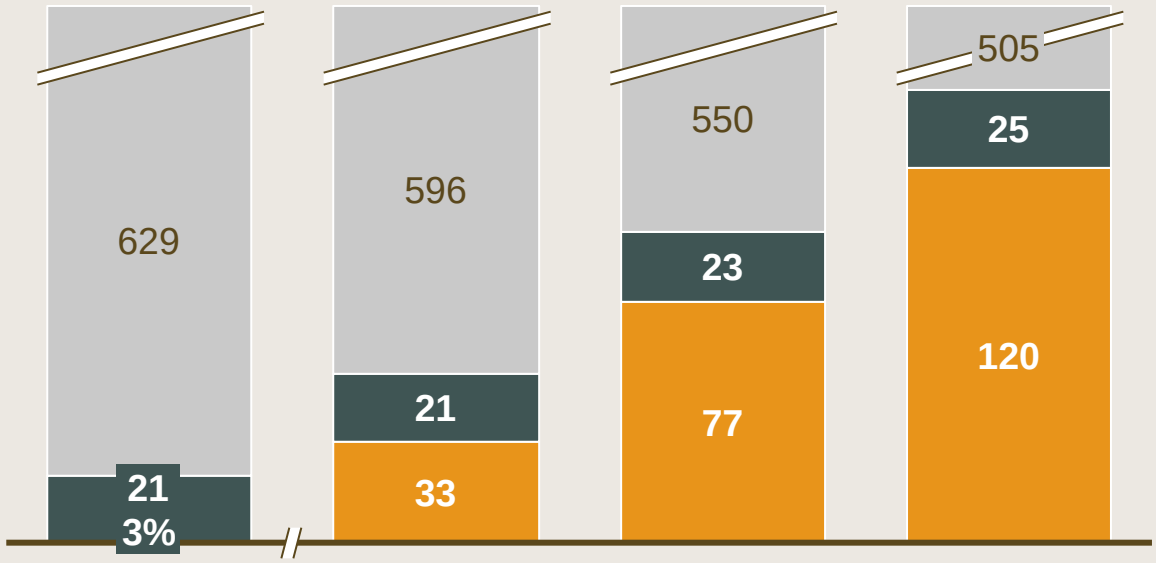
SOURCE: RBI, In-country interviews, Company websites

BC network expansion has significantly increased formal banking coverage of rural villages, though large gaps remain

Uncovered villages | Covered via bank branches | Covered via BCs (static & mobile)

Village banking services coverage

Number of villages covered by a bank branch or BC[1]



	2006	2010	2011	2012
Uncovered villages Percent	97%	92%	85%	78%

Additional statistics

- In 2012, 99.7% of settlements over 2000 population covered by banking services
- At least 20% of covered villages are served only by 'mobile' BCs who cover more than one village[1]

1 Includes 'Mobile' BCs, who visit a particular village on a pre-determined schedule, often once per week

SOURCE: RBI,

BC's focus is on delivering payments and savings instruments geared to poor people

Product	Description	Availability	Key consideration
▪ **Basic savings bank account ('no frills')** e.g. HDFC	▪ Full bank account that can be opened with zero balance; new regulation forces this to be held on core banking platform and therefore must have bank account services	▪ BCs of relevant bank must be within 30 km of a bank branch	▪ Although substantial rollout has occurred high dormancy is reported; the challenge will be promoting usage from a new and little understood customer group
▪ **Wallet with a bank partnership (**e.g. Airtel Money Super Account with Axis Bank, also Vodafone, Eko)	▪ Cash-out; much like a bank account but operated from a separate technical platform and therefore different range of services	▪ Subset of service provider's agents within 30 km of partner bank branch and designated as BCs	▪ Airtel has more much more agent reach than any bank but can only provide this enhanced service with cash-out within 30 km of a partner bank branch
▪ **Non-bank wallet** e.g. Airtel Money	▪ No cash-out but add money to pay for services (e.g. theatre tickets, travel tickets); or pass money to other wallets or a bank account (e.g. remittance but not to cash)	▪ Subset of Airtel agents	▪ Without cash-out, are there sufficient use cases for this to be an exciting consumer product?
▪ **Government benefit disbursement (**e.g. NREGA)	▪ Government agencies distribute funds from government programs through BCs (FINO being the largest in this area)	▪ Subset of ~100K BCs, depending on specific program and relationship with bank or BC	▪ Disbursal of government benefits has seen some success, but reportedly full withdrawal of cash upon payment is common; still unclear if current structure/ incentives enable other financial services

SOURCE: RBI, In-country interviews, BC websites

The Aadhaar national ID scheme offers potential significant benefits for access, customer onboarding, and costs of accounts

Aadhaar: a national scheme that intends to provide every Indian citizen with a unique ID number

	Potential Benefits	Key considerations
Access	▪ Provide a large segment of the population (estimated at over 33%) their first and only official form of identification, and therefore access to a bank account	▪ Will account access lead to account use?
Marketing / Onboarding	▪ Aadhaar can provide an entry point for bank account marketing; in some cases citizens are encouraged to open a bank account during Aadhaar onboarding ▪ Onboarding cost for providing a bank account is therefore also offloaded to the Aadhaar scheme	▪ Does offloading onboarding to Aadhaar make overall account profitable?
Cost	▪ Aadhaar is unlikely to reduce KYC costs independently for individuals that already have IDs, as the labor and process requirements won't drastically change versus current authentication procedures ▪ Transactional costs will not be lowered (and may be increased) if Aadhaar-enabled transaction procedures require specialized biometric authentication infrastructure	▪ Can Aadhaar-enabled authentication and authorization processes be designed to reduce system cost?

SOURCE: UIDAI, In-country interviews

Aadhaar, and infrastructure built around it, can facilitate payments and account access for those currently without ID

PRELIMINARY

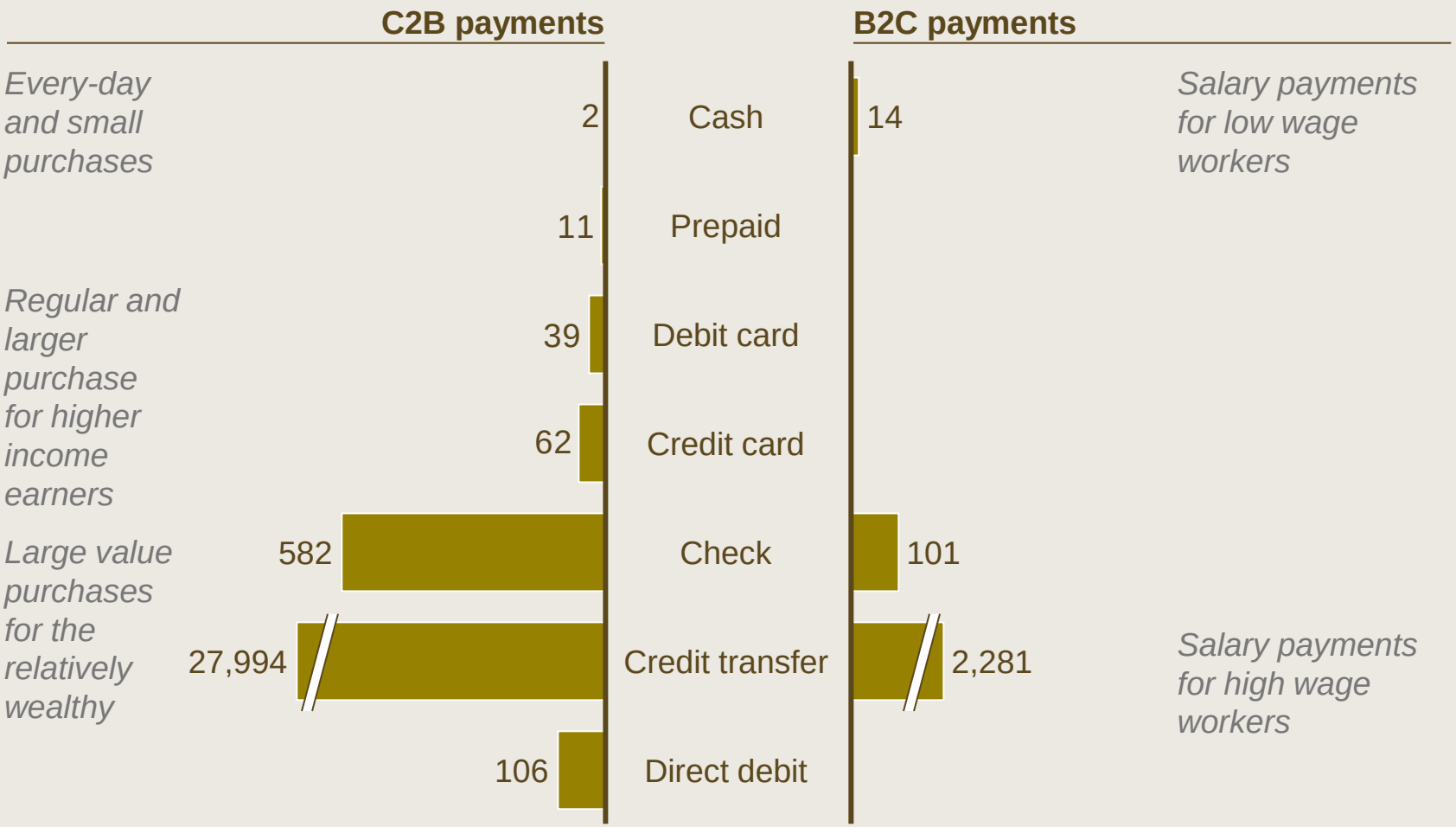
	Description	Implications
Aadhaar (a.k.a. UID)	▪ A unique identification number linked to a resident's demographic (name addres, DOB, gender), biometric information (iris, fingerprint) and a one-time PIN	▪ First form of identification for roughly a third of Indian residents[1] ▪ Provides previously-unidentifiable Indian residents access to formal financial system
Aadhar Enabled Bank Account (AEBA)	▪ Bank account (full service or 'basic savings') that is mapped to an individual's Aadhaar number via a database maintained by the NPCI ▪ Individuals without a bank account are able to open one during their Aadhaar enrollment	▪ Automatically provides any resident access to a basic bank account ▪ First step in realizing financial inclusion benefits of Aadhaar
Aadhaar Payments Bridge (APB)	▪ Payments mechanism allowing government agencies to distribute subsidies and benefits via an individuals' Aadhaar number ▪ NPCI manages the central core infrastructure that maps an individuals Aadhaar number to an AEBA	▪ Disbursing benefits and subsidies directly into individuals' bank accounts may help jumpstart use of bank accounts
Aadhar Enabled Payments System (AEPS)	▪ Authentication layer for any payments systems that allows individuals to utilize Aadhaar for authentication and operation of their AEBA	▪ Could reduce infrastructure costs, depending on final implementation (i.e., requiring biometric information for any transaction would likely increase cost)

1 High-level estimate

SOURCE: UIDAI, In-country interviews

Cash is used for small transactions, cheque and credit transfers for large ones, and debit and cards for those in the middle

Average size of payment by instrument, 2011
USD

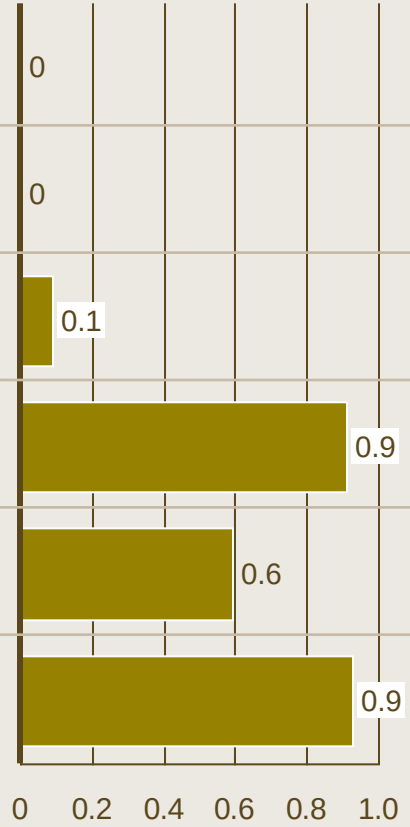


SOURCE: McKinsey Payments Map Release Q1-2012

Many transaction products are bundled and direct fees are zero; RBI caps other fees

Net fees: Consumer fees; Business fees

Fees by payment instrument $/transaction	Fees per dollar transacted, BPS	Description of fees
Check[1]	0	▪ Consumer fees are negligible at transaction level ▪ Merchant services often bundled with account
Direct Debit	0	▪ Consumer fees are negligible at transaction level ▪ Merchant services often bundled with account
Credit Transfer – NEFT[2,3]	0.1	▪ Consumer fees are capped by the RBI ▪ Merchant payee does not pay fees to receive transfer
Credit Transfer-RTGS[2,4]	0.9	▪ Consumer fees are capped by the RBI ▪ Merchant payee does not pay fees to receive transfer
Debit card[5,7]	0.6	▪ Consumer fees are "0" at the transaction level ▪ Merchant pays transaction fees to both issuing and acquiring banks; fee caped by RBI
Credit card[6,7]	0.9	▪ Consumer fees are "0" at the transaction level ▪ Merchant pays transaction fees to both issuing and acquiring banks; fee caped by RBI



1 Fees are sometimes charged for 'outstation cheques' (i.e., checks that must be sent to a non-local clearinghouse), capped at $0.46 (25 INR) for cheques under ~$180 (10K INR), $0.90 (50 INR) for cheques under ~$1,800 (100k INR) and ~$1.80 (100 INR) for any other value; 2 NEFT is used for transfer under ~$3,640 (200K INR); RTGS for transfers over this amount; 3 NEFT charges range from $0.05 – $1.82 (2.5-100 INR); 4 RTGS charges range from $0.45 - $0.90 (25-50 INR); 5 Average debit card transaction: $39 USD; 6 Avg. credit card transaction: $62 USD; 7 Through June 2012, debit and credit card MDRs were ~1.50% (number used here). Starting July 2012, debit card MDRs were lowered to 0.75%-1%

NOTE: Assumes 55 INR = 1 USD

SOURCE: RBI, McKinsey Global Payments Map

'Cash is king' in C2B transactions, and is the preferred method of payment for most merchants

C2B TRANSACTIONS

	Consumer							Merchant				
	Re-quires Bank Acct	Direct Fees (USD)	Indirect Fees (USD)	Benefits	Mer-chant Accept. (%)	Actual Use (Vol, %)	Con-sumer Access (%)	Re-quires Bank Acct	Direct Fess (USD)	Indirect Fees (USD)	Benefits	**Use cases**
Cash		-	-	▪ Ubiquitous ▪ Universal	100	99.7	100		-	▪ N/A	▪ Ubiquitous ▪ Immediate	▪ All ▪ Especially small value
Check	✓	-	▪ -	▪ Included with account ▪ Safer for large txs	<1	<0.1	35	✓	-	▪ N/A	▪ -	▪ -
Credit transfer /Direct debit	✓	-	▪ -	▪ Convenient for large txs ▪ Esp. online	<1 <1	<0.1 <0.1	35 8	✓	-	▪ N/A	▪ Convenient for large txs,	▪ P2P ▪ Bill payments ▪ Larger values
Debit Card	✓	-	▪ -	▪ Convenient to carry	4	<0.1	8	✓	0.52 (MDR)	0 (No terminal fee)	▪ Direct credit ▪ Minimizes cash handling	▪ General online and offline merchant
Credit Card	✓	-	▪ Annual fees	▪ Float and liquidity benefit	4	<0.1	2	✓	0.97 (MDR)	0 (No terminal fee)	▪ Direct credit ▪ Minimizes cash handling	▪ Higher value merchant payments
Prepaid		-	▪ Card purchase	▪ Convenient to carry	4	0.1	<2	✓	N/A	▪ N/A	▪ Direct credit ▪ Minimizes cash handling	▪ Transport, small value
Mobile		N/A	▪ N/A	▪ N/A	N/A	N/A	2		N/A	▪ N/A	▪ N/A	▪ N/A

SOURCE: World bank Findex (2011), The Little Data Book on Financial Inclusion 2012, McKinsey Global Payments Map

How the system works by payment instrument (1/2)

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Cheque	▪ Written by payer on paper provided by payer bank ▪ Most popular form of non-cash payment (by volume)	▪ Cheque clearing houses receive cheques ▪ Clearing houses are either managed by the RBI or public sector banks	▪ Transactions in RBI-managed clearing houses settle via banks' accounts held with the RBI ▪ Transactions in bank-managed clearing houses are settled by the managing bank	▪ Payee receives cheque from payer and presents to bank ▪ Payee bank processes account credit, sorts cheques and sends to cheque clearing house; funds are held until clearing
Credit Transfer	▪ Payer enters bank information online/at bank ▪ Employer deposits salary into employee's account ▪ Most popular form of payment (by value); typically used for large value transfers	▪ One-to-many transactions handled by the ECS; each entry triggers multiple credit entries from one withdrawal ▪ One-to-one transactions under 200,000 INR are handled by NEFT ▪ Transactions over 200,000 INR are handled by the RTGS	▪ ECS transactions settled locally in accounts held with bank managing the clearing house or with the RBI through the central clearing house in Mumbai ▪ NEFT settles on a deferred net settlement basis, at multiple points through the day, via RTGS	▪ Payee bank
Direct Debit	▪ Payer pre-approves debits via a signed form, often including withdrawal limit ▪ Payer can stop payment between notification of amount and funds withdrawal	▪ All direct debit transactions are handled by the ECS, specifically the ECS debit system ▪ Multiple debits result in one deposit to the payee's accounts	▪ ECS transactions settled locally in accounts held with bank managing the clearing house or with the RBI through the central clearing house in Mumbai	▪ Payee (more likely the payee's bank) determines when to process instructions to draw money from payer

SOURCE: CPSS – Red Book

How the system works by payment instrument (2/2)

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Debit Cards **Credit Cards** **Prepaid**	▪ Payer presents card or details at POS or via phone, paper or online	▪ Acquiring banks capture the transaction and route to payment networks (Visa, MasterCard, American Express, Diner's club) to process the payment ▪ RuPay , a national network, is in the process of being launched by NPCI	▪ Transactions are cleared by the respective network (Visa, MasterCard, American Express) ▪ Settlement occurs at the network's settlement bank: Bank of America for Visa, Bank of India for MasterCard. American Express clears and settles on its own.	▪ Payee swipes card at POS device or receives details ▪ POS device or internet gateway forwards details to card network for processing ▪ Acquiring bank processors may link merchant to network
Mobile	▪ Mobile application or SMS ▪ Payer must have activated mobile banking service with his/her bank and linked a mobile number to his/her bank account	▪ NPCI's Immediate Payment Service (IMPS)[1] ▪ Also can be a mobile network operator through a mobile money scheme	▪ IMPS transactions are routed through NPCI's National Financial Switch (NFS); and cleared & settled via the Clearing Corporation of India (CCIL)	▪ Payee needs to have linked mobile number to bank account and have a Mobile Money Identifier (MMID)

1 IMPS provides a service that links a mobile number to bank account routing information and initiates a real-time credit transfer via the NPCI's National Financial Switch (NFS) used f or ATM switching

SOURCE: CPSS – Red Book

Public networks play a central role in settlement for all instruments and in clearing many non-card transactions

Public infrastructure
C Clearing
S Settlement

		Large Value Transfer System		Automated Clearing House		1139 Cheque Clearing Houses[1]		Card Payment Network		Deferred Net Settlement (DNS) System		Volume (%)[5], 2011	Rationale for choice
		Public	Private	Public	Private	Public	Private	Public	Private	Public	Private		
Network Design	Network	RTGS	N/A	ECS credit ECS debit NECS	N/A	Ope-rated by RBI	Operated by state-owned banks	Rupay[2]	VISA MasterCard AMEX	NEFT	N/A		
	Time to settle	Instant		2-3 days		2-3 days	2-3 days		1-2 days	1 day			
	Net/Gross	Gross		Varies		Net	Net		Net	Net			
	Open/closed	Open		Open		Open	Open		Differs	Open			
	Interoperable	Yes		Yes		Yes	Yes		Yes	Yes			
Clearing & Settlement by instrument	Cheque					C S	C S					41% 59%	Ubiquitous but expensive Less costly but only large banks
	Direct debit			C S									
	Credit transfers[3]	S C S		C S						C		30% 56% 14%	Transaction size limits and availability
	Debit card								C S[4]				
	Credit card												
	Prepaid card												

1 March 2010; 2 RuPay is yet to be launched broadly; open questions on final structure remain; 3 Can be initiated via mobile through NPCI's IMPS, which is settled through the ATM switching network NFS; 4 Settlement occurs at each networks' settlement bank: Visa – Bank of America, MasterCard – Bank of India, American Express – American Express; 5 2011

SOURCE: BIS CPSS Red Book, In-country interviews, RBI

Table of Contents

The payment system in Kenya

Characteristics

- **Payments activity is fragmented across players** – banks, clearing & settlement networks, and telcos – increasing costs, and leading to limited market coordination (e.g. lack of switch interoperability)
- **The user base is highly segmented** – Because only a few providers cater to each segment, competition is more limited than a traditional concentration analysis might indicate
- **Incumbents have held defensible positions** – In traditional non-cash payments, banks are in control; in mobile money, Safaricom is the largest provider and de facto leader
- **Products are generally expensive with limited consumer orientation**, stemming from limited competition among entrenched incumbents, and a historical lack of consumer orientation
- **Regulators have let the market lead –** They have not inhibited the growth of mobile money nor have they acted to unify or rationalize the network or distribution infrastructure (e.g., clearing & settlement, ATMs, agents)
- **Remittance-dominated mobile money is used widely and dominated by a single telco provider --** its growth was driven by a heavily rural population and strong rural-urban connections, but formal C2B use and linked financial services remain limited

Implications for financial inclusion

- **Mobile money is a natural winner in this economy, but may be stalled** at providing money transfer; expansion of mobile money functionality likely will require coordinated change across institutional players, merchants and consumers, e.g.:
  - Provider de-fragmentation to reduce costs
  - Merchant education and re-pricing to further acceptance
  - True interoperability among mobile money players and between MM players and banks
  - An increase in competition in both the banking and telecom sectors)
- **Non-mobile money cashless solutions** will not access poor populations until agent banking gains sufficient reach and/or banks gain access to the mobile channel
- **Driving mobile money usage at the merchant** may require a new POS solution outside of USSD/SMS that provides quick and cost-effective payments

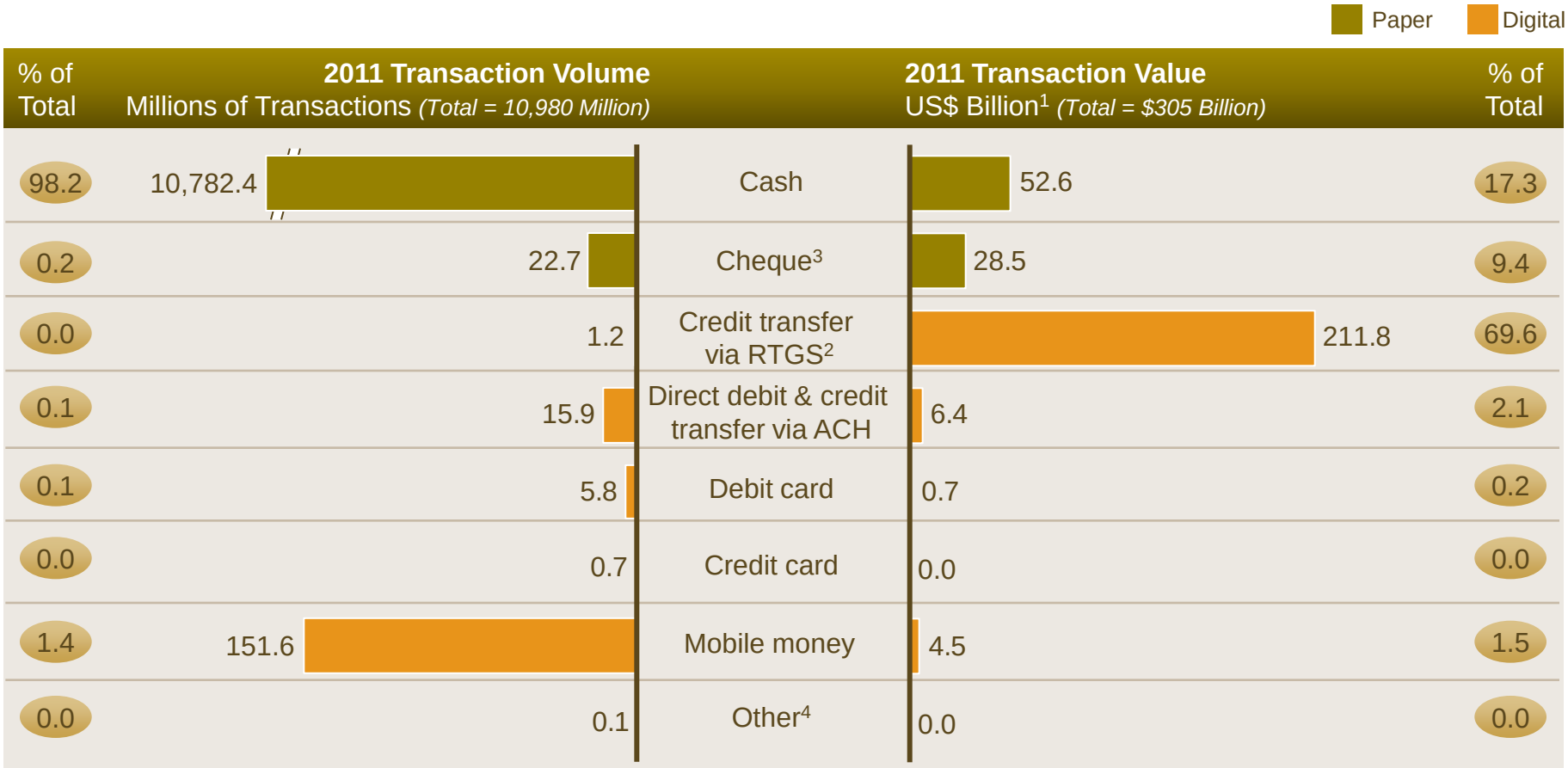
Payments in Kenya by the numbers

Usage & Inclusion	Instrument usage	**Cash-heavy with widespread use of mobile in C2C** ▪ Percentage of digital and mobile payments by value: 54% C2C, 7% C2B, 24% B2C
	Financial inclusion	**Low** ▪ Formal access: 42% of population, 19% of bottom 40%
Payment system	Network infrastructure	**Fragmented** ▪ Central platforms (RTGS and ACH for cheque clearing) co-exist alongside fragmented interbank transaction platforms (e.g., ATMs), creating inefficiencies in the system and user experience (e.g., multiple POS, limited ATM reach)
	Regulation	**Permissive** ▪ Private-sector-led market development, including free-development of mobile money, with some uncertainty over domain of each related regulator body; market-led system that supports entrepreneurial efforts to a significant degree
Environment	Banking system reach	**Low-reach, urban-centered** ▪ Branches – 5 branches per 100K pop. ▪ ATMS – 10 ATMs per 100K pop. ▪ POS – 88 POS per 100K pop.
	Mobile & telecoms	**Developed** ▪ Established mobile market led by single dominant provider – Safaricom – and other MNOs ▪ Mobile users: 67% of population
	Other market infrastructure	**Sufficient** ▪ Telecoms functions relatively reliably in major markets, but can increase access in rural areas. Power functions in major markets but population electrification rates are 10-20%; where payment systems are deployed, core infrastructure does not pose major problems for functionality
	Economic environment	**Lower income** ▪ GDP: $800 / capita. GINI coefficient of 42.5 in 2008
	Demographics & geography	**Rural, young population, urbanizing slowly** ▪ Adult population (over 15) of 24.5 million, total population of 43 million (42.5% of population 0-14 years) ▪ 22% of population urbanized

NOTE: Numbers are for 2011, unless otherwise stated

SOURCE: Findex Global Database; CIA Fact Book; Expert Interviews

Mobile money is the most common digital payment channel by volume in Kenya, while RTGS payments dominate by value



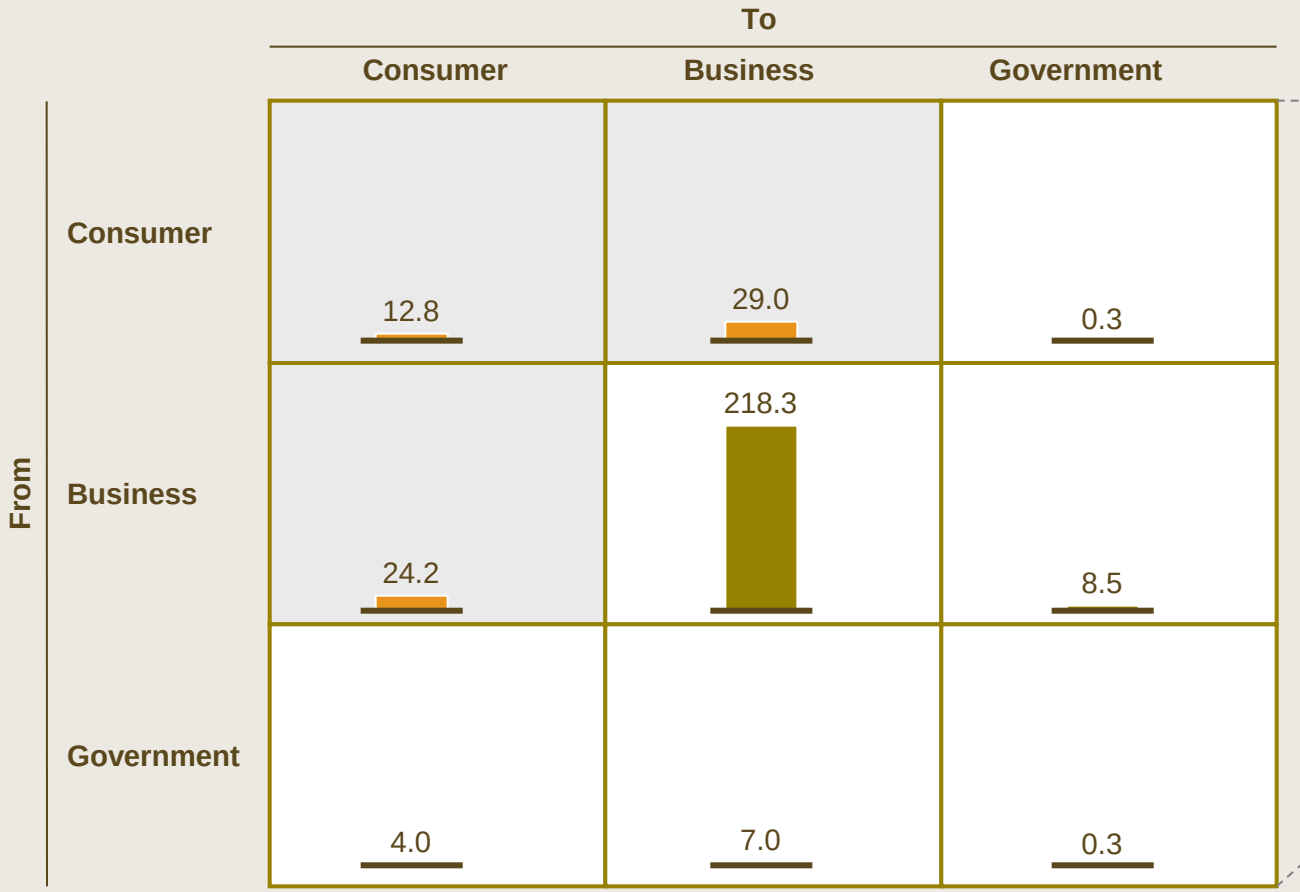
- RTGS credit purchases account for the majority of transactions by value as initiatives such as value-capping and g-pay push greater large value transactions through the system
- Cash dominates the system – accounting for 98% of the total transaction volume

1 90 Kenyan shillings = 1 US$, 2011 average; 2 Includes all payments through RTGS system, excludes net settlement resulting from clearing house operations; 3 Includes all cheques converted to ACH; 4 Includes prepaid cards

SOURCE: Kenyan Central Bank; Safaricom; Kenyan Bankers Association; Expert interviews

The transactions most strongly impacting Kenyan consumers account for $66 billion of payment flow

Trade payments in Kenya by transaction parties, 2011
US$ Billion[1]



Total trade payments by value, 2011
US$ Billion[1]

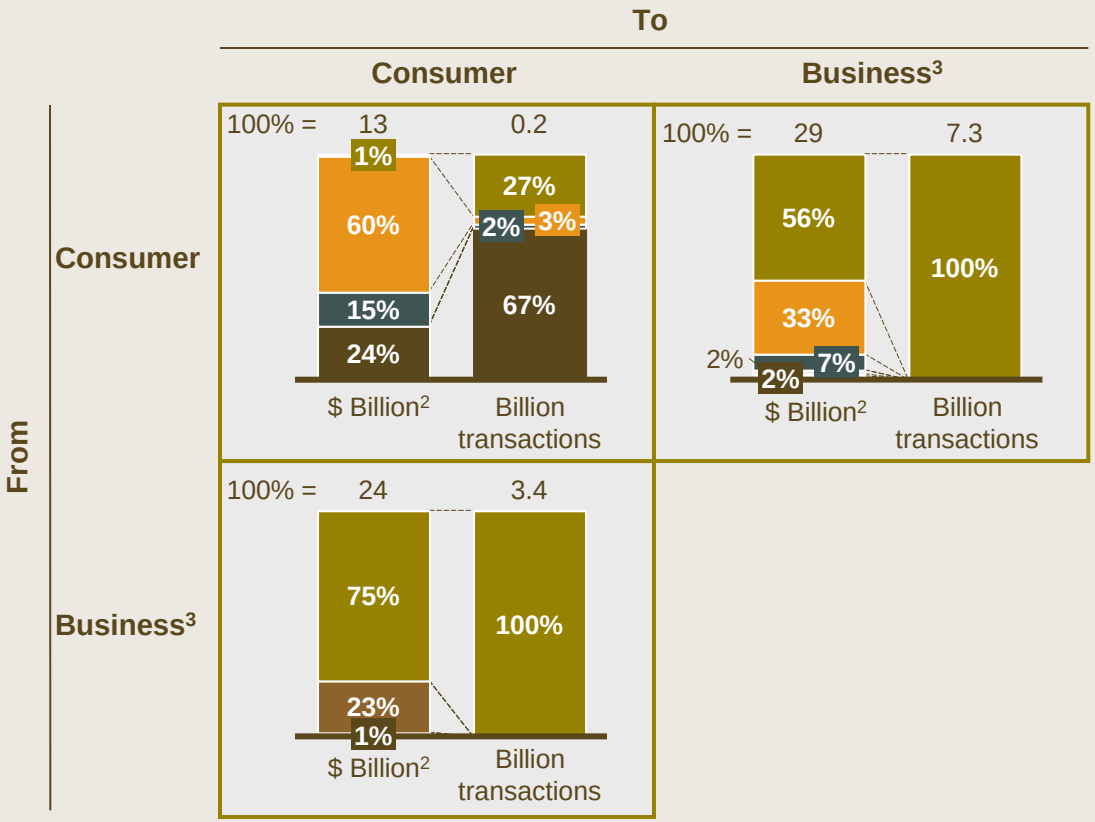
1 90 Kenyan shilling = 1 US$, 2011 average

SOURCE: Kenyan Central Bank; Safaricom; Kenyan Bankers Association; Expert interviews

Mobile money plays a major role in C2C payments in Kenya, but paper instruments predominate for other payments

$ = High value (>20% use)
# = High volume (>20% use)

Kenyan trade payments by transaction parties, 2011[1]
Value in US$ Billions[2], Transactions in Billions



Major instruments used by transaction type

	C2C	C2B	B2C
Cash	#	$#	$#
Cheque	$	$	
Direct debit			
Credit transfer			$
Debit card			
Credit card			
Mobile money	$#		

1 Note that official data for most of these quantities does not exist, so many of these numbers are best estimates. Largest uncertainties are in C2B numbers, since the division between formal and information sectors is hazy
2 90 Kenyan shillings = 1 US$, 2011 average
3 Includes both business and government payments.

SOURCE: Kenyan Central Bank; Safaricom; Kenyan Bankers Association; Expert interviews

Financial inclusion in Kenya

Overall financial inclusion performance: low-medium

- **Percent with an account at a formal financial institution**
  - Overall -- 42%
  - Top 60% -- 62%
  - Bottom 40% -- 19%
  - Women -- 19% have formal financial accounts
- **Payment services access**
  - Debit card access -- 30%
  - Credit card access -- 6%
  - Wages received in formal account -- 16%
- **Distribution access (per 100,000 people):**
  - Bank branches -- 5
  - ATMs -- 10
  - POS terminals -- About 88
  - Mobile payment agents -- 143
  - Mobile access -- 67% of population

Key takeaways

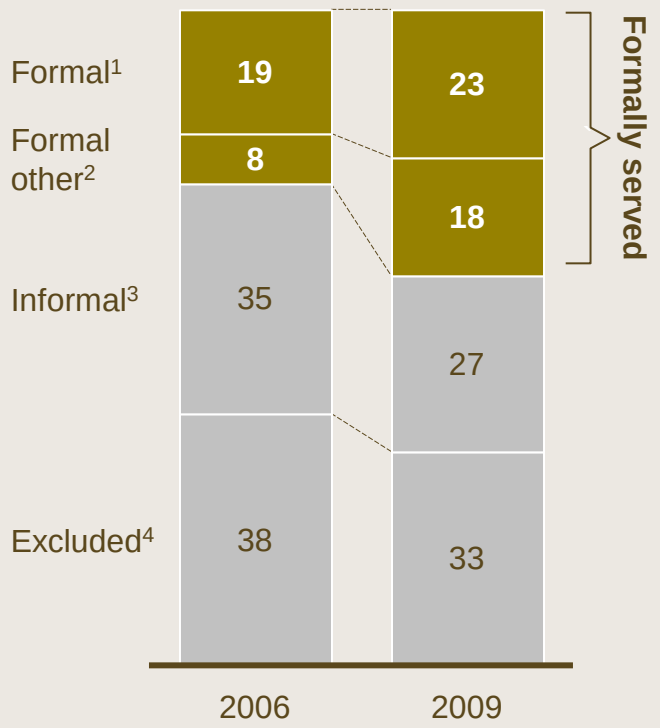
- **The traditional bank branch network is not well penetrated in rural areas;** bank branch expansion into these areas in the late 1990s was reversed when banks changed course and closed unprofitable branches, creating distrust among affected customers
- **Formal banking products are perceived to have little relevance for many of the poor** who have limited balances and irregular income. **Consumers are also averse to ongoing monthly maintenance fees**
- **Financial literacy** of banking products is generally low and consumers find banking intimidating
- **MPESA enjoys massive adoption across all segments of the population** and enjoys significant consumer trust
- **MPESA suits consumer needs for storing and transferring money; and consumers are much more willing to accept transaction charges** (which are 1.5%-2% for average-sized transactions

1 Based off of number of agents in 2012

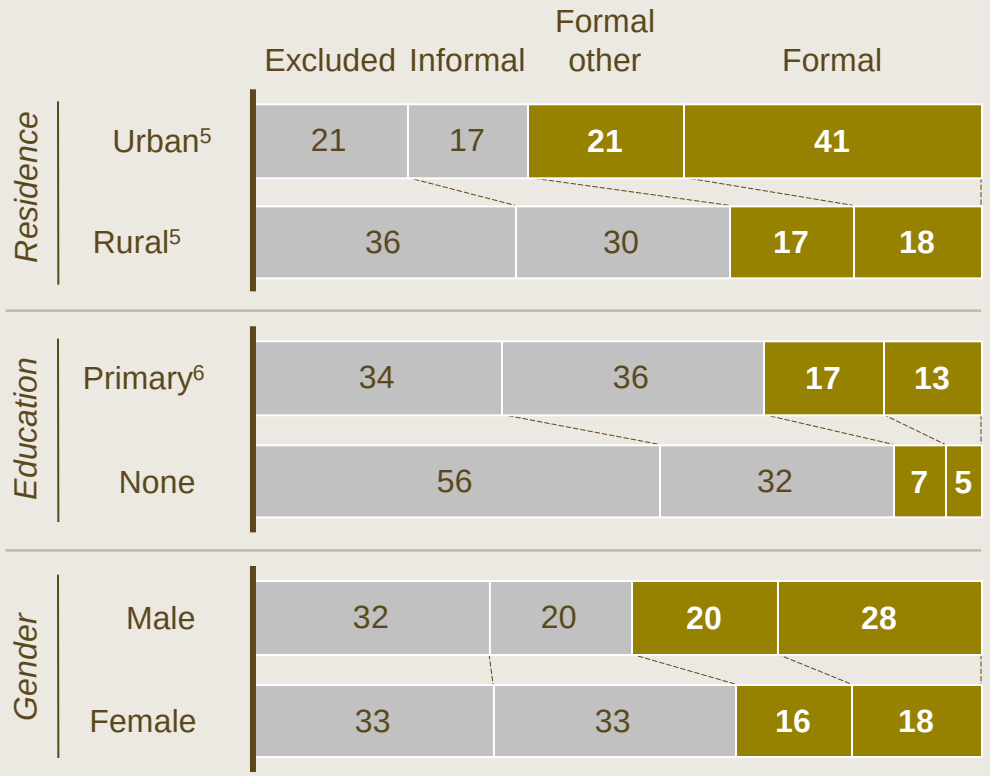
SOURCE: Findex Global Database; Central Bank of Kenya; WMM Global Insight; Expert Interviews

Fully 40% of adults have formal access, with higher inclusion in urban areas, among men, and those with at least primary education

Population breakdown by level of inclusion[5]
Percent of adult population



Population segment breakdown by level of inclusion, 2009[5]
Percent of adult population



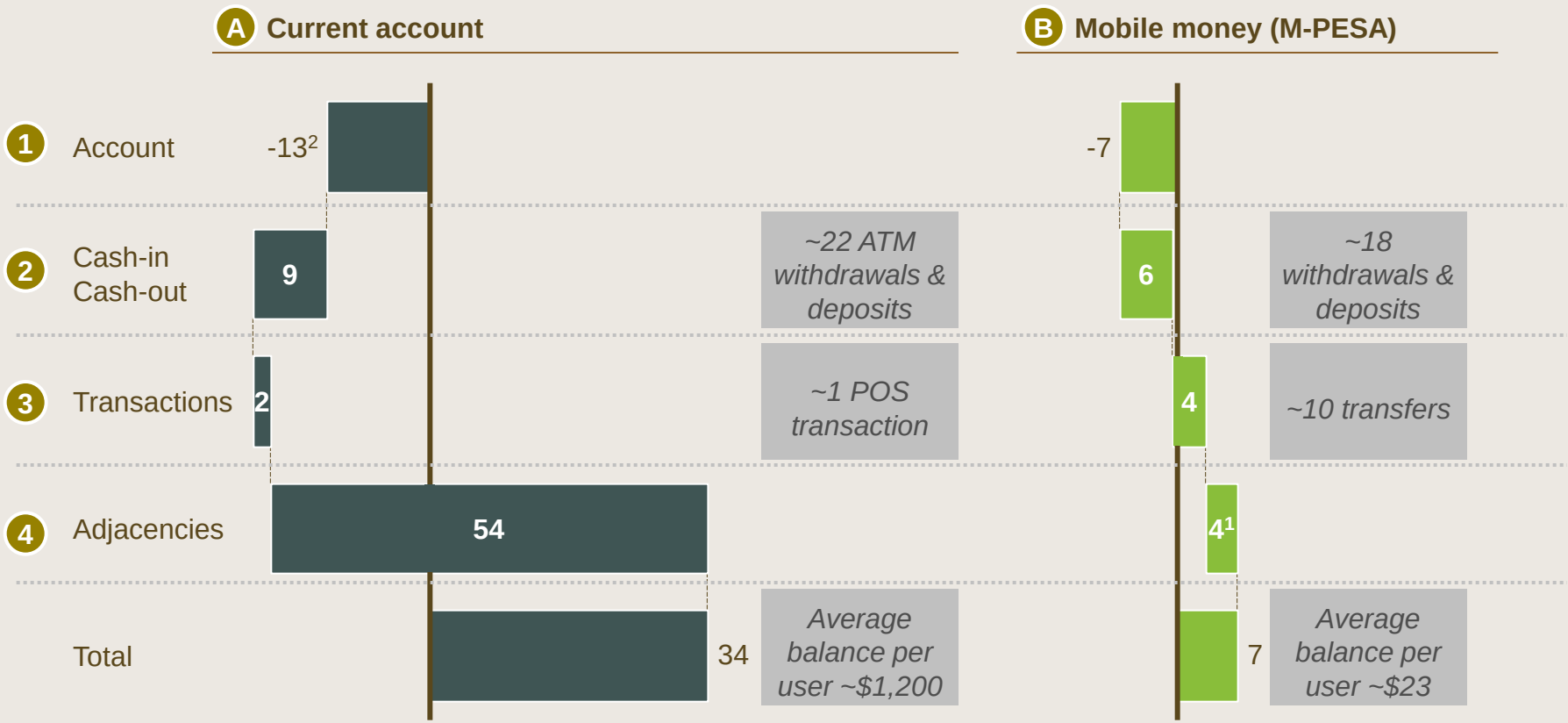
1 Formal: use a bank, PostBank or insurance product; 2 Formal other: use services from non-bank financial institutions such as SACCOs (Savings and Credit Cooperative Societies) and MFIs; 3 Informal: use informal service providers (e.g., ASCAs, RoSCAs) 4 Excluded: use none of the above; 5 Based on a survey of adults 18 years or older, with ~6,500 survey respondents; 6 Respondent with higher than primary education have yet higher access levels (34.7% and 70.3% formal inclusion for those with secondary and tertiary education, respectively)

SOURCE: FinAccess National Survey 2009, Dynamics of Kenya's changing financial landscape

Kenya has two distinct payment system profit models – bank-led current account and telco-led mobile money

ESTIMATES

Estimated profit decomposition per customer for mobile money and current accounts 2012
USD

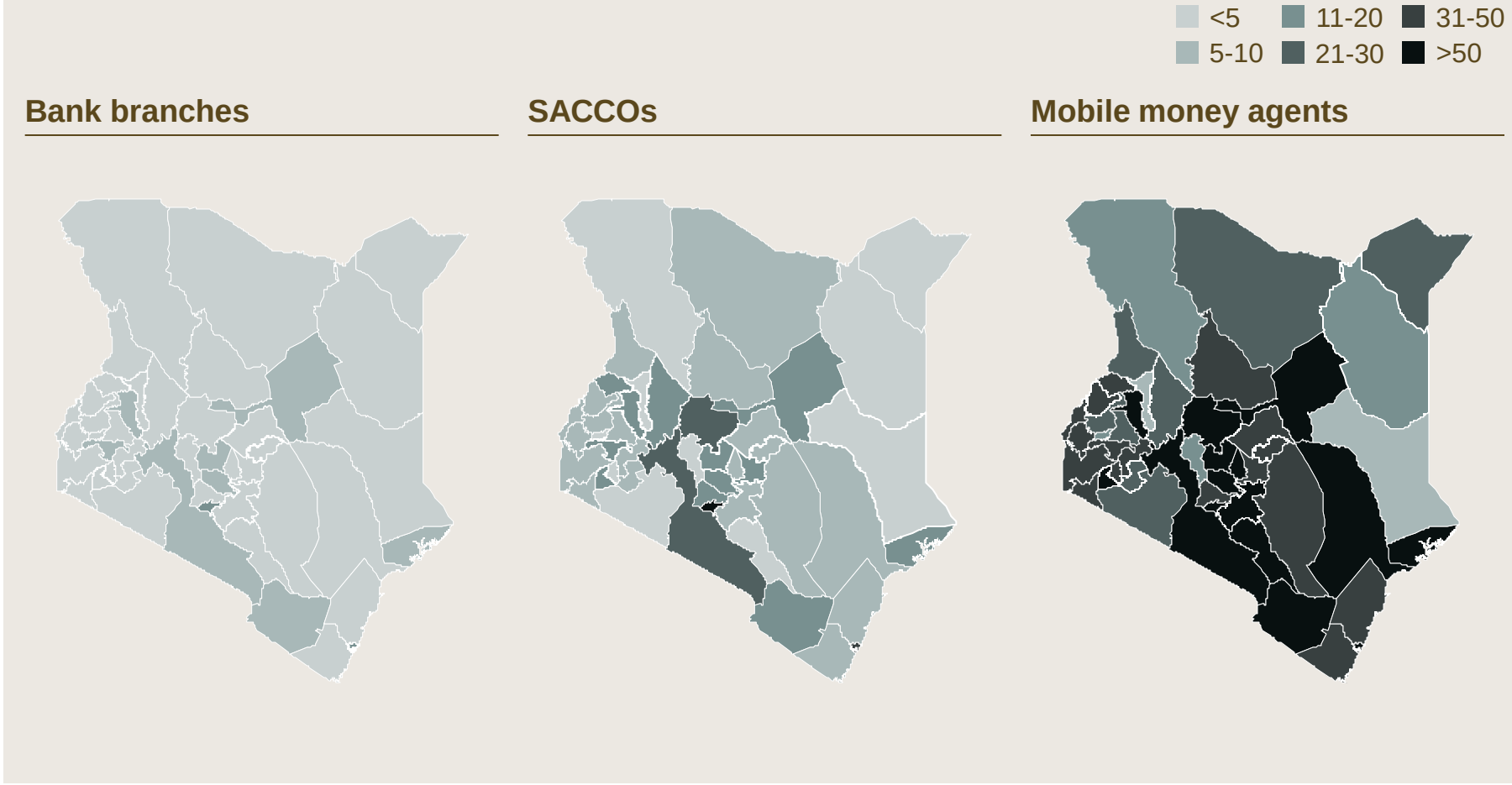


1 Estimated rage of adjacencies benefits are $2-6, based on Safaricom data supplemented by interviews. This is the mid-point. 2 Costs per account are estimated by taking industry-wide operating expenses, and assigning 50% to liabilities-linked activities. 86% of aggregate balance sheet liabilities are customer deposits. Hence 50% x 85% of total costs are assigned to deposit accounts. CICO and transaction costs from debit cards are subtracted from this total

SOURCE: Central Bank of Kenya; Safaricom Annual reports; Equity Bank annual reports; WDI; Oanda; Expert interviews

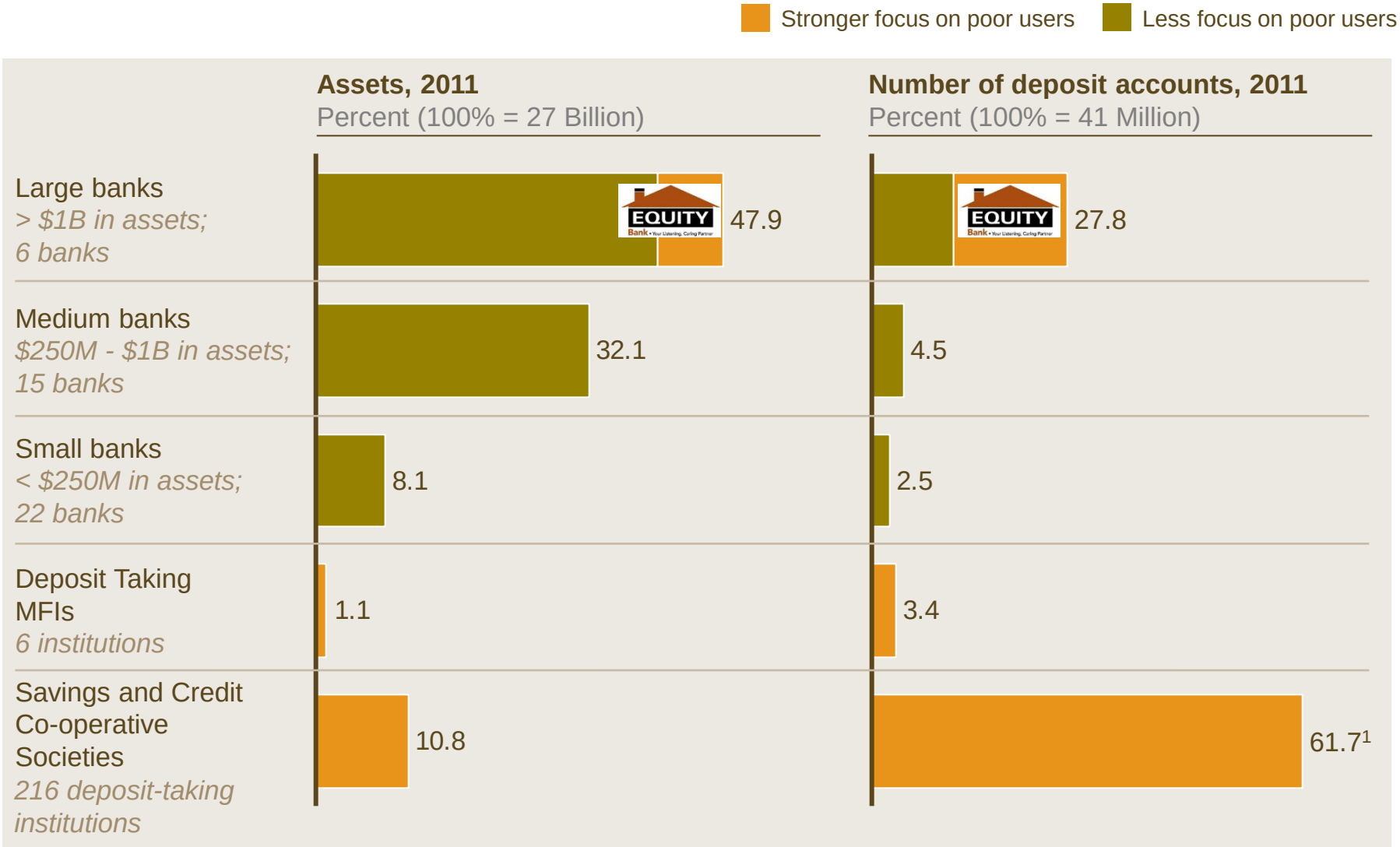
Outside Nairobi, formal banking reach is limited; mobile money agents are more common but still sparse in some areas

Provider density
Outlets per 100,000 adults



SOURCE: CBK – *Bank Supervision Annual Report (2011);* themix.org

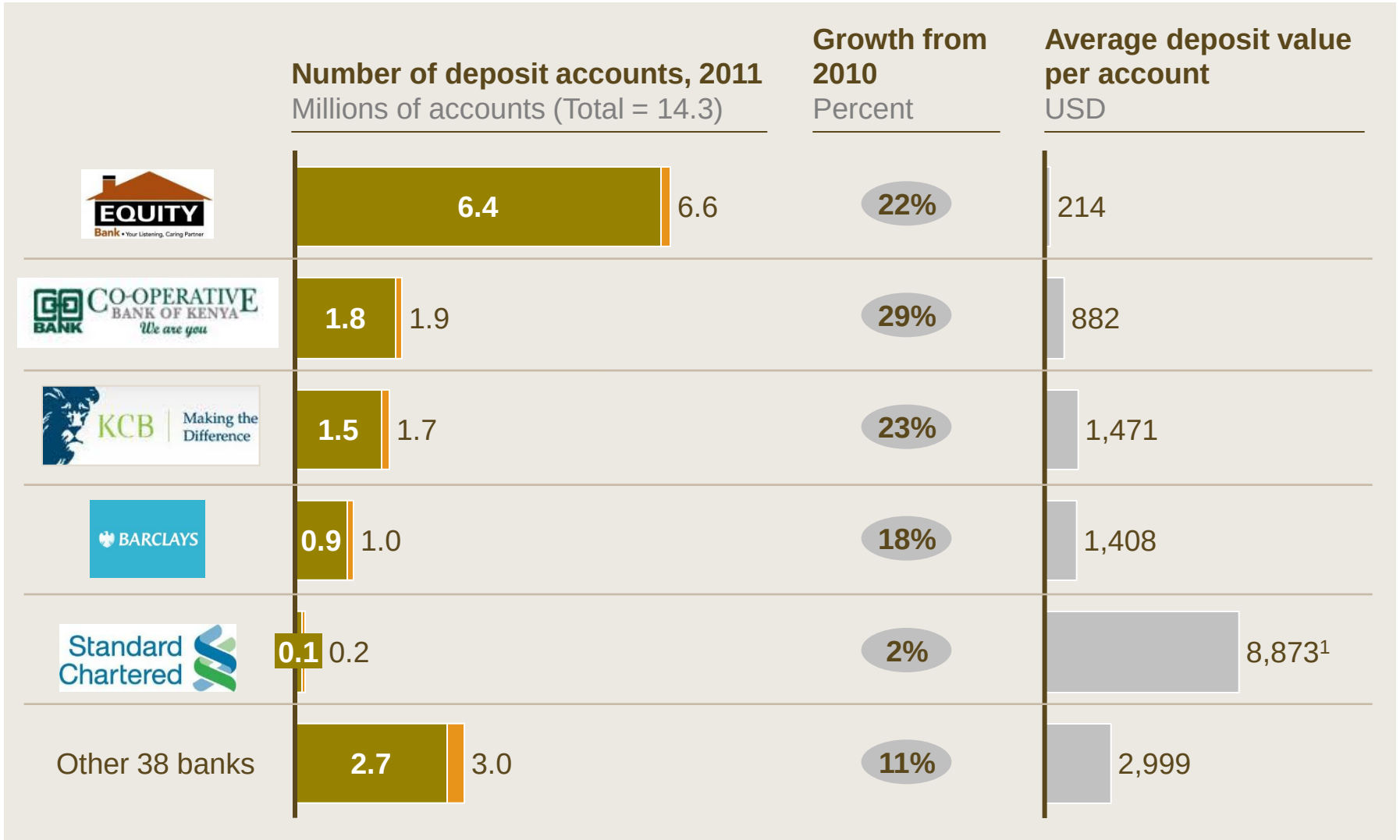
Except for Equity Bank, smaller and potentially less efficient institutions maintain the largest number of deposit accounts



1 Assumes accounts have the same average balance as the average balance of DTM accounts with under 100,00 Ksh ($1,157)

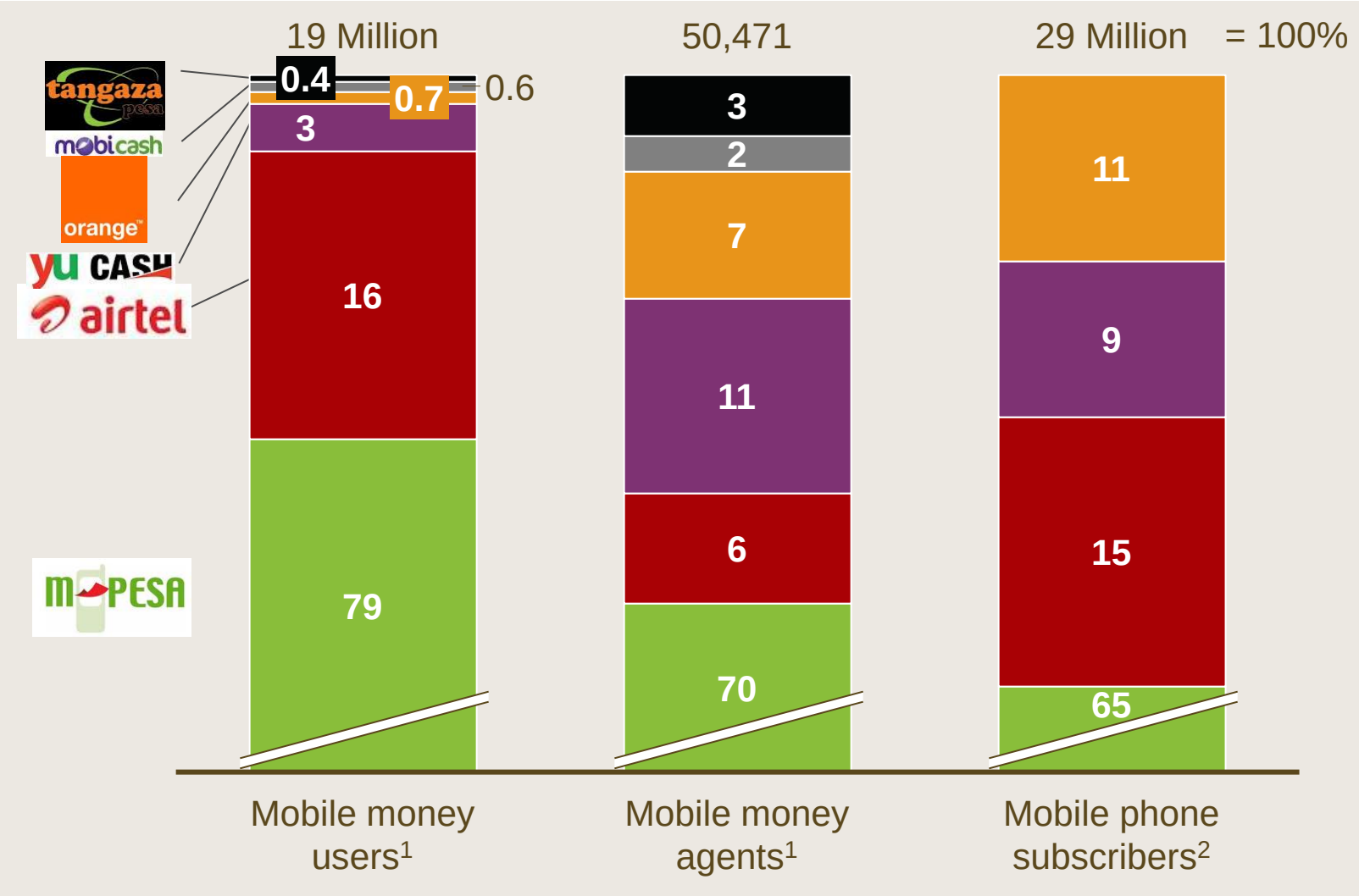
SOURCE: CBK – *Bank Supervision Annual Report (2011), Financial Sector Stability Report (2011)*, Oanda

Across banks, most deposit accounts have under $1,160 in deposits; banks with more accounts have smaller average balances and higher growth rates



SOURCE: CBK – *Bank Supervision Annual Report (2011), Financial Sector Stability Report (2011)*, Oanda

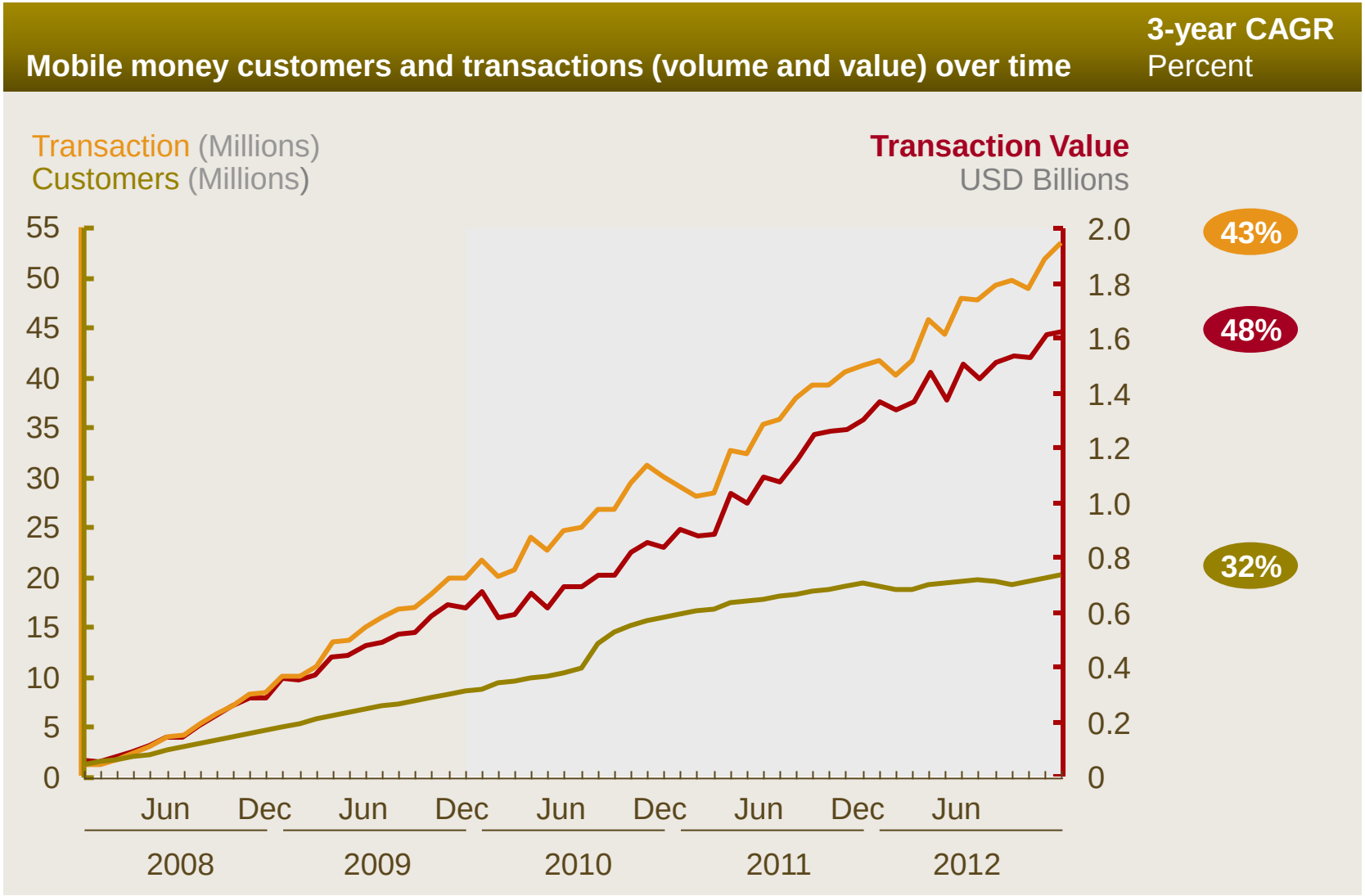
Mobile money transactions occur through MMO-run closed networks; M-PESA offers the largest agent network



1 Dec 2011 data; 2 March 2012 data

SOURCE: Central Bank of Kenya; CCK

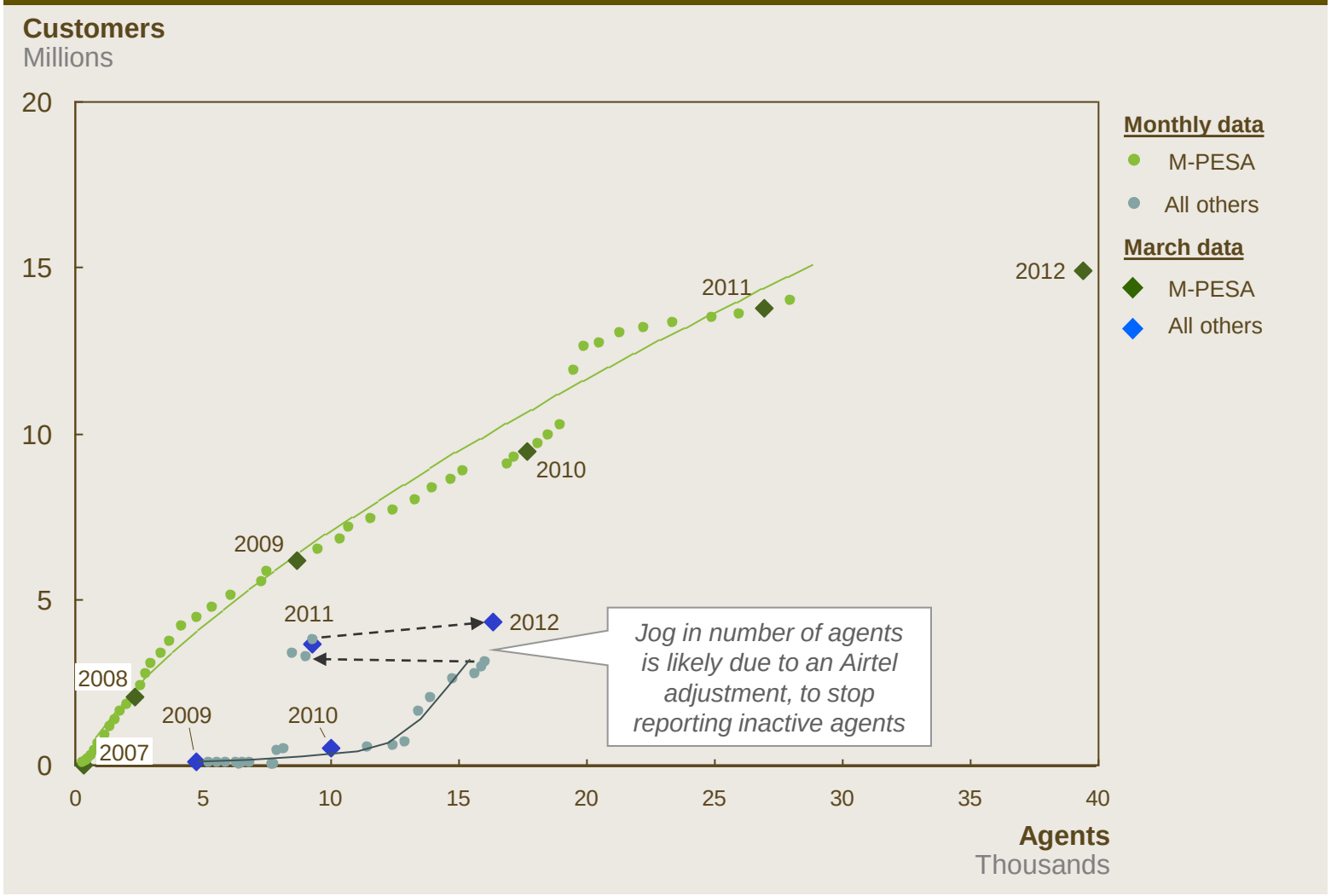
Mobile money has exploded since its inception in 2007; volume and value transacted have grown even faster than number of customers



SOURCE: Central Bank of Kenya

M-PESA grew its customer base faster compared to its agents than its competition; however, fast customer growth has stopped

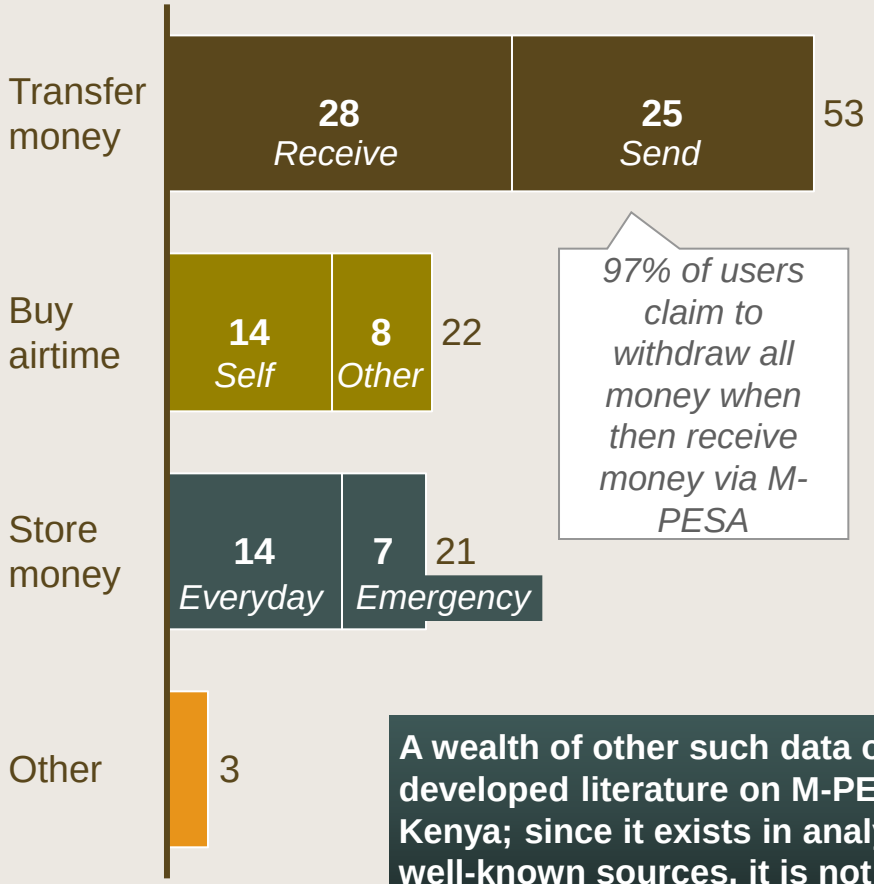
Numbers of customers *versus* agents over time



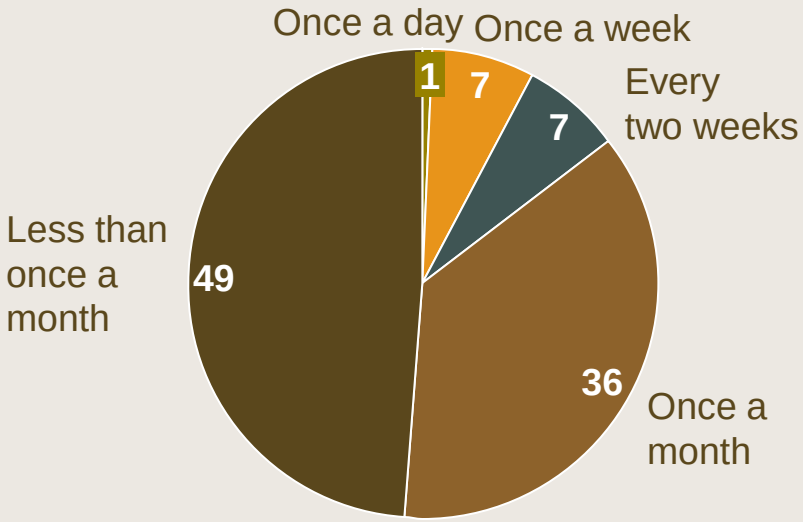
SOURCE: Central Bank of Kenya; M-PESA statistics release

Mobile money is most valued as way to transfer money, commonly once a month or less frequently

Most important use of M-PESA[3], 2009[1]
Percent



M-PESA[3] usage frequency, 2009[2]
Percent



A wealth of other such data on use behavior exists in the well developed literature on M-PESA and financial inclusion in Kenya; since it exists in analyzed form in easily accessible and well-known sources, it is not contained within this document

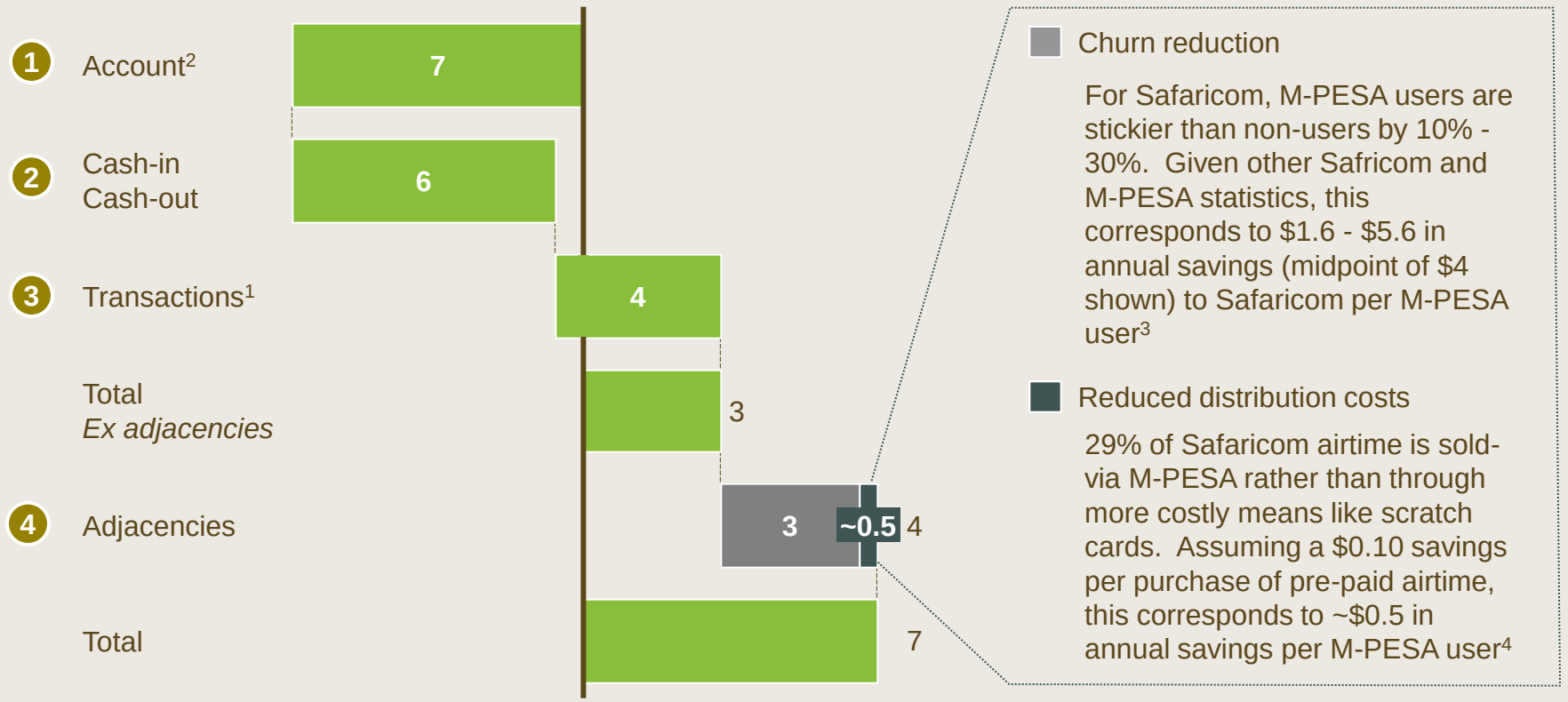
1 Based on 3,343 responses from 1,120 users; 2 1,120 responses; 3 M-PESA accounts for >95% of mobile money transaction volume and value so is a good proxy for mobile money use generalle

SOURCE: "Mobile Payments in Kenya: Findings from a survey of M-PESA users and agents", January 2009

Including adjacent benefits to Safaricom through churn reduction and reduced distribution costs, adds $2-6 of profit per M-PESA user

ESTIMATES

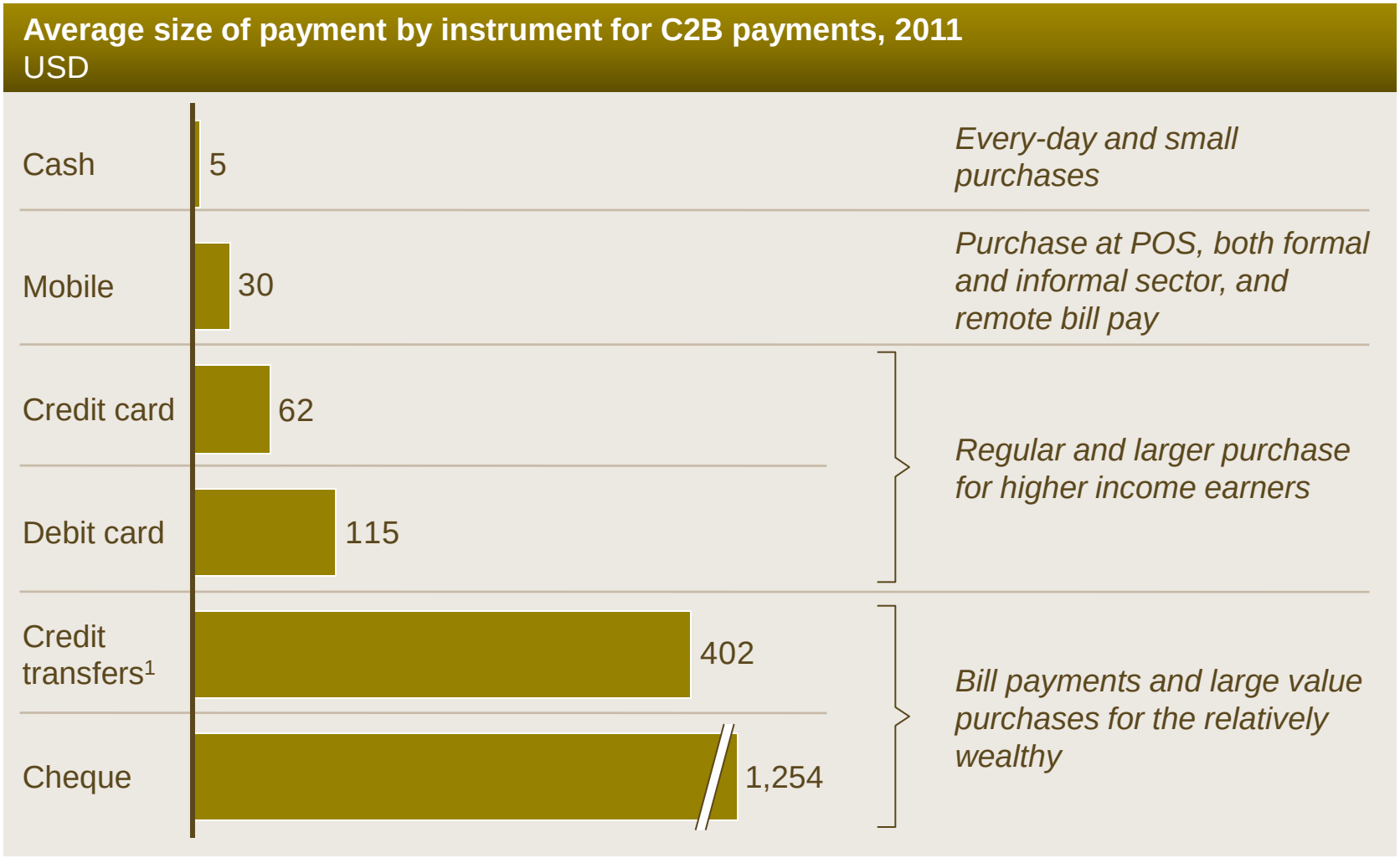
Decomposition of estimated M-PESA profit per customer including adjacencies, 2012
USD



1 Transactions include all transfers, including bill pay and salary payments; 2 Includes customer service and support center costs and estimate of back-office processing costs as well as licensing fees paid to Vodafone; 3 For 2012: $51: annual other voice and data revenue per Safaricom subscriber. 28%: Overall Safaricom mobile subscriber churn. 78%: fraction of mobile subscribers also signed up as M-PESA users. Benefit per M-PESA user is given by the formula: (revenue per Safaricom subscriber)*(Safaricom subscriber churn)*(stickiness differential between M-PESA users and non-users)/(1 – fraction of mobile subscribers using M-PESA* stickiness differential between M-PESA users and non-users); 4 Safaricom has 19M in monthly purchases of paid subscriptions and there are ~15M M-PESA subscribers

SOURCE: Central Bank of Kenya; Safaricom Annual reports; WDI; Oandal CCK; Expert interviews

People pay with cash for small C2B transactions, cheque and credit transfers for large ones, and mobile and cards for those in the middle



1 Only includes credit transfers via ACH

SOURCE: Kenyan Central Bank; Safaricom; Kenyan Bankers Association; Expert interviews

Accessibility and cost govern the choice of *C2C* instrument; cash is generally preferred in-person and mobile money for remote payment

ESTIMATES

	Payer					Actual Use (Vol, %)	Payee					Example use cases
	Requires Bank Acct	Direct Fees[2] (USD)	Indirect Fees[2] (USD)	Benefits	Access (%)		Access (%)	Requires Bank Acct	Direct Fees[2] (USD)	Indirect Fees[2] (USD)	Benefits	
Cash		-	▪ ATM/ agent withdrawal ($0.10-3.45[1])	▪ Accessible ▪ Ubiquitous	100	28	100		-	▪ -	▪ Immediate receipt ▪ Accessible ▪ Ubiquitous	▪ Gift ▪ Loans ▪ Informal sector payment
Check	✓	-	▪ Checkbook, postage ($0.25-1.15)	▪ Convenient for large transactions ▪ Safety	42	3	42	✓	-	▪ -	▪ Convenient for large transactions ▪ Safety	▪ Gifts ▪ Loans ▪ Long distance remit
Credit transfer	✓	$0.60-1.76	▪ Returned processes ($0.50-1.15)	▪ Convenient for large transactions ▪ Safety	42	3	42	✓	$0-0.60	▪ -	▪ Convenient for large transactions ▪ Safety	▪ Gifts ▪ Loans ▪ Long distance remit
Mobile money		$0.03-1.15	▪ Handset	▪ Accessible ▪ Safety ▪ Relative low cost	67	67	67		-	▪ Potentially agent withdrawal ($0.10-$3.45)	▪ Accessible ▪ Safety ▪ Relative low cost	▪ Gifts ▪ Loans ▪ Long distance remit ▪ Informal sector payment

1 $0.35-$0.87 for own-bank / $1.74-$1.90 off-bank ATM and $0.11-$3.43 for mobile money withdrawal at an agent; 2 All values over $0.110 rounded to nearest $0.05

SOURCE: Expert interviews, World Databank, Bankable Frontier Associates, Central Bank of Kenya

For C2B transactions, mobile money is generally not low cost compared to cash, and sees relatively little use

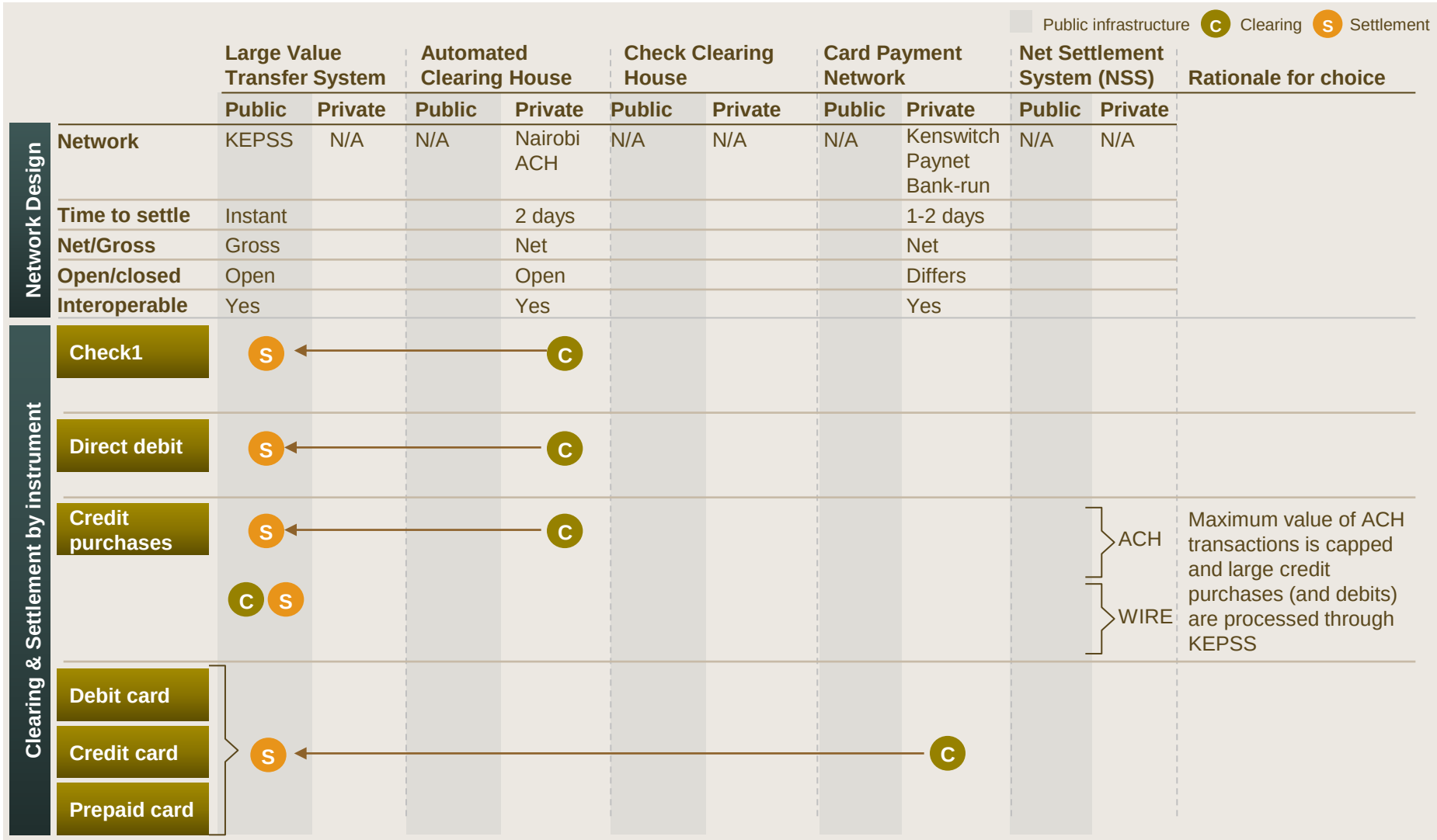
ESTIMATES

	Consumer						Merchant					
	Requires Bank Acct	Direct Fees[3] (USD)	Indirect Fees[3] (USD)	Benefits	Merchant Accept. (%)	Actual Use (Vol, %)	Consumer Access (%)	Requires Bank Acct	Direct Fees[3] (USD/%)	Indirect Fees[3] (USD)	Benefits	Example use cases
Cash		-	▪ ATM/ agent withdrawal ($0.10-3.45[1])	▪ Accessible ▪ Ubiquitous	100	98	100		-	▪ Cash handling	▪ Ubiquitous ▪ Immediate ▪ Avoid VAT	▪ In-store ▪ Bills (at office)
Check	✓	-	▪ Postage, checkbook ($0.25-1.15)	▪ Convenient for large txs ▪ Float benefit	2	-	42	✓	-	▪ Transport	▪ Convenient for large txs ▪ Widely used	▪ Bills ▪ Remittance
Credit transfer	✓	$0.60-1.76	▪ Returned processes ($0.50-1.15)	▪ Convenient for large txs	N/A	-	42	✓	$0-0.60	▪ -	▪ Convenient for large txs	▪ Bills ▪ Online purch.
Debit Card	✓	-	▪ -	▪ Convenient to carry	1-10	-	30	✓	1.8-3.0%	▪ Terminal (~$320) ▪ Systems	▪ Direct credit ▪ Minimizes cash handling	▪ In-store ▪ Online purch.
Credit Card	✓	-	▪ Annual fees ($25-70)	▪ Float and liquidity benefit	1-10	-	6	✓	1.8-3.0%	▪ Terminal (~$320) ▪ Systems	▪ Direct credit ▪ Minimizes cash handling	▪ In-store ▪ Online purch.
Prepaid		N/A	▪ N/A	▪ Accessible	N/A	-	N/A	✓	N/A	▪ Terminal (~$320) ▪ Systems	▪ Direct credit ▪ Minimizes cash handling	▪ Little used
Mobile money		$0.03-1.15	▪ Handset	▪ Accessible ▪ Low cost	19	1	67	✓[2]	N/A	▪ Handset ▪ Agent withdrawal ($0.10-$3.45)	▪ Direct credit ▪ Minimizes cash handling	▪ Remittance ▪ Bill pay ▪ Growing in-store

1 $0.35-$0.87 for own-bank / $1.74-$1.90 off-bank ATM and $0.11-$3.43 for mobile money withdrawal at an agent; 2 Depends on merchant size; 3 All values over $0.110 rounded to nearest $0.05

SOURCE: Expert interviews, World Databank, Bankable Frontier Associates, Central Bank of Kenya

For non-mobile money payment transactions, card and ATM clearing is fragmented but KEPSS plays a central role all settlement

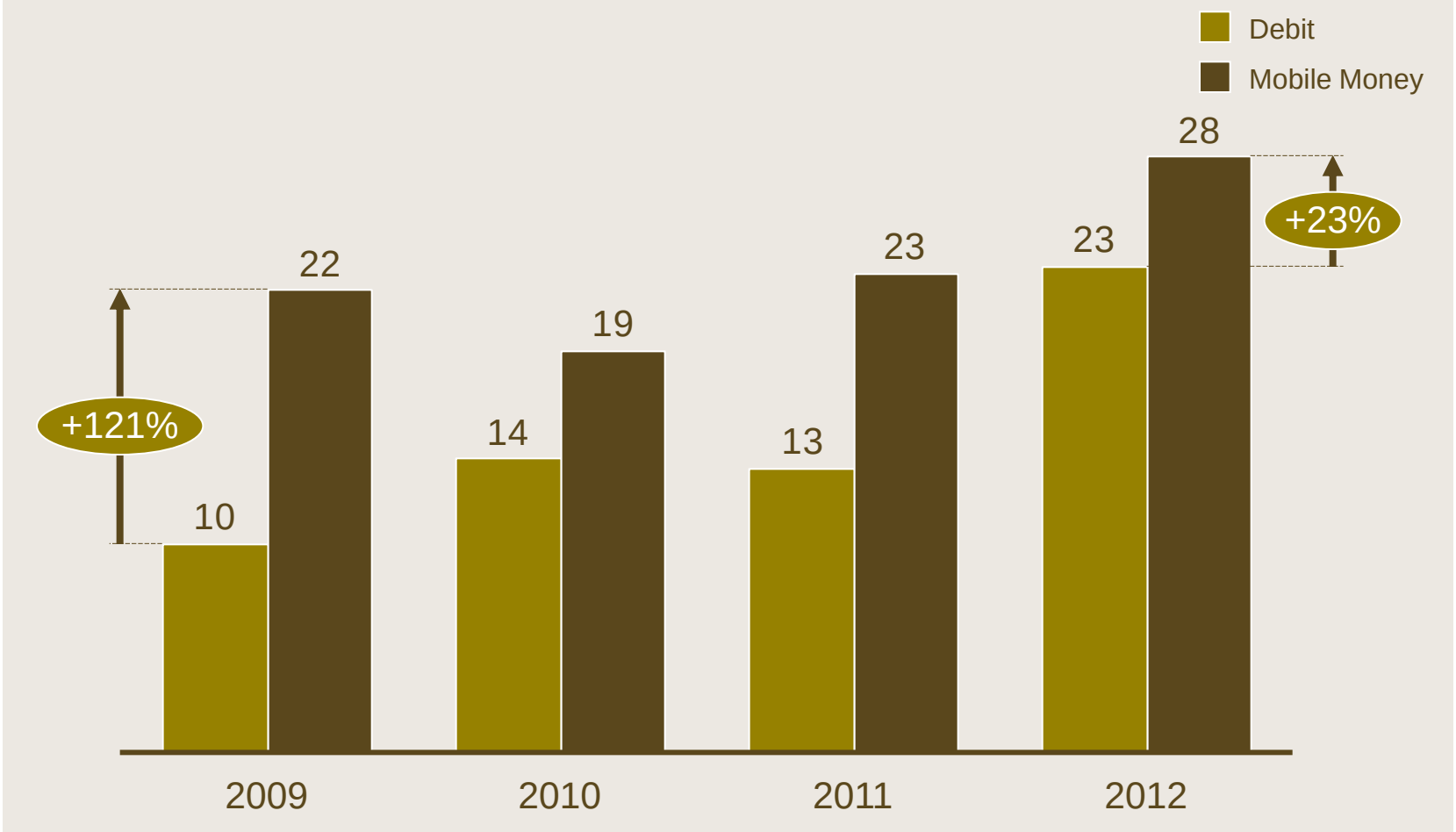


1 All checks are converted into ACH transactions and processed through ACH. 3 Estimated based on 2011 figures; WIRE represents all WIRE transactions including non-trade payments.

SOURCE: Central Bank of Kenya; Expert Interviews

Among respective users, frequency of debit card usage is growing faster than that of mobile money

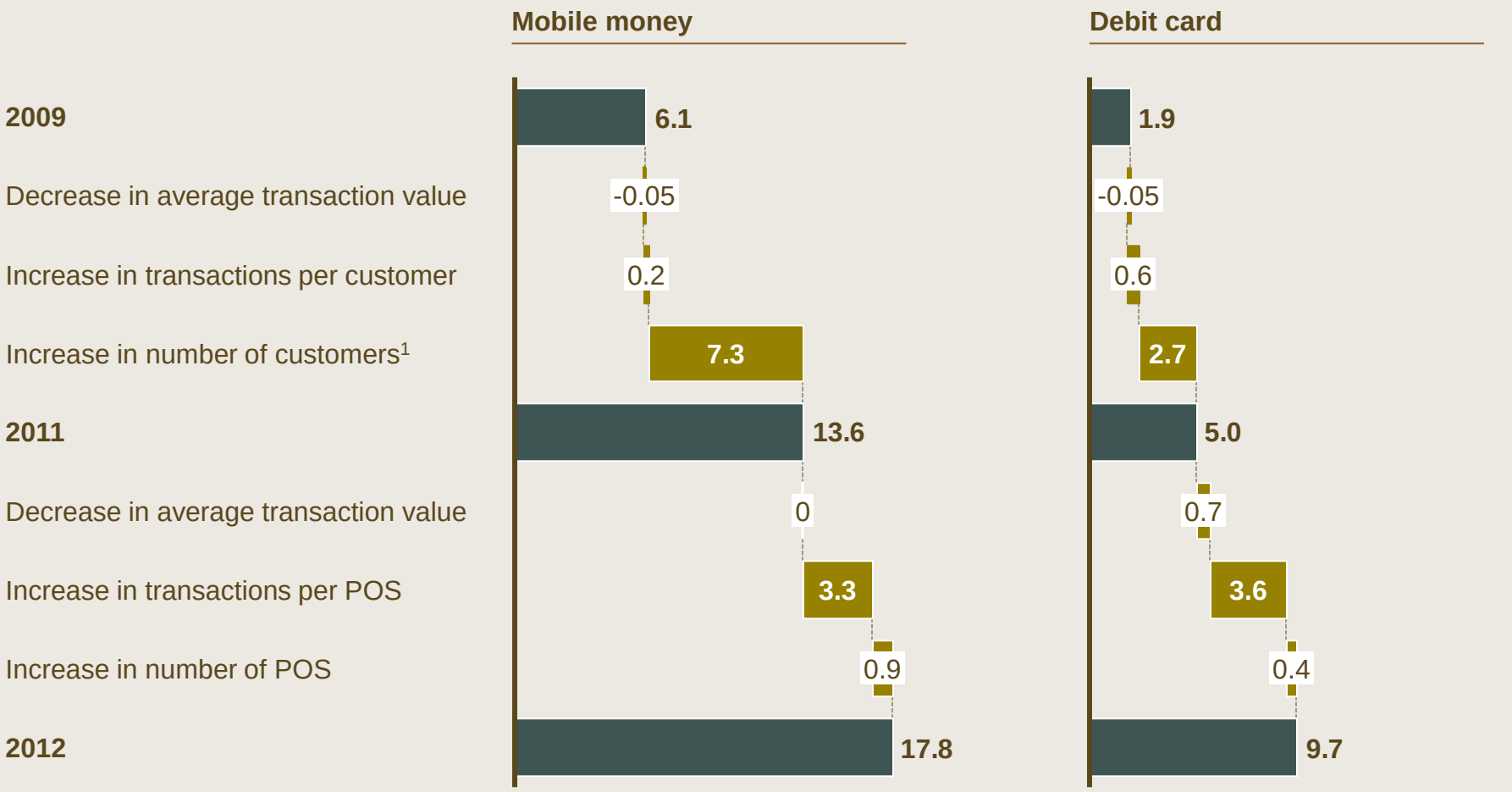
Average annual transactions per user for debit cards *versus* mobile money



SOURCE: Central Bank of Kenya

In 2011, the driver of mobile money and debit card growth switched from new customer acquisition to increased transactions

Decomposition of growth in transaction value, from 2009 to 2011 and from 2011 to 2012
USD Billions



1 Number of mobile money users grew from 9M to 19M to 20M from 2009 to 2011 to 2012, respectively, equivalent to growth in penetration of adult (>15 years) population from 37% to 78% to 82%.

SOURCE: Central Bank of Kenya; CIA Fact Book

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The payment system in the Netherlands

Characteristics

- **For basic payments services, banks focus on cost reduction rather than generating fee revenue**. After WWII the Dutch government provided “free” basic bank accounts via the post office network. Starting then, to remain competitive, banks kept their basic services free and focused efforts on lowering costs
- **Banks cooperate to reduce costs, facilitated by a consolidated banking sector and appropriate regulatory supervision.** Banks have formed a series of common vehicles to manage payments as utilities, most recently in cooperation with merchants. Consolidated banking facilitates cooperation, as does a regulator willing to allow banks to collaborate, while prohibiting collusion
- **This bank-led utility model has remained structurally stable and innovative, even through substantial market changes.** The past 20 years have seen large market shifts including the formation of Interpay, a successful court case against the banks, the Euro transition and expiration of cheques, the formation of Equens, and the Single European Payments Area (SEPA); through all this, the model has remained structurally intact; it has also expanded to include merchants, and has continued to innovate (e.g. iDEAL for online payments)
- **The next 5 years hold new challenges; innovation and flexibility will be required** -- New structural challenges include the transition to SEPA and dissolution of national payment schemes, the expansion of Equens' ownership beyond Dutch banks, and a potentially extended period of low interest rates.

Implications for financial inclusion

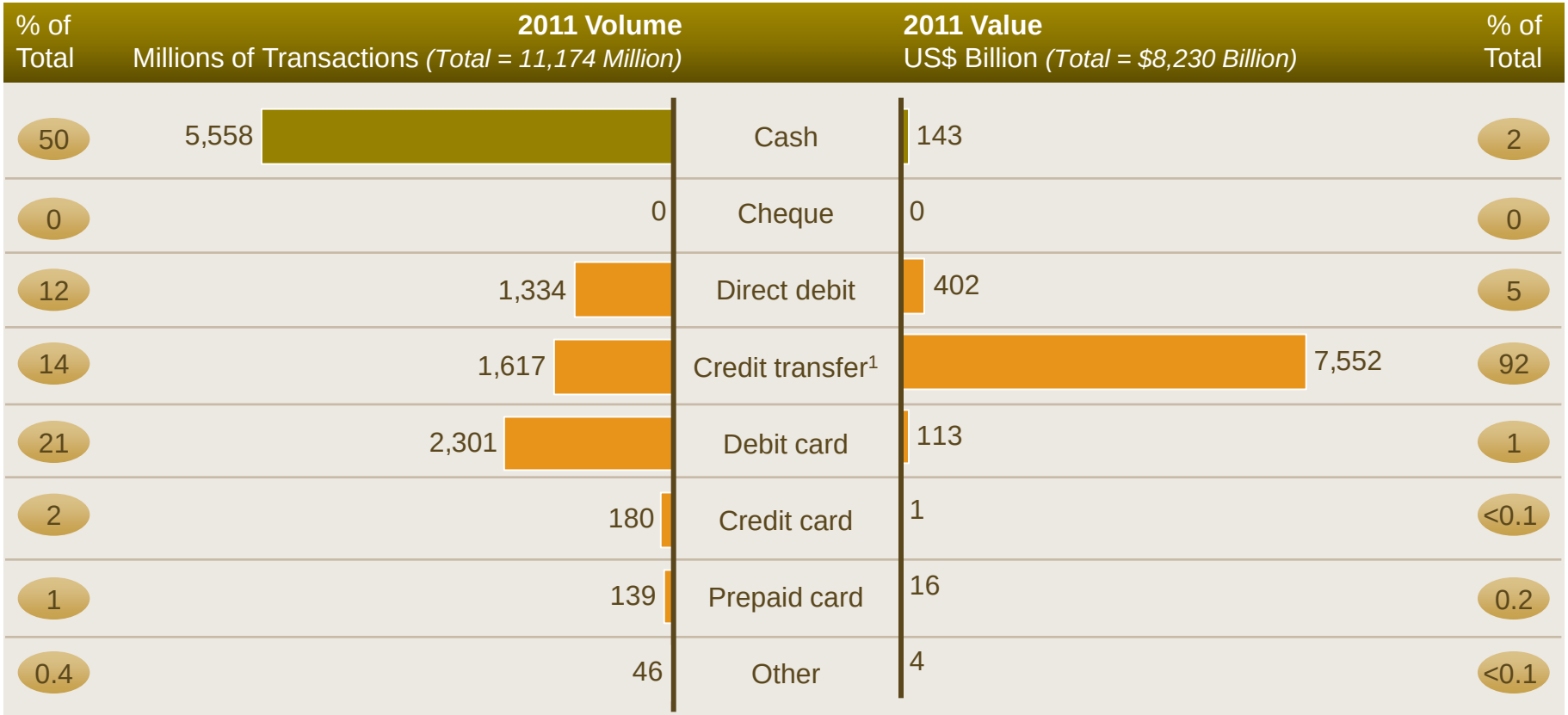
- **Netherlands' relatively small and rich population is highly banked across all income levels;** financial barriers or distance from banking services are unlikely to be drivers for financial exclusion (currently at about 1.5 percent)
- **The most important mechanisms of cost reduction include** removing cheques and reducing paper-initiated credit transfers, and engaging merchants to diminish the role of cash
- **Additional scale benefits will be realized as Dutch clearing migrates to Equens’ SEPA-compliant systems** that currently operate across multiple European countries
- **“Free” consumer banking has been supported by interest on savings and overdrafts;** continued low interest rates could lead to a more visible fee for banking services

Payments in the Netherlands by the numbers

Usage & Inclusion	Instrument usage	**Strong payments electronification based on DDA (debit) payment instruments across all types of usage** ▪ Less than ½ C2B transactions are cash, 54% of non-cash C2B transactions are debit card ▪ 68% of all consumer-related transactions (C2B,C2C, B2C) are made by credit transfer
	Financial inclusion	**Best in class** ▪ One of the richest countries in Europe, with social safety net and benefits well developed ▪ 99% of adult population is banked; 98% of bottom 40% by income (#6 in the world); 98% debit card usage is #1 in the world
Payment system	Network infrastructure	**Centralized bank-owned clearer/processer** ▪ All DDA-related clearing occurs through Equens, which is owned by the banks ▪ All C2B payment systems operated by Currence, a subsidiary of Equens
	Regulation	**Centralized utility model led by the banks and actively governed by highly capable regulator** ▪ DNB (Central bank of the Netherlands) takes an active role in balancing the potential monopoly power of the centralized payments entity, and a highly consolidated banking sector (top 3 banks hold 92% of retail bank accounts)
Environment	Banking system reach	**High-reach due to relative population density e.g. all consumers live less than 5 km from a bank branch** ▪ Branches – 23 branches per 100K adults ▪ ATMS – 12 ATMs per 100K adults ▪ POS – 189 per 100K adults ▪ Online banking penetration – 79 percent
	Mobile & telecoms	**Established** ▪ 100% population covered by mobile signal ▪ 1.15 SIM cards / adult
	Other market infrastructure	**High** ▪ Strong core infrastructure foundation across all elements, e.g., electricity, transport, delivery
	Economic environment	**Upper income** ▪ Nominal GDP: $50,247 / capita. GINI coefficient of 31 in 2007
	Demographics & geography	**Highly urban, middle-age population** ▪ 83% of population living in urban areas; 17% in rural areas

SOURCE: Findex Global Database, CIA Fact Book; World Bank; Eurostat

Digital channels account for over 98% of transaction value in the Netherlands, while cheques have been eliminated



- The payment system is highly digital with 98% of value and 50% of volume conducted digitally
- Cheques have been discontinued in the Netherlands
- Debit cards are highly used even for small value transactions, and account for 21% of total payment volume.
- Credit cards are not widely used, with consumers favoring debit cards instead

1 Does not include trade payment credit transfers made via RTGS, since most such payments are between FIs. Corresponding volume is very small (less than 10 Million)

SOURCE: McKinsey Global Payments Map

The transactions most strongly impacting Dutch consumers account for about $1 trillion of payment flow

Area of focus

Trade payments in the Netherlands by transaction parties, 2011
US$ Trillion

From \ To	Consumer	Business	Government
Consumer	0.18	0.51	0.06
Business	0.26	6.65	0.23
Government	0.12	0.20	0.03

Total trade payments by value, 2011
US$ Trillion

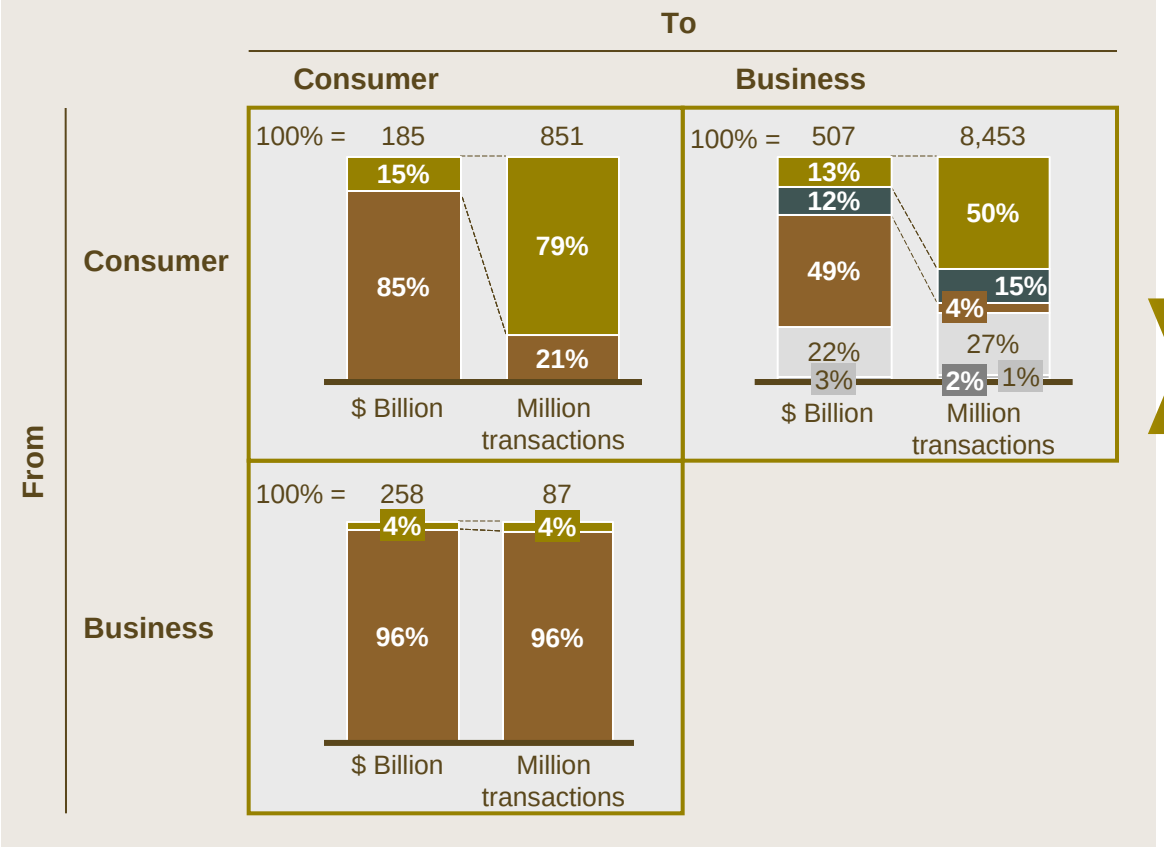
1 Includes all transfers made via RTGS. Some small fraction of these may be 'Other trade payments', between businesses

SOURCE: McKinsey Payments Map Release Q1-2012,ECB, Retail Banking Research, DNB, ECB

Credit transfers dominate payments in the Netherlands, with debit use also high, and cash transaction volumes significant

Dutch trade payments by transaction parties, 2010

Value in US$ Billions, Transactions in Millions



$ = High value (>20% use)

= High volume (>20% use)

Major instruments used by transaction type

	C2C	C2B	B2C
Cash	#	#	
Cheque			
Direct debit			
Credit transfer	$	$	$#
Debit card		$#	
Credit card			
Prepaid card			

SOURCE: McKinsey Payments Map Release Q1-2012, ECB, Retail Banking Research, DNB

Financial inclusion in the Netherlands

Overall financial inclusion performance: very high

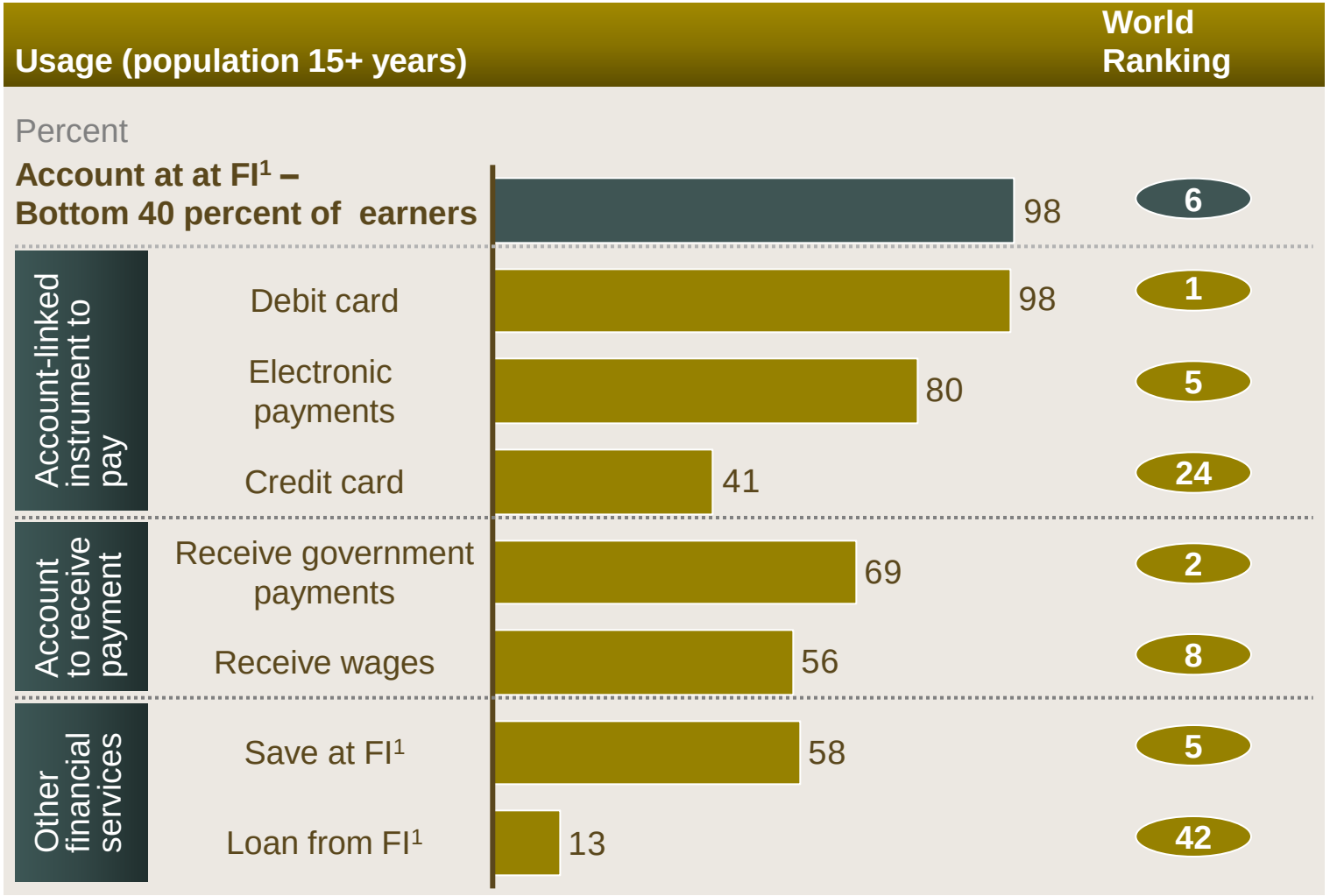
- **Percent with an account at a formal financial institution**
  - Overall -- 98.7% (Rank No. 6)
  - Bottom 40% -- 98.2% (Rank No. 5)
  - Women -- 98.4% have formal financial accounts (Rank No. 7)
- **Payment services access**
  - Debit card access -- 98% (Rank No. 1)
  - Credit card access -- 41% (Rank No. 22)
  - Wages received in formal account -- 56% (Rank No. 8)
- **Distribution access (per 100,000 people)**
  - Bank branches -- 23 (Rank No. 36, Rank No. 11 by land area)
  - ATMs -- 58 (Rank No. 39, Rank No. 8 by land area)
  - POS terminals -- 2,285 (Rank No. 9)
  - Online access -- 92% (Rank No. 1)
  - Mobile penetration -- 115% (i.e.,1.15 SIM cards/adult) (Rank No. 47)
- **Additional comments:**
  - Relatively low ATM and bank branch densities are less indicative due to high population density, which ranks 4th in countries over 10 million population (for comparison -- U.S. ranks 58)
  - In ATMs/km2, the Dutch rank No. 9 globally

Key takeaways

- **Comprehensive reach and coverage** of the financial system provides services to all consumers in a utility-based configuration, allowing the banks to minimize cost of provision, and generate revenue from retail bank accounts
- **The banking system is robust and trusted, providing services at reasonable prices**; this is suggested by very low opt-out rates, and high rates of inclusion among low-income populations
- **Very high rates of online access will result in further cost reductions** as more consumers set up bill payments and pay online merchants directly and digitally
- **Dutch have the highest national access to debit cards in the world**, driven by universal banking access, fewer payment instruments, and other cooperation-based drivers, e.g., a covenant agreement between merchants and banks, and a common marketing drive by banks towards debit card use

SOURCE: Findex Global Database

Inclusion rates are among the highest in the world except among borrowing products

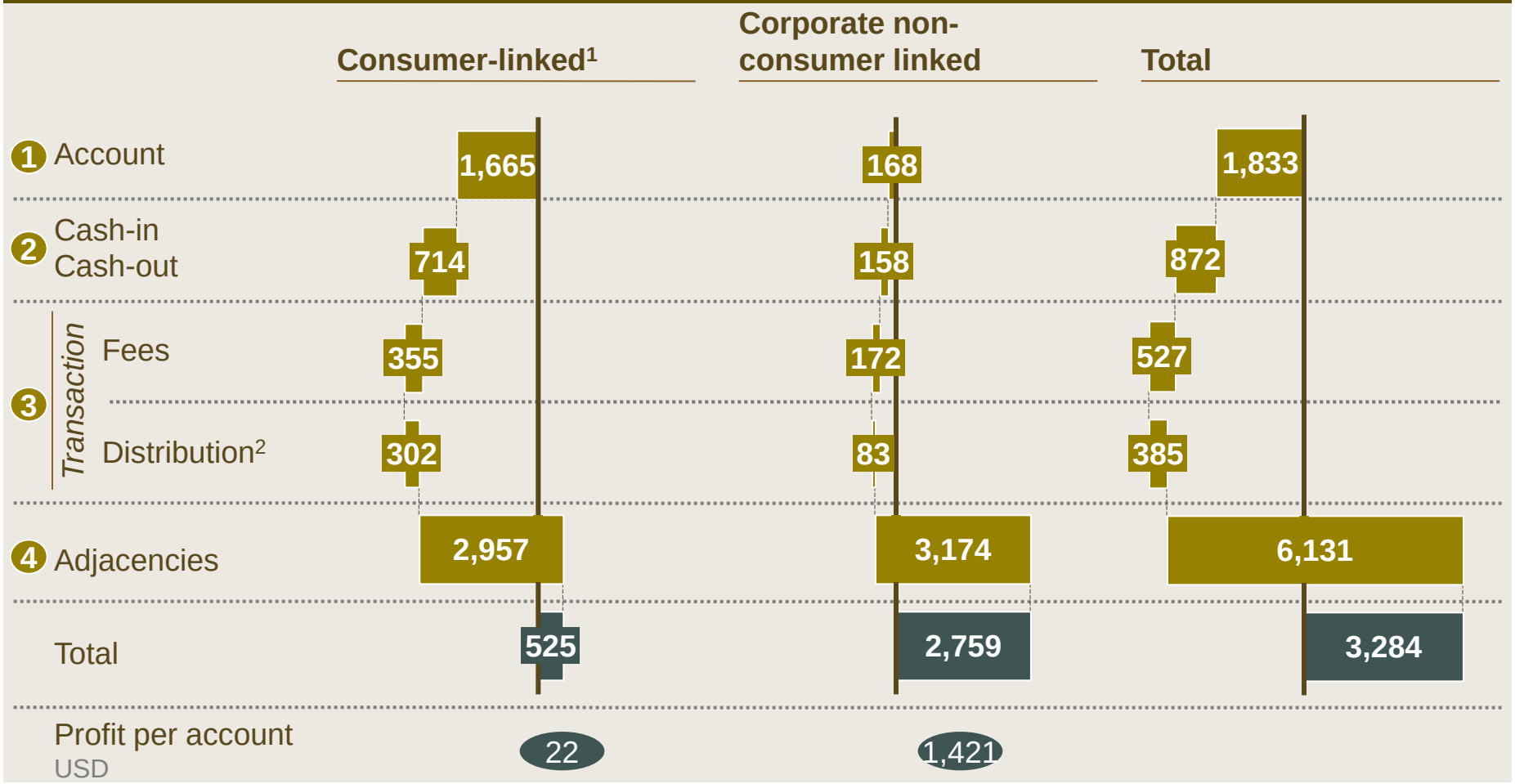


1 FI: Financial Institution

SOURCE: European Financial Inclusion Network, Findex Global Database

Overall, the Dutch payments system is profitable, making most of its money through interest on current accounts

Payments system profit
USD Millions

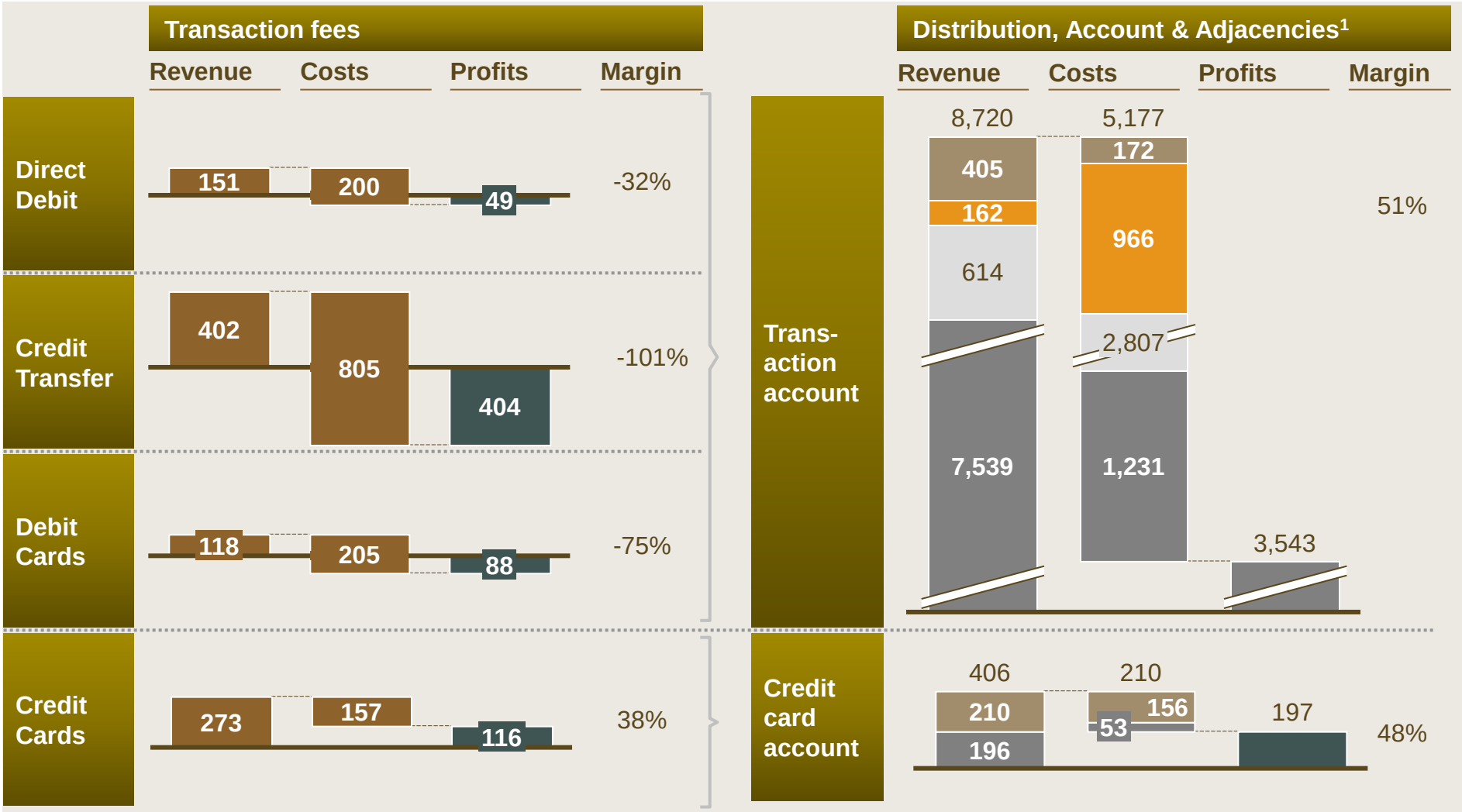


1 Includes all costs and revenues associated with services provided to businesses in C2B and B2C transactions
2 Revenues include debit and credit card maintenance fees and terminal costs; costs include card maintenance and acquiring fees and terminal costs

SOURCE: McKinsey Global Payments Map (2010)

Most transaction types lose money stand-alone, but adjacencies are highly profitable

USD Millions; Percent, 2011



1 Distribution – includes maintenance & acquiring for debit cards; Account – transaction account maintenance; Adjacencies – (i) for transaction account this is current account & overdraft NII as well as loan losses for overdraft accounts, (ii) for credit card account, this is revenues from NII and costs associated with loan losses

SOURCE: McKinsey Global Payments Map

Profits are limited for all but banks, who profit significantly

Profit from transactions, distribution, account and adjacencies[3], 2010 USD Millions

		Creditor bank	Creditor-side processors	Infrastructure & Network: ACH	Infrastructure & Network: Card network	Debtor-side processors	Debtor bank
Transaction account-linked	Direct debit[1]	41	2	0.2		2	- 90
	Credit transfer[1]	202	1	0.3		19	- 606
	Debit card[1]	31	2	0.4	0.4 C	3	118 X
	Transaction account[2]	- 114					4,462 R X
Credit card	Trans-actions[1]	106	13		6 C	33	10 R X
	Credit card account[2]	- 9					204
Total Profit (ex cash)		454	19	1	6	75	3,269

What drives profitability?

R Bearing risk

C Coordination role

Retail relationship

<0

0 – 10

10 - 50

50 – 100

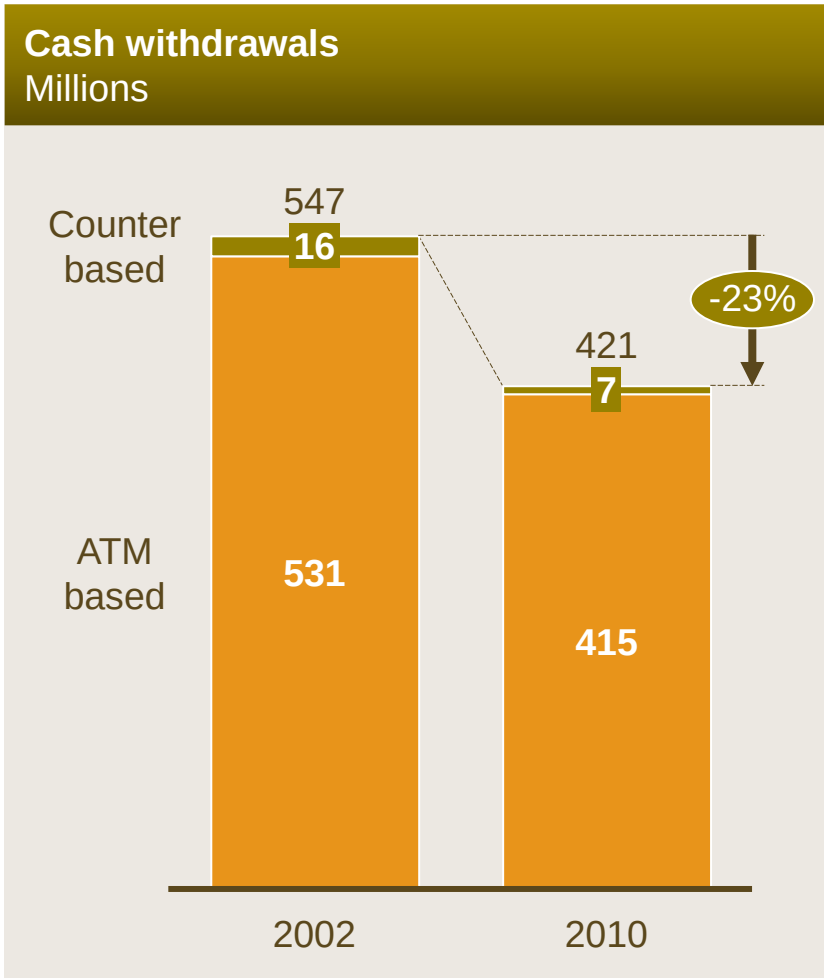
100 – 500

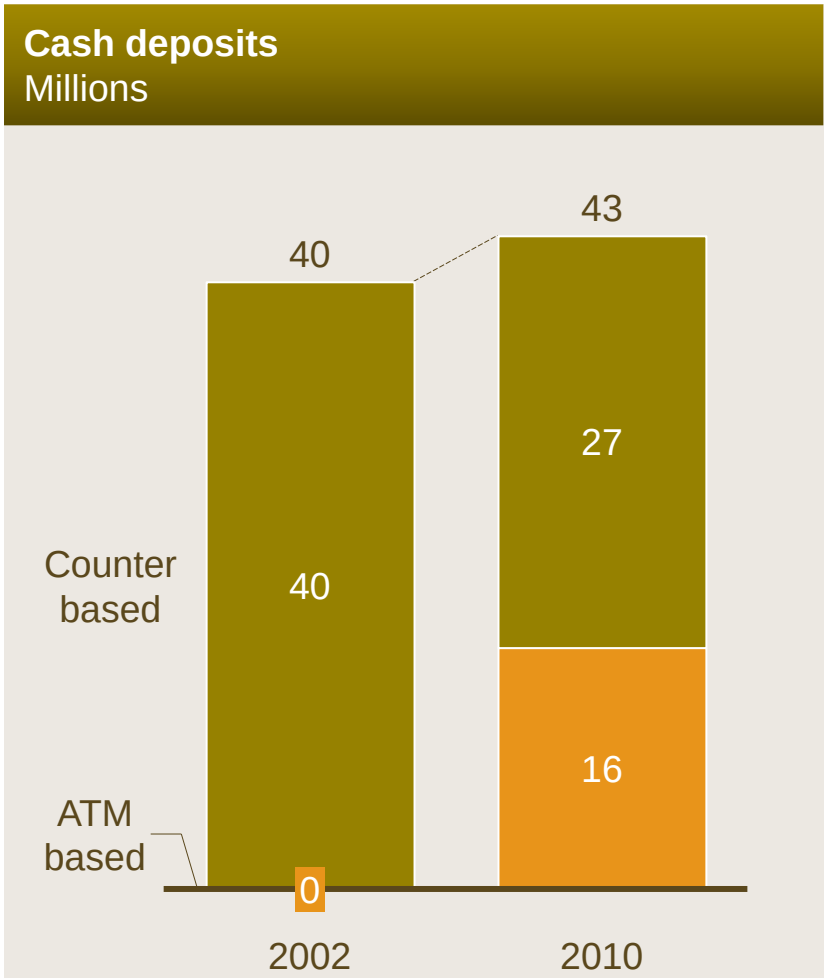
>500

1 Profits linked directly to transactions – includes direct transaction fees and costs float (small) & incidental fees (small); 2 Profits from distribution, account, and adjacencies: (i) distribution – includes maintenance & acquiring, (ii) account – account maintenance (only for transaction account), (iii) adjacencies – (a) for transaction account this is current account & overdraft NII & overdraft loan losses, (b) for credit card account, this is revenues from NII and costs associated with loan losses; 3 Note that net margin from previous slide is give by the sum of creditor bank and debtor bank profits. Other players' profits rely on revenues from fees/contracts paid by either creditor or debtor bank (numbers may not add exactly due to rounding)

SOURCE: McKinsey Global Payments Map; Expert Interviews

Cash withdrawals have been decreasing and deposits are made increasingly at the ATM rather than at bank branches



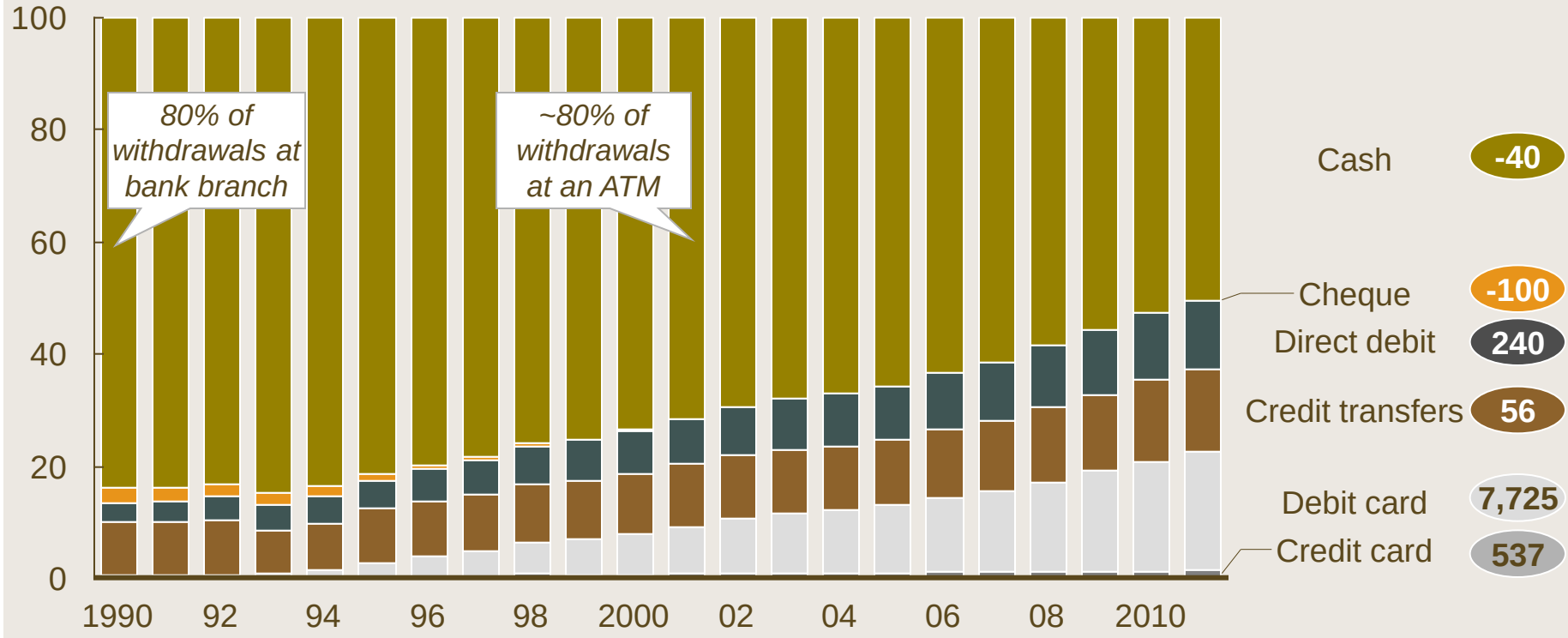


SOURCE: McKinsey Global Payments Map

Since the 1990s, payments have become increasingly electronic, with debit card use growing particularly rapidly

Breakdown of transaction volume by major payment instrument[1,2]
Percent

20-year change
Percent

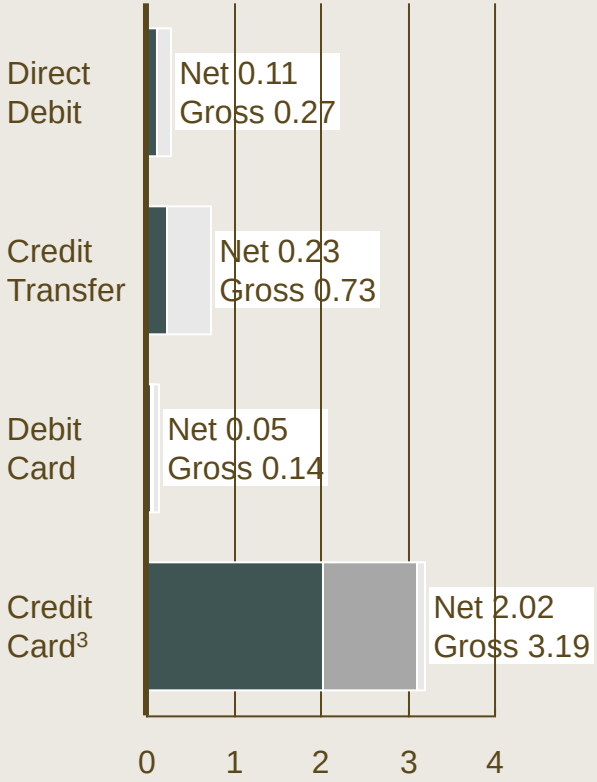


1 Average number of all transactions (government, business and consumer) per year varies no more than +/- 6% over the period (2011 volume was 11.2 Billion)
2 Transaction volume CAGRs 1990-2010: Cash -2% (<-5% for 2007-10); Debit card +25%; Credit card +9%; Credit transfer +3%; Direct debit +7%

SOURCE: McKinsey Payments Map Release Q1-2012, RBR, ECB

Consumers do not pay to transact and merchant fees are significant only for credit card payments

Fees by payment instrument
$/transaction



Fees per dollar transacted, BPS

Gross fees
- Net fees
  - Consumer fees
  - Merchant fees
- System fees
- Other internal fees

Description of fees

Fees per dollar transacted, BPS	Description of fees
4	▪ **Consumer** pays no fees at the transaction level ▪ **Merchant** accounts are charged a percentage fee each time they receive a direct debit payment
0.5	▪ **Consumer** pays no fees at the transaction level ▪ **Merchant** accounts are charged a percentage fee each time they receive a credit transfer payment
11[2]	▪ **Consumer** pays no fees at the transaction level[1] but annual maintenance fees average $0.19 per transaction ▪ **Merchant** pays transaction fees to acquiring bank (there is no interchange fee in the Netherlands)
179[4]	▪ **Consumer** pays no fees at the transaction level[1] but annual maintenance fees average $1.70 per transaction ▪ **Merchant** pays transaction fees to acquiring bank, which pays part to issuing bank and part to the network

1 Consumers pay only annual fees and no transactional fees (i.e., they pay an annual maintenance fee on their card but they don't pay for each additional transaction); 2 48 bps per transaction including annual maintenance fee; 3 General purpose consumer credit card; 329 bps per transaction including annual maintenance fee

SOURCE: McKinsey Global Payments Map; Expert Interviews

Convenient instruments, which are free to users and inexpensive to businesses, are most used – cash, debit cards, and credit transfers

C2B TRANSACTIONS, 2011

	Consumer							Merchant				
	Requires Bank Acct	Direct Fees (USD)	Indirect Fees (USD)	Benefits	*Merchant Accept. (%)*	Actual Use (Vol, %)	*Consumer Access (%)*	Requires Bank Acct	Direct Fess (USD)	Indirect Fees (USD)	Benefits	*Sample use cases*
Cash		-	▪ -	▪ Accessible ▪ Ubiquitous	100	50	100		0.01	▪ 0.01	▪ Ubiquitous ▪ Immediate	▪ All ▪ Especially small value
Cheque	✓	-	▪ -	▪ -	0	0	0	✓	-	▪ -	▪ -	▪ -
					No longer accepted							
Credit transfer/ Direct debit	✓	-	▪ -	▪ Convenient for large txs ▪ Esp. online	~0 Offline but high online	19	99	✓	0.35	▪ 0.01	▪ Convenient for large txs	▪ P2P ▪ Bill payments ▪ Larger values
Debit Card	✓	-	▪ $0.19 *(avg per trx, from ~$5+ annual fee)*	▪ Convenient to carry	82	27	98	✓	0.05	▪ 0.19	▪ Direct credit ▪ Minimizes cash	▪ General online and offline merchant
Credit Card	✓	-	▪ $1.60 *(avg per trx, from annual fee)*	▪ Float and liquidity benefit	40	1	41	✓	2.02	▪ $0.10 *(avg per trx, from annual fee)*	▪ Direct credit ▪ Minimizes cash	▪ Higher value merchant payments
Prepaid			▪ Card purchase	▪ Accessible	4	2	*n.a.*	✓	0	▪ 0	▪ Direct credit ▪ Minimizes cash	▪ Transport, small value
Other[1]		N/A	▪ N/A	▪ N/A	0	1	0		N/A	▪ N/A	▪ N/A	▪ N/A

1 Includes mobile (not used) and retailer cards (46 Million transactions; less than 1 %)

SOURCE: World bank Findex (2011), McKinsey global payments map 2010 data, expert interviews

The system is utility, with Currence owning payments products and Equens clearing and settling nearly all transactions[1]

Defining feature of NL's' utility system

		Credit transfer	Direct debit	Debit cards[1]	Credit cards	Other
Currence	▪ Currence owns Dutch uniform payments products and licenses and certifies all users (banks and suppliers). It aims to create a competitive and transparent payment system while ensuring continued innovation, security and efficiency by separating scheme and product from banks and from infrastructure	*Pre-printed forms*; acceptgiro; *Online payments*; iDEAL	Incasso machtigen	PIN *(now defunct)*	-	*Stored-value*; Chipknip
Banks (ABN-AMRO, ING, Rabobank)	▪ Several large banks dominate (e.g., ABN Amro, ING, Rabobank), competing in payments product delivery but collaborating on infrastructure and all offering Currence products. Occasionally, banks will innovate outside of Currence (e.g., iDEAL was begun by 3 banks and then handed over to Currence to run as a scheme)	✓	✓	✓	✓	✓
Payments service providers	▪ Non-banks service providers of all sorts, including processors, are also licensed through Currence by product and by role E.g., – iDEAL has 28 Collecting Payment Service Provider Certificate Holders in the Netherland – Chipknip has licensed providers as Terminal Supplier (13), Data Communications Provider (26), PSP (2), Card Supplier (7)	✓	✓	✓	✓	✓
Equens	▪ Equens is a large-scale "thick" network providing transaction processing as well as clearining and settlement; it also provides other payment-related services (e.g., card supplier). Equens began in the Netherlands but is now pan-European	✓	✓	✓		✓
International card payment networks	▪ International card payment networks (MasterCard, VISA, AMEX) brand credit cards and clear and settle all credit card purchases.	-	-	-	✓	-

1 As part of the transition to the Single European Payments Area (SEPA), the processing market has opened beyond Equens to all competitors and Currence products are being phased out as the Netherlands switches to Europe-wide schemes. The transition is mid-way, with PIN having been replaced by SEPA-wide schemes Maestro and V PAY as of 1/1/2012 and other products being phased out

SOURCE: Expert Interviews; Company websites

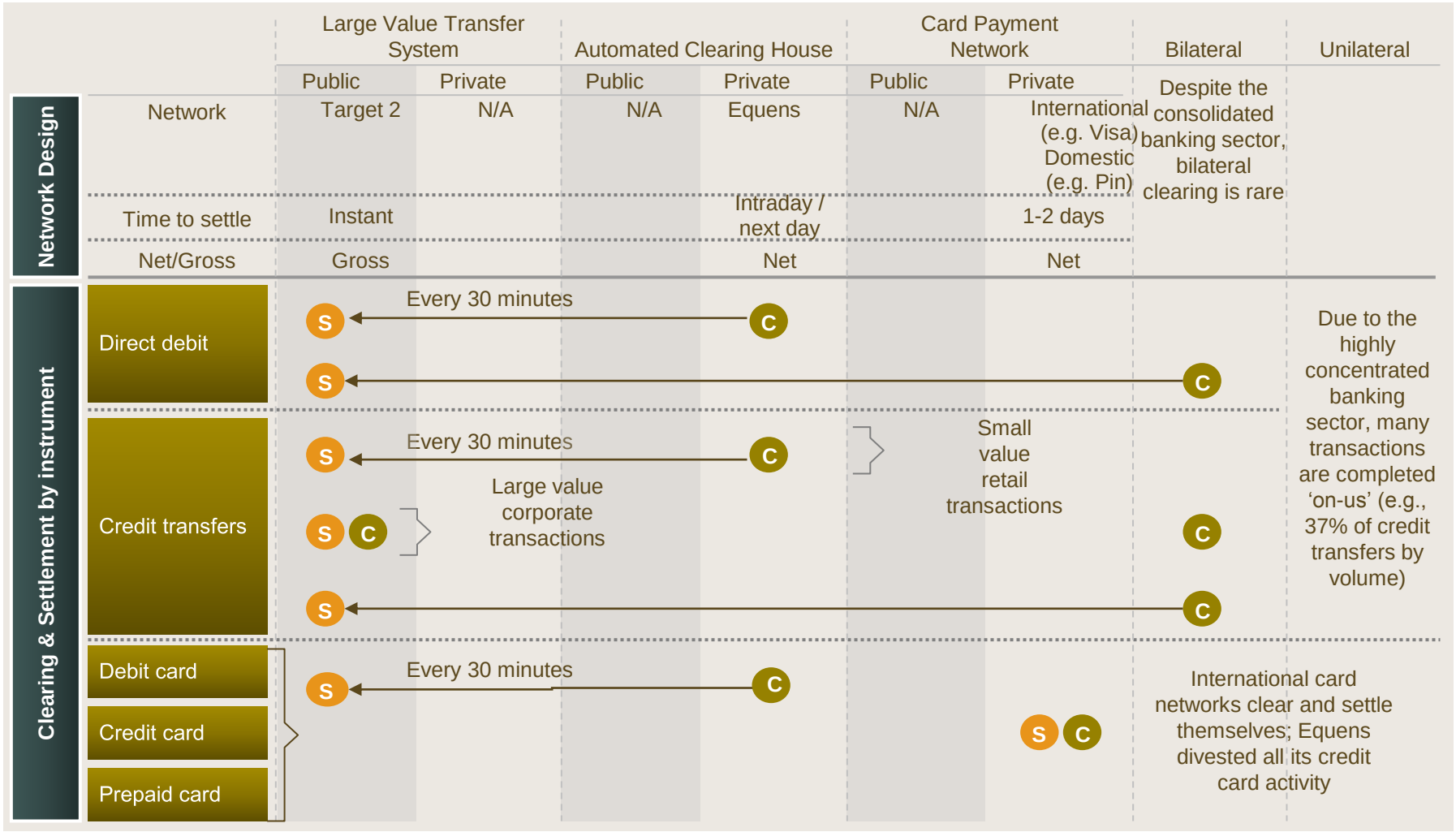
Equens plays a central role in processing and clearing for all instruments except credit cards

Focus on next page

	Consumer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Cheque	Completely phased out in the Netherlands			
Direct debit	▪ Used mainly for bill payments ▪ A physical signature is still required; form usually printed from online or received in post ▪ Occurs as periodic retail debits with low repeat cost	▪ An account holder can authorize a company to direct debit payments without notifying the bank ▪ Banks are 'DD friendly' e.g. often allowing DD to clear even if overdraft	▪ **Equens** processes all retail (non-real time) transactions ▪ ACH clears and settles every 30 minutes ▪ Settlement accounts are held at DNB and settlement occurs via **Target 2**	▪ The bank provides a redress option on direct debits limited in time (5 days for one-time and 8 weeks for repeat DDs)
Credit transfers	▪ Transfers can be established online, by phone (through call center), or in branch – Online ▫ Consumer initiated - via PC banking or consumers can pay online merchants directly from their DDA via iDEAL ▫ Business initiated – often via batch payments (~98%) – Branch - bills often include pre-filled forms that can be used at a branch or via mail for the transfer (~20% of transfers)		▪ **Equens** processes all retail (non-real time) transactions ▪ ACH clears and settles every 30 minutes ▪ Settlement accounts are held at DNB and settlement occurs via Target 2	▪ Most processing for cashless transactions is done in house at the bank ▪ Some processing is done at Equens which also provides processing services
Debit card	▪ All cards are Chip/PIN (EMV-compliant) and are nearly universally accepted (at >90% of POS)	▪ Equens is a 'thick ACH', providing most processing; the remainder is done in-house	▪ Domestic debit card payment networks (e.g. PIN) and prepaid networks (e.g. Chipknip) are operated by Currence, owned by the Dutch banks, and cleared by **Equens** ▪ **Equens** also operates the ATM network	▪ Banks do all debit card acquiring; regulator stopped Equens from acquiring ~10 years ago ▪ Equens does most processing
Prepaid card	▪ Low usage; Main brand ChipKnip repositioned in 2007 to focus on parking, vending and catering payments			
Credit card	▪ Acceptance is limited (e.g. many supermarkets do not accept) ▪ Transition to EMV is complete (all cards and >90% of POS devices)	▪ Non-bank third parties do all processing	▪ International credit card networks (Visa, MasterCard, AMEX) clear and settle ▪ **Equens** acts as ATM processor on issuing & acquiring sides	▪ Separate acquirer for credit: merchants must have a relationship with a specialized private player
Mobile	Not significant in this market as a separate payment instrument *(mobile is used as a channel)*			

SOURCE: BIS CPSS Red Book and Blue Book, World bank documents; Expert Interviews; McKinsey Glorbal Payments Map

Clearing is heavily concentrated in Equens and final settlement occurs through the Target 2 RTGS, ensuring scale

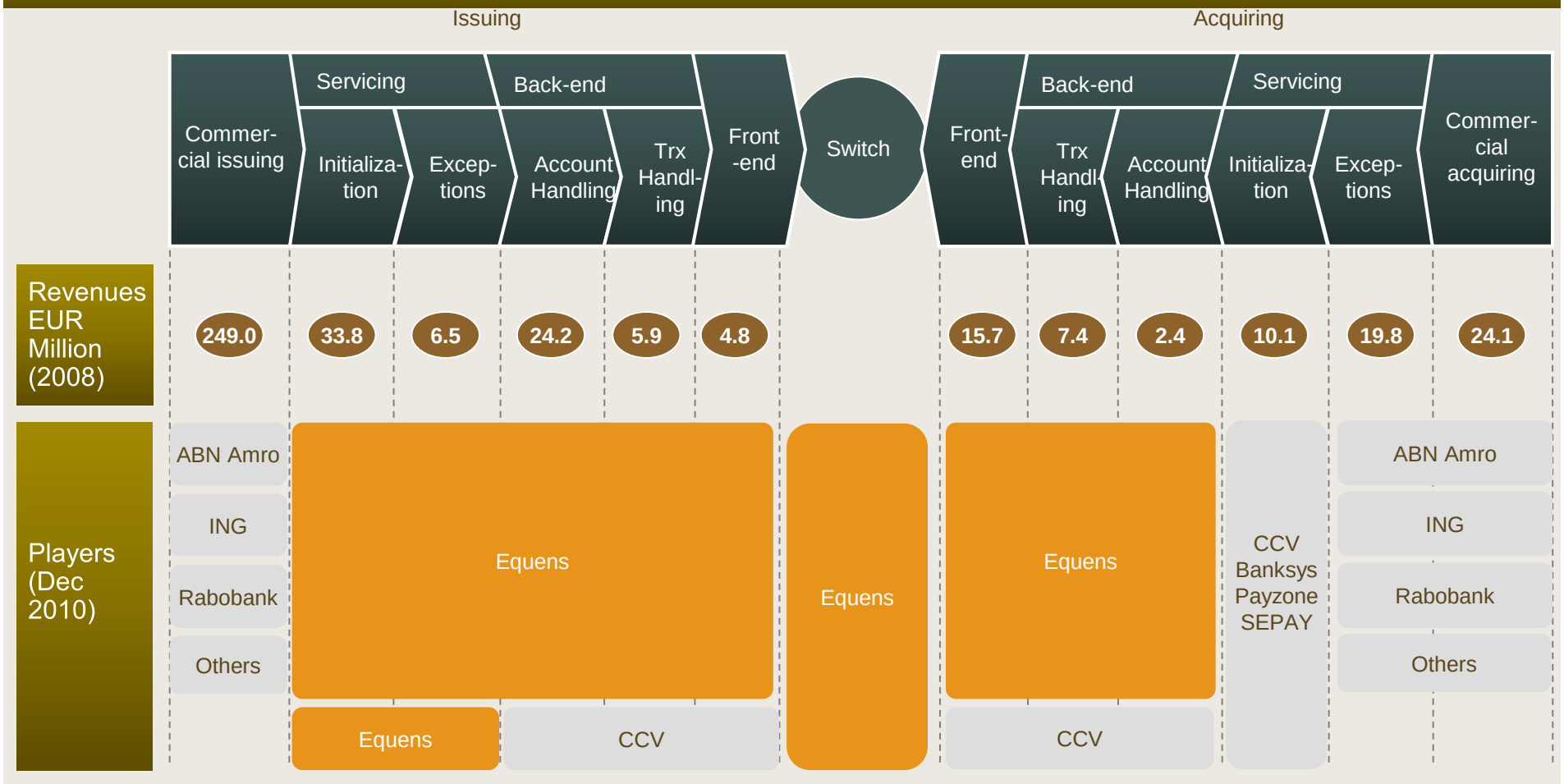


1 Equens clears and settles every 30 minutes; net values remaining are settled daily via the RTGS

SOURCE: BIS CPSS Red Book and Blue Book

For debit cards, Equens performs most bank-end and servicing activities

Overview of bank-issued debit card value chain

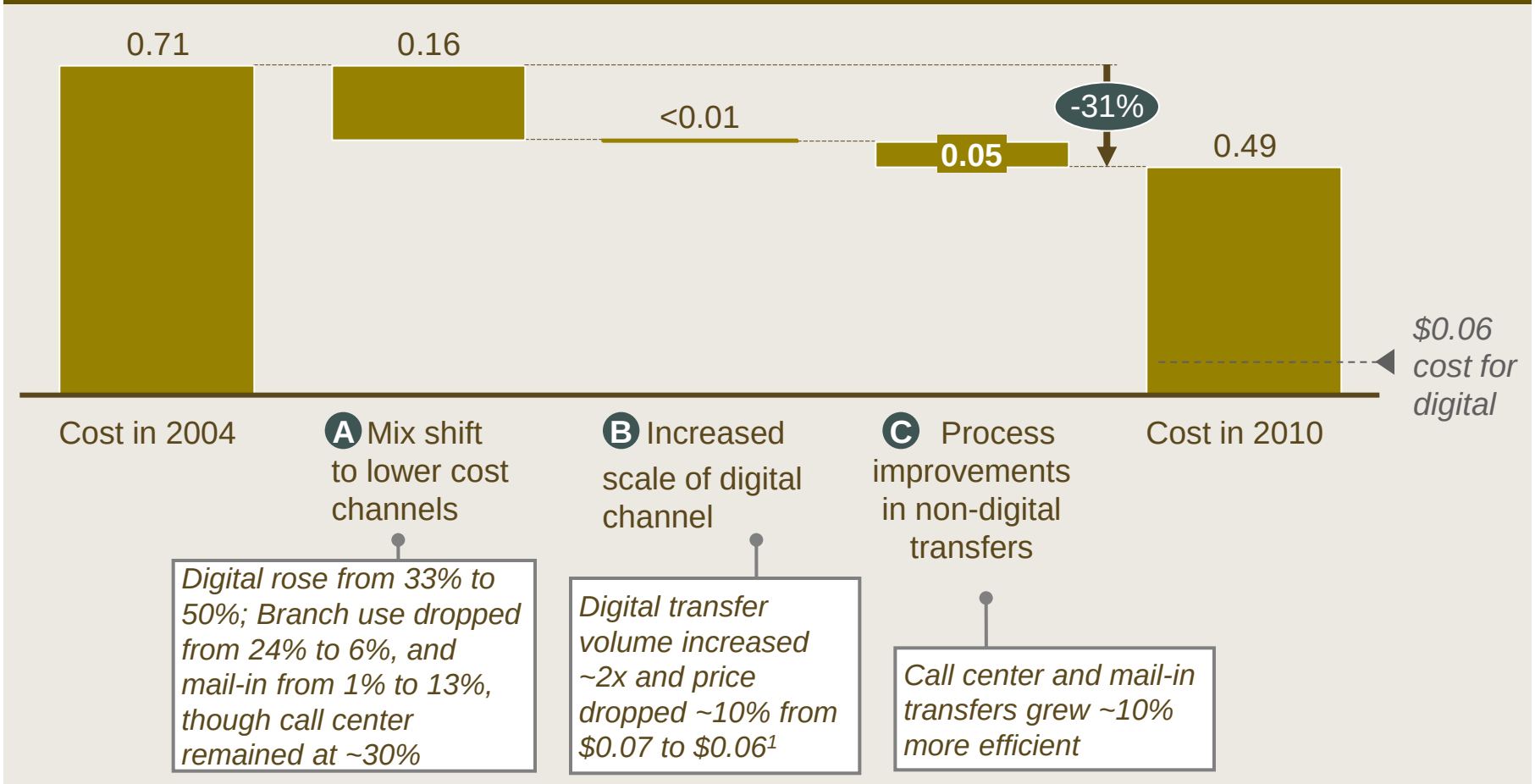


1 Market share in number of cards issued for issuing and in number of transactions acquired for acquiring

SOURCE: McKinsey Global Payments Map; Expert Interviews

The shift to more efficient channels was the most important lever for credit transfer cost decreases; room to improve remains

Cost of credit transfer in the Netherlands: Elements of the 2004-2010 reduction in direct costs
USD/transaction



1 Magnitude of the scale effect was limited since the Netherlands already had very large volumes and efficient processes for digital transactions in 2004

SOURCE: McKinsey Payments Map Release Q1-2012, RBR, ECB

There is a history of collaboration in payments, which has been a true national utility since 2002; SEPA may usher in a new era

Payments processing separate by instrument

1994

Interpay is the single payments processor & switch, owned &operated by the banks

1994

Interpay Nederland formed by 8 Dutch banks through the merger of multiple entities (Bankgirocentrale, Eurocard Netherlands, BeaNet), leading to increased scale and product standardization

2002 - 2005

Market reorganized following Central Bank recommendations and Competition Authority pressure, sparked by retailer complaints

2004: Currence formed to own uniform payments products, separating scheme from infrastructure

2005: Establishment of the Foundation for the Promotion of Efficient Payment Transactions, a joint foundation of banks and retailers to promote efficient POS payment & reduce cash use and promote transparent and cost-related pricing

2002

National utility system, with collaboration among banks & retailers with payments infrastructure separate from products & scheme

2006

Interpay merges into Equens SE, as impeding SEPA formation encouraged multi-state consolidation leading to consolidation of overhead costs and increased scale

2012

SEPA with open market processing & scheme management through the European Payments Council

2012-2015

Phase-in of SEPA, as domestic schemes are phased-out and processing becomes open market (though Equens remains dominant)

1 Single European Payments Area

SOURCE: Expert Interviews; Company and Institution Web pages

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The payment system in Nigeria

Characteristics

- **An established banking system, with a handful of particularly strong players**, administers non-cash payment instruments, and focuses mostly on corporate and wealthy retail customers
- **The economy is heavily cash-based** with corresponding high costs of cash, carried largely by banks. The unbanked use cash exclusively; even the banked must carry cash in case of service outages and a lack of digital acceptance at merchants; banks still cover cash management costs so merchants see no need to change
- **A consolidated, locally led payments infrastructure**: Domestic infrastructure players (NIBSS, InterSwitch) lead the market
- **The regulator (Central Bank) plays an active role in shaping the payments system,** e.g., "Cashless" initiative, mobile money licenses, routing most payments via NIBSS
- **The Central Bank's "Cashless" initiative applies multiple levers to drive non-cash usage;** offering a case-study on electronification of payments in developing markets
- **Mobile money growth is seen as complementary to traditional bank offerings**; and expanding traditional bank distribution channels is seen as complementary to mobile money expansion (ATM cardless cashout, POS-enabled cashback, customer migration and cross-sell)
- **The bank-led model for mobile money has a clear goal to be a major part of the financial system**; it's unclear if demand will be sufficient to drive usage at scale. Mobile money is seen as an accelerator to bringing customers into formal banking

Implications for financial inclusion

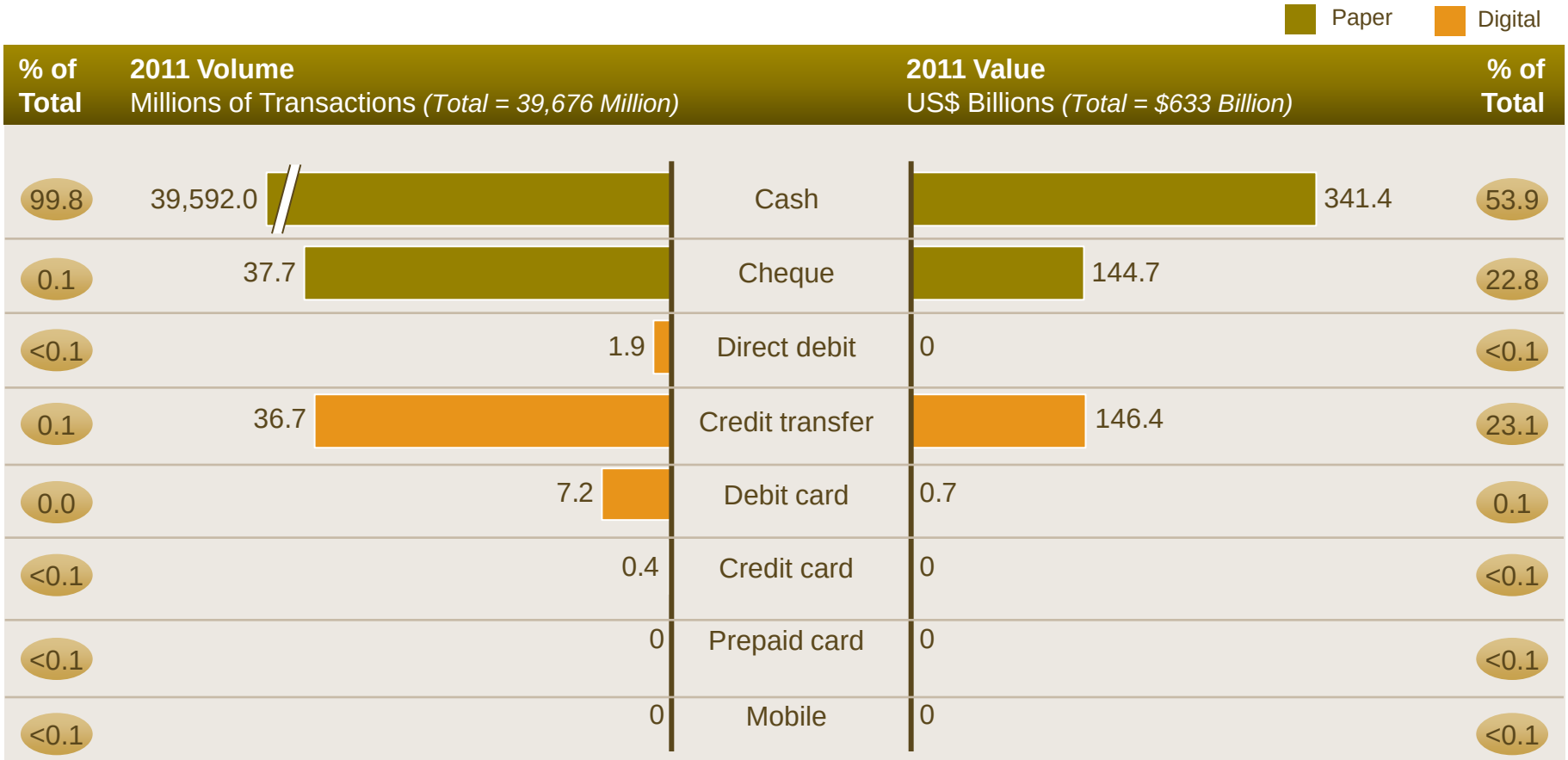
- **Bank-led test case** – The regulator may stimulate a bank-led mobile money model with much broader payments usage than remittance and non-payment financial services; if successful this will provide lessons for other developing markets
- **Core Infrastructure** – Reminder that basic infrastructure will limit opportunities in many markets that are still struggling to establish reliable electricity and telecoms
- **A good example of how early adoption economics may function –** Generating public awareness of non-cash alternatives; economics of POS rollout and investment recovery; convincing merchants to accept card payments; structuring value chain profitability to align incentives
- **Substantial financial exclusion in urban areas** – There is a major opportunity to expand inclusion, focusing on urban centers and more traditional infrastructure, given proximity to branches, ATMs, and POS

Payments in Nigeria by the numbers

Usage & Inclusion	Instrument usage	**Highly cash dominated with virtually no mobile money** ▪ Percentage of digital payments: 0.02% of volume, 49% of value; bank card usage low with debit cards used mainly for ATM withdrawals
	Financial inclusion	**Low** ▪ Formal access: 36% of population, 14% of bottom 40%. Access concentrated in large cities with rural areas underpenetrated
Payment system	Network infrastructure	**Centralizing** ▪ NIBSS (privately owned by CBN and banks) serves as a platform for much of Nigeria's payment infrastructure running the ACH and National Central Switch. Interswitch (privately owned) is dominant cross-bank ATM switch and largest card switch ▪ ACH infrastructure is relatively new and modern; cheque truncation implemented recently
	Regulation	**Highly active** ▪ Led by Central Bank of Nigeria (CBN), with major programs across instruments (e.g., cash-reduction, mobile money, agent banking). Some gaps in regulation (e.g. consumer redress) ▪ Regulator is taking strong measures to structure market (e.g. excluding telcos from mobile money, regulating value chain activities in POS), and has backtracked on certain regulations (e.g. independent ATM deployers)
Environment	Banking system reach	**Low-reach, urban-centered** ▪ Branches: - 7 branches per 100K (~6,000 total) ▪ ATMS – 11 ATMs per 100K (~9,900 total) ▪ POS – About 175 per 100K (~150,000 total, up from 12,000 in 2010) ▪ Banking sector more focused on corporate banking, relying on retail deposits for cheap funding
	Mobile & telecoms	**Moderate** ▪ Rapidly growing market, with 3 major providers (MTN (~40%), Glo (~20%), AirTel (~20%)) ▪ Mobile users: 55% of population
	Other market infrastructure	**Poor** ▪ Lack of reliable electricity and telecom causes failed transactions and unpredictable connectivity; substantial issue for basic payment functionality in merchant locations
	Economic environment	**Lower middle income** ▪ GDP: $1,400 / capita. 14th richest country (out of 47) in Sub-Saharan Africa but oil accounts for about 40% of GDP ▪ About 48 million formal sector employment, about 54 million informal sector employment. GINI Coefficient 48.8 (2010)
	Demographics & geography	**Mixed urban/rural; young, rapidly urbanizing population** ▪ Adult population of about 85 million; total population of about 160 million; 50% of adult population rural; 50% urban ▪ Economic activity highly concentrated in Lagos and Abuja

SOURCE: Findex, EFInA, World Bank, Expert interviews

Cash dominates Nigerian payments by both value and volume; credit transfers are the most common digital channel



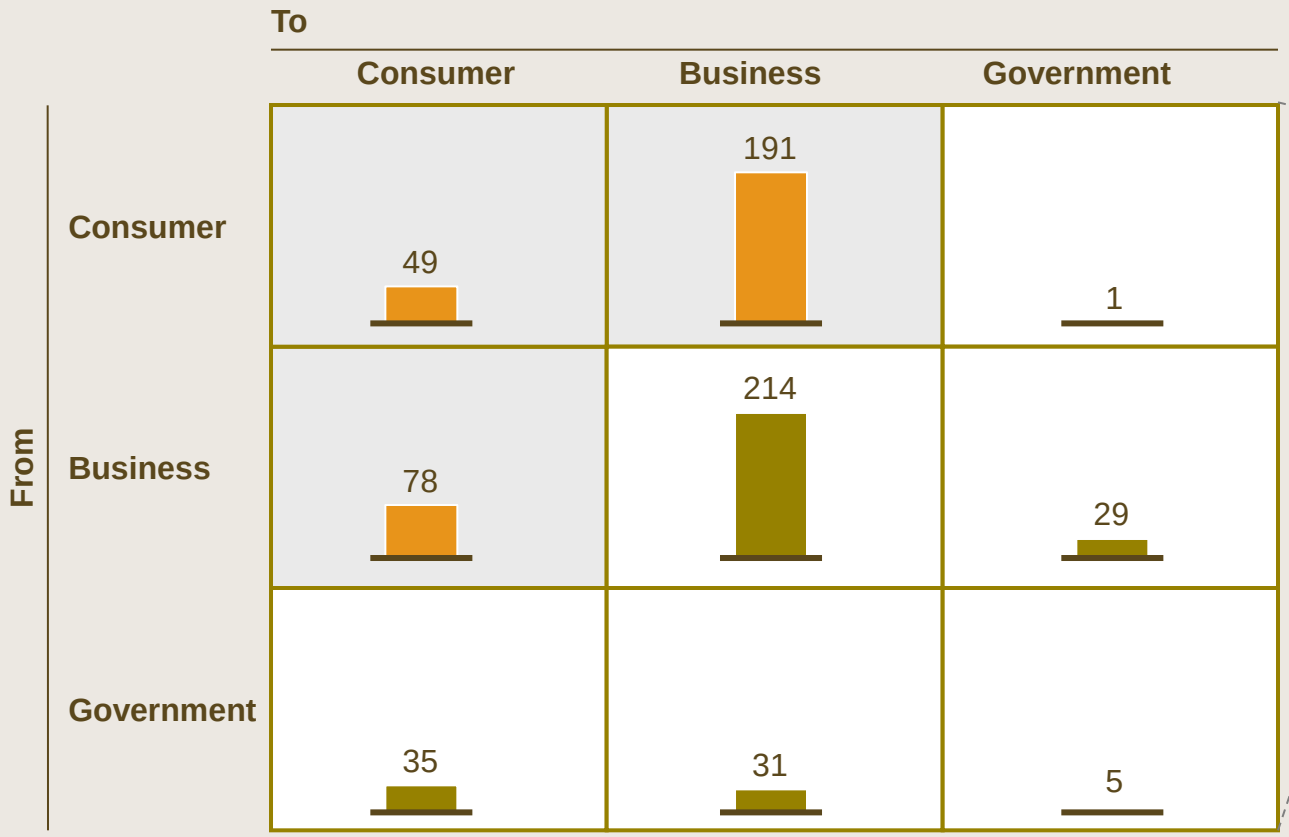
- Cash dominates the system, accounting for about 99% of the total transaction volume
- Credit transfers are catching up to cheques, and may have overtaken them in 2012 by volume and value
- Cards are negligible relative to size of the economy with debit cards more widely used than credit or prepaid
- Mobile has not yet taken off in any meaningful way even though a few players have launched mobile money

SOURCE: Central Bank of Nigeria, Retail Banking Research, Expert interviews

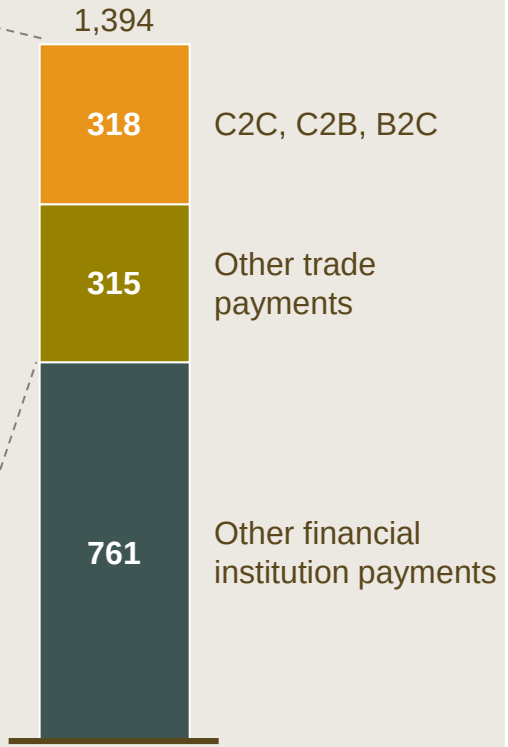
The transactions most strongly impacting Nigerian consumers account for $318 billion of payment flow

Area of focus

Trade payments in Nigeria by transaction parties, 2011[1]
US$ Billion



Total trade payments by value, 2011[1]
US$ Billion



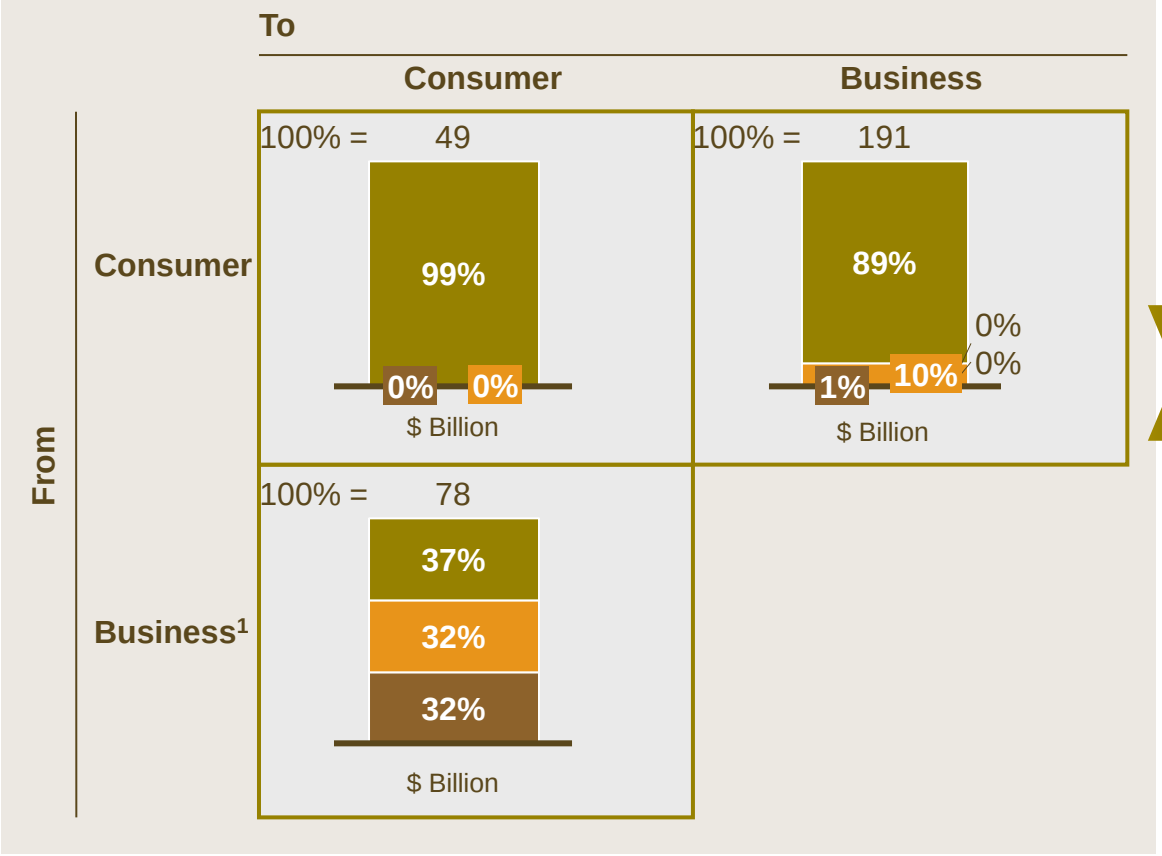
1 Payment flows based on best available official and public data for Nigeria, including C2B flows based on official NBS Consumption Patterns in Nigeria 2009/10 report and B2B calculated as a residual of all other payment flows (may be underestimated)

SOURCE: CBN Annual Reports; RBR Research, National Bureau of Statistics, Press Search

Cash dominates consumer payments in Nigeria, except in B2C where firms with 50+ employees must pay salaries digitally

ESTIMATES

Nigeria trade payments value by transaction parties, 2011
Value in US$ Billions



$ = High value (>20% use)
# = High volume (>20% use)

Major instruments used by transaction type

	C2C	C2B	B2C
Cash	$#	$#	$#
Cheque			$
Direct debit			
Credit transfer			$
Debit card			
Credit card			
Mobile			

1 B2C figured based on salary/wage payments. Assumed formal sector employees paid 1/3 cash, 1/3 cheque, 1/3 credit transfers. Formal sector represents ~95% of total B2C flows. Informal sector assumed to be paid entire in cash. Informal sector, only ~10% of wages are B2C with the remainder C2C due to large number of owner/proprietors whose salary payments are considered to be C2C.

SOURCE: National Bureau of Statistics, Expert interviews

Financial inclusion in Nigeria

Overall financial inclusion performance: low

Percent with an account at a formal financial institution
- Overall -- 30%
- Top 60% -- 40%
- Bottom 40% -- 14%
- Women -- 23% have formal financial accounts

Payment services access – Bottom 40% (Top 60%):
- Debit card access -- 7% (27%)
- Credit card access -- less than1% (less than 1%)
- Wages received in formal account -- 3% (18%)

Distribution access (per 100,000 people)
- Bank branches -- 6.8
- ATMs -- 11.8
- POS terminals -- about 175
- Mobile payment agents -- 0
- Mobile access -- 55% of population

Additional comments:
- Nigeria ranks 88th globally in access to an account at a formal financial institution, but is above the average for Sub-Saharan Africa (24%) and for low income countries (24%).
- About 24% of people report that they do not have a bank account because banks are far away

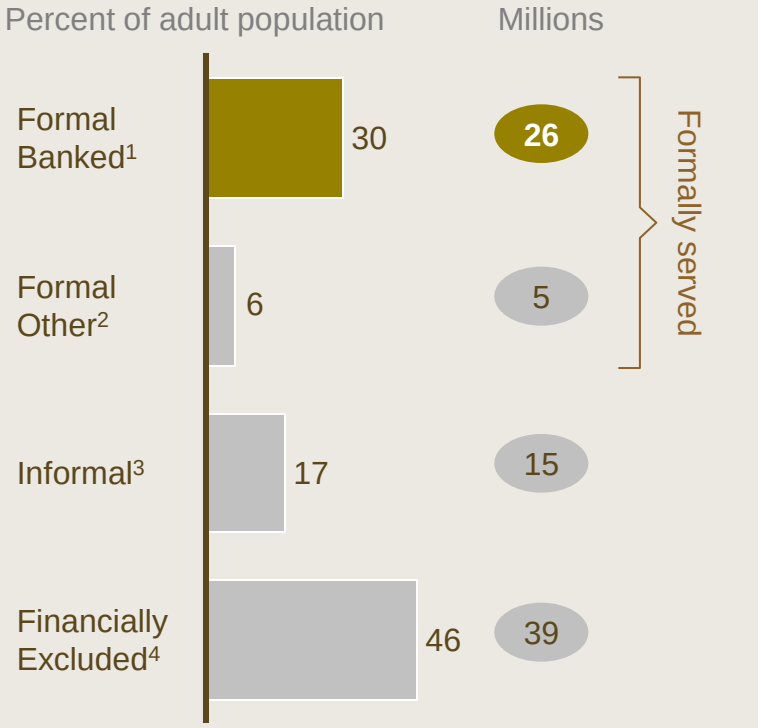
Key takeaways

- **The bank branch network remains very uneven and does not reach large segments** of the population, especially in the north and rural areas
- **Banking remains generally expensive for the majority of people,** despite some product innovation towards affordability (e.g. lower account balances)
- **Some consumer segments perceive limited relevance for traditional branch banking products** due to low or irregular income, high cost of banking and intimidating bank processes
- **Financial literacy is a major concern** as the less educated find account opening, deposits and withdrawals intimidating and stressful
- **Recent developments such as the CBN Financial Inclusion Strategy** may pave the way for improving reach and relevance while decreasing cost

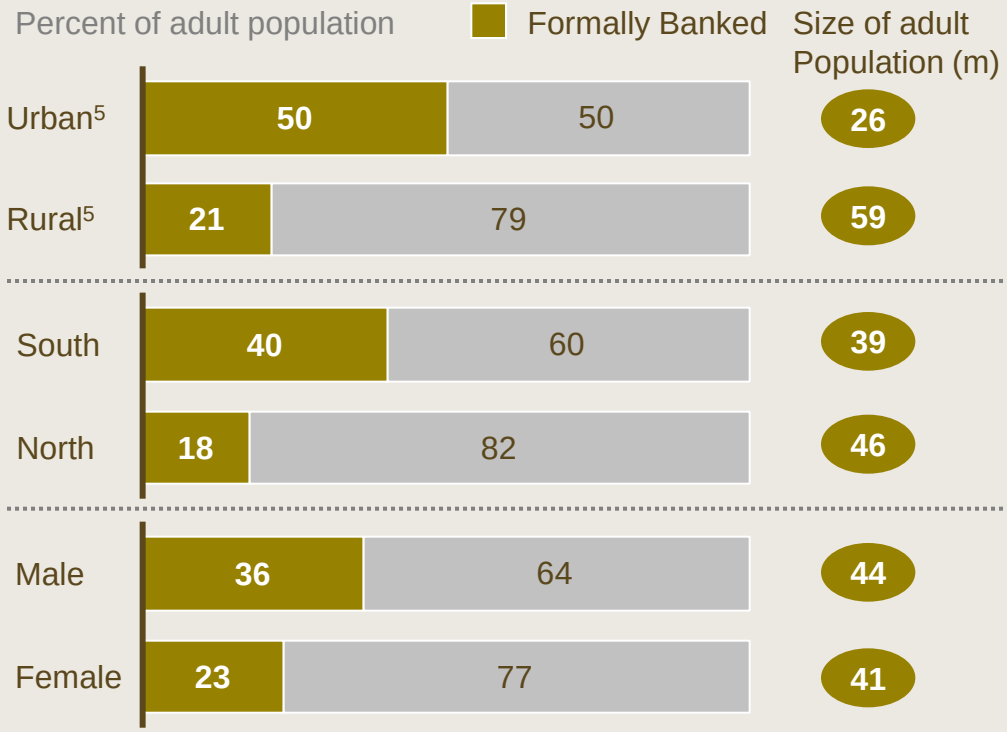
SOURCE: EFInA Access to Financial Services in Nigeria 2010, Findex Global Database

Only 30% of adults are banked, with greater inclusion in urban areas, in the South and among men

Breakdown of population by level of inclusion



Population that is formally banked

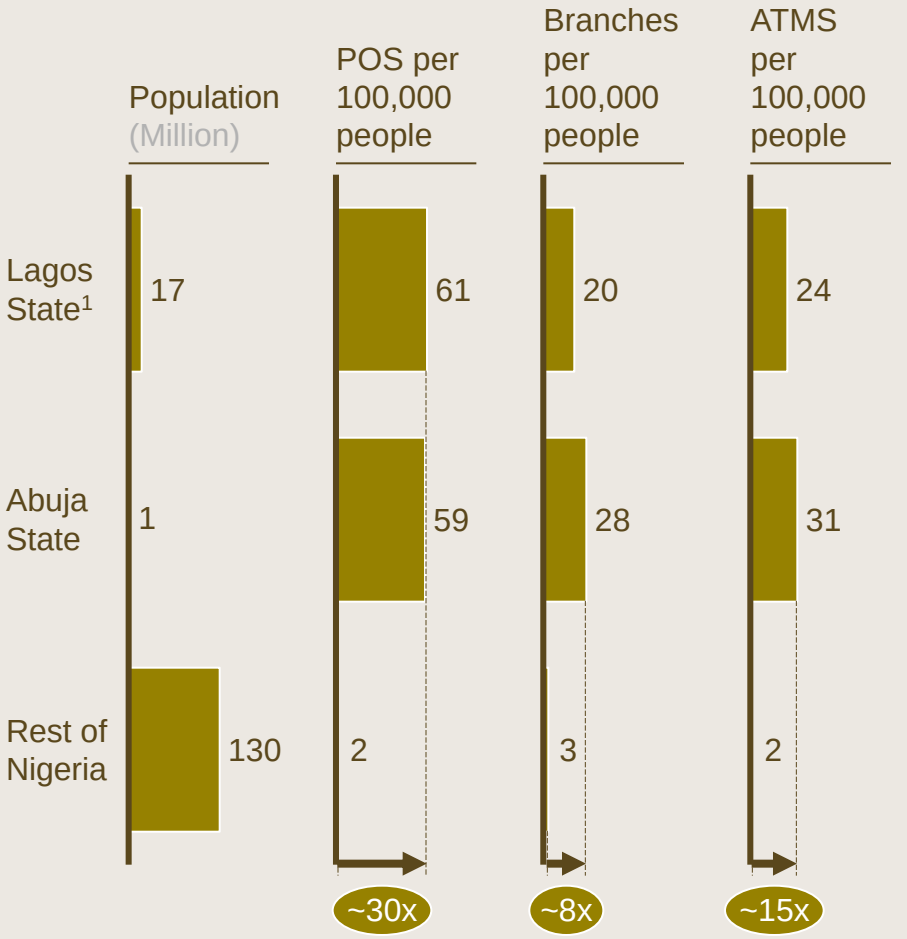


1 Banked: All adults who have access to or use a deposit money bank; 2 Formal other: All adults who use other formal institutions and financial products not supplied by deposit money bank, including insurance companies, microfinance banks, remittances; 3 Informal only: All adults who have access to or use only informal services and products. This includes Savings clubs/pools, informal remittances (via a transport service or recharge card); 4 Financially excluded: Adults not in the formal (banked), formal other or informal only categories; 5 EFInA data based on survey differs in its assessment of overall urban-rural split (~30/70) vs. other sources which give the urban-rural split to be ~50/50

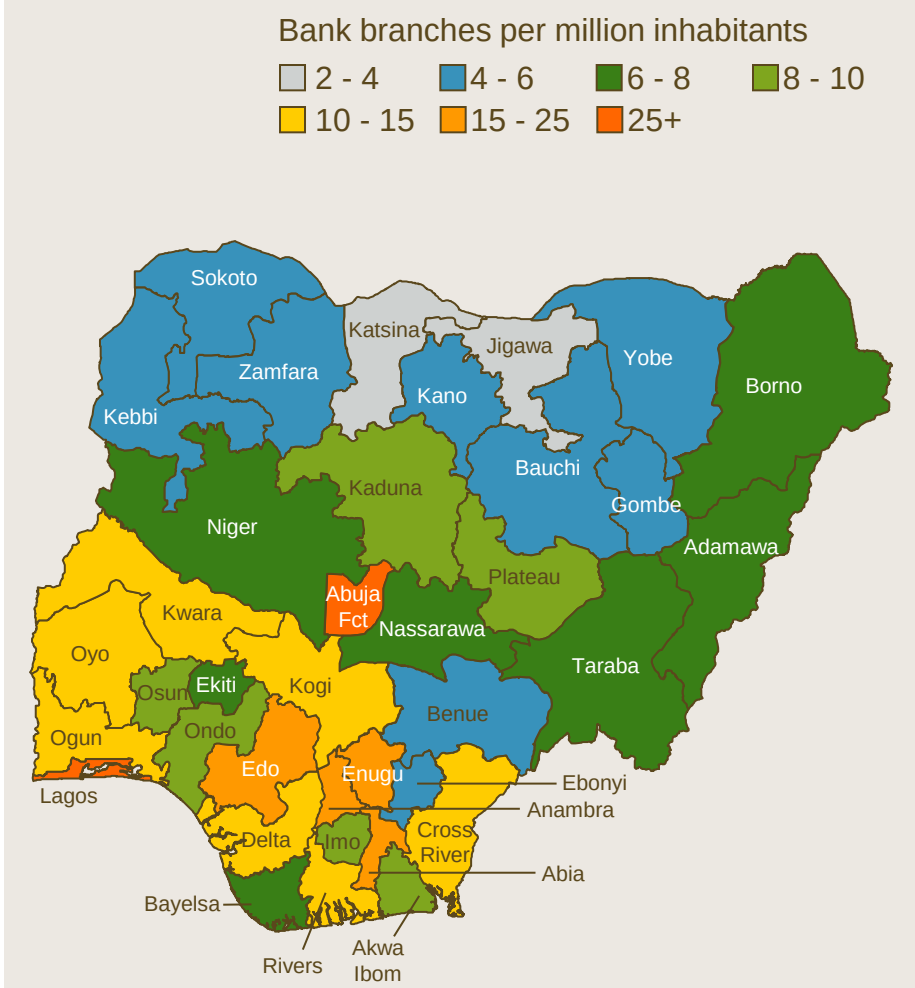
SOURCE: EFInA Access to Financial Services in Nigeria 2010

Outside of Lagos and Abuja, access to bank services or any non-cash options for transacting are limited

Banking infrastructure density by region, 2009



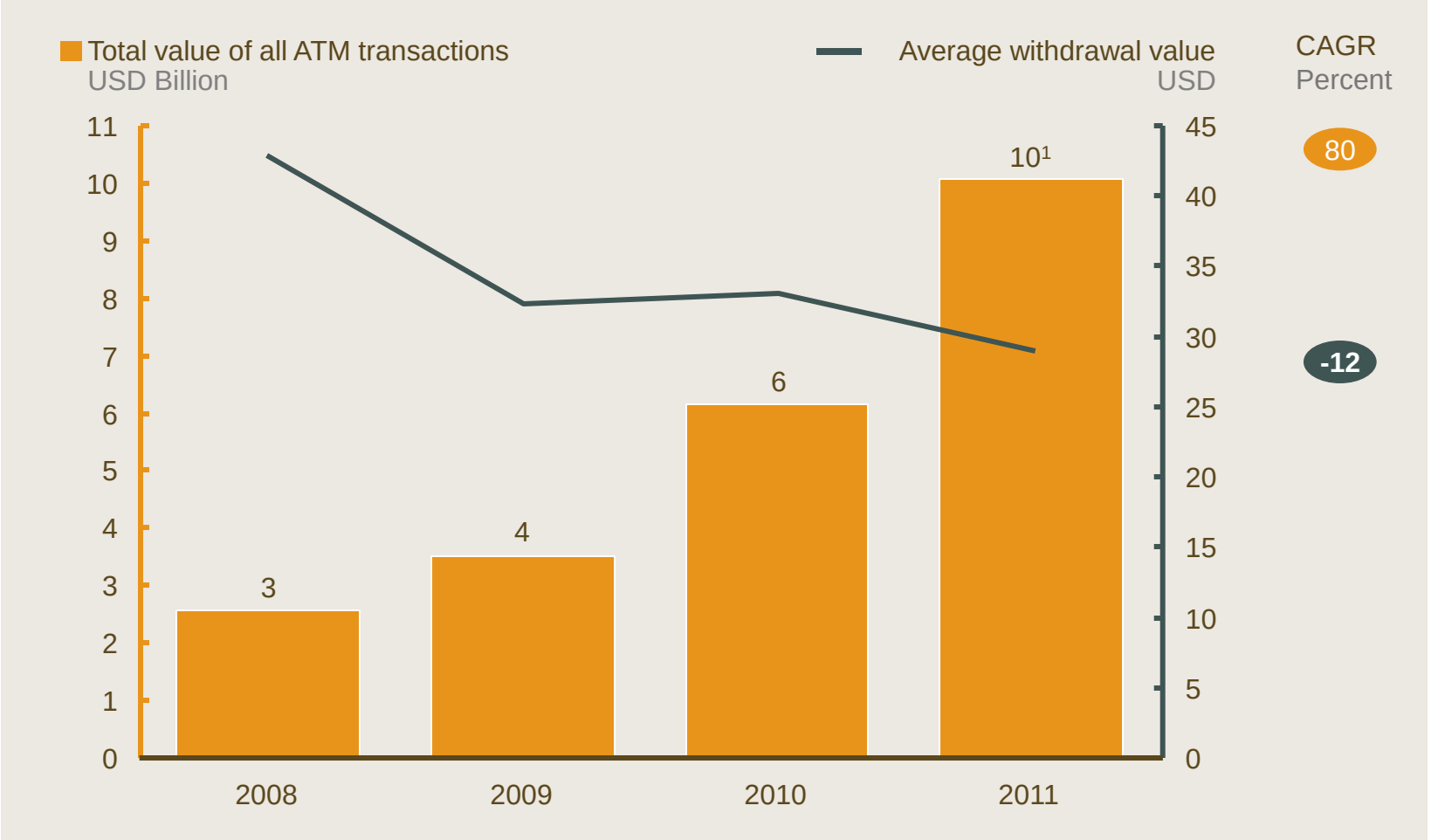
Bank branch density by Nigerian State, 2009



1 Lagos accounts for ~66% of all cheques and ~85% of all POS trans-actions in Nigeria

SOURCE: New Cash Policy – Cashless Lagos Stakeholder Implementation Session. October 2011; OPM analysis of surveyed banks (EFInA Access to Financial Services in Nigeria 2010)

ATM usage is growing rapidly with withdrawal sizes shrinking



1 3% of total cash transaction value in Nigeria (vs. ~10% in the Netherlands)

SOURCE: Central Bank of Nigeria; NIBSS

Along with its universal accessibility, the lower visible cost of cash accounts for its dominance

C2B TRANSACTIONS

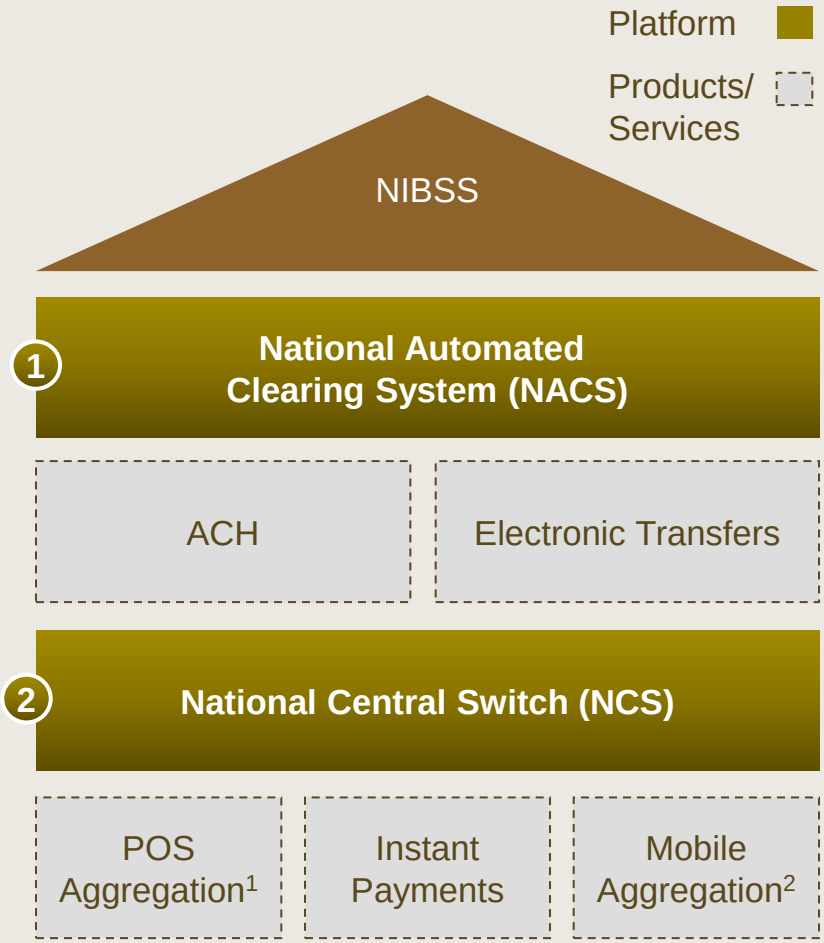
	Consumer						Merchant					
	Requires Bank Acct	Direct Fees (Naira/USD)	Indirect Fees (Naira)	Benefits	Merchant Accept. (%)	Actual Use[1] (Val, %)	Consumer Access (%)	Requires Bank Acct	Direct Cost (Naira)	Indirect Cost (Naira)	Benefits	Sample use cases
Cash		-	ATM $0.64 (off-us); $0-0.42 (on-us) Theft/Loss	▪ Accessible ▪ Ubiquitous	100	89.4	100		-	▪ Cash handling	▪ Ubiquitous ▪ Immediate ▪ Avoid VAT	▪ Used almost exclusively for day to day spend
Cheque	✓	-	▪ Cheque-book costs, current account fee	▪ Convenient for large txs ▪ Float benefit	2	10.0	30	✓	-	▪ Transport	▪ Convenient for large txs ▪ Widely used	▪ Wealthy for large value (e.g. school fees)
Credit Transfer	✓	Same day: $13 + 0.1%	▪ N/A	▪ Convenient for large txs	x	0.3	30	✓	-	▪ …	▪ Convenient for large txs	▪ Large value purchases & remittances
Direct Debit	✓	-	▪ N/A	▪ Convenient for recurrent pmts	x	0.0	30	✓	-	▪ …	▪ Convenient for cash mgmt	▪ Hardly used (e.g. Dstv)
Debit Card	✓	Annual $3.23 Issuing $3.23		▪ Convenient to carry	~1[2]	0.4	~23	✓	Vary by industry ~1.25% or max $13	▪ Free terminal	▪ Direct credit ▪ Minimizes cash handling	▪ Some banked use for some categories (e.g. airline ticket)
Credit Card	✓	Annual $50 Issuing $50 Monthly $5	▪ Penalties, interest, other charges	▪ Float and liquidity benefit	~1[2]	0	~0.2	✓	Vary by industry ~1.25% or max $13	▪ Free terminal	▪ Direct credit ▪ Minimizes cash handling	▪ Wealthy use for international travel
Prepaid		Annual $3.23 Issuing $3.23 ATM $0.42-$0.64 Reload $0.13	▪ Limits on trx ▪ Additional fees (e.g. pin renew)	▪ Accessible	~1[2]	0	~0.2	✓	Vary by industry ~1.25% or max $13	▪ …	▪ Direct credit ▪ Minimizes cash handling	▪ Hardly used Banked and unbanked may use to shop online
Mobile		Cash out $0.64 for under $65 Transfer $0.32-0.64	▪ Handset/ terminal	▪ Accessible ▪ Low cost	-	0	-		N/A	▪ Handset/ terminal	▪ Direct credit ▪ Minimizes cash handling	▪ N/A

1 Value used instead of volume due to lack of reliable volume data
2 <1% assumes that informal sector merchants are counted towards merchant acceptance total

SOURCE: Zenith Bank website, UBA bank website, Skye Bank website, Bankable Frontiers, EFInA, Expert interviews,

NIBSS serves as a platform for much of Nigeria's payment infrastructure

Nigerian Interbank Settlement System (NIBSS) Background and Processing Infrastructure Platforms



- NIBSS was established in 1994 under mandate to make payments more efficient in Nigeria and to develop an integrated nationwide network for electronic transfers and settlements. NIBSS is owned by the CBN and the banks.

1 NACS, established in 2002, was the first ACH in Nigeria. It is used for cheque, direct debit and credit transfers. Transfers run under the Nigeria Electronic Funds Transfer (NEFT) platform

2 The National Central Switch (NCS) was implemented in 2010 and serves as a platform for multiple products and services.

- The main purpose of NCS was to provide interconnectivity and interoperability for card payment schemes which it achieved via POS aggregation
- NCS also offers NIBSS Instant Payments, a faster and more efficient method of funds transfer than NEFT
- The NSC will also serve as an aggregator for mobile money schemes

1 POS aggregation runs on top of existing NCS.
2 Mobile aggregation not yet implemented but regulatory mandate has been issued that all mobile money transactions will route through NIBSS

SOURCE: NIBSS, Expert interviews

How the system works by instrument (1/2)

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Cheque *# of Trx: 37.7m* *% of non-cash: 45%*	▪ Written by payer on cheque stock (paper) provided by the bank. Presented to payee. ▪ Cheques use MIRC technology and standardized for automated processing	▪ Receives batch data from ACH and posts individual debits to payer accounts ▪ Cheque truncation commenced Aug 2012	▪ Automated: NIBSS transmits instructions to ACH. ACH matches payee & payer bank, and notifies each of payment – Settlement in T+2 – Daily inter-bank settlement of net position using NIBSS ▪ Manual: 28 Bankers clearing houses, settling through NIBSS	▪ Payee receives cheque from payer and presents to bank. ▪ Payee bank processes account credit. Sorts cheques and sends to ACH for settlement via NIBSS
Direct Debit *# of Trx: 1.9m* *% of non-cash: 2%*	▪ Payer authorizes payee to withdraw money by paper authorization	▪ Payer bank debits payer account and authorizes settlement ▪ Settlement instructions directed to ACH via NEFT (NIBSS)	▪ NIBSS NEFT system used to deliver instruction to ACH which matches payee & payer bank, and notifies each of payment ▪ Direct debits clear in 3 days ▪ Daily inter-bank settlement of net position using NIBSS or CIFTS through NACS ▪ NIP also provides an alternative real-time option	▪ Payee authorizes bank to debit payer account ▪ Payee bank credits payee once it receives confirmation from ACH
Credit Transfer *# of Trx: 36.7m* *% of non-cash: 44%*	▪ Credit Transfer (single): Payer instructs bank to transfer funds to payee using payee account data (usually in branch) ▪ Credit Transfer (bulk): Corporates provide data file to bank for bulk processing (e.g. wages)	▪ Bank verifies funds availability, posts debit to customer account ▪ Bank sends outward instructions to ACH for clearing and settlement via NEFT (NIBSS) system	▪ NIBSS NEFT system used to deliver instructions to ACH which matches payee & payer bank which route transactions ▪ Credit transfers clear in 1 day ▪ Daily inter-bank settlement of net position using NIBSS or CIFTS (RTGS) through NACS ▪ NIP also provides an alternative real-time option	▪ Payee bank receives NEFT instructions and credits customer account ▪ Payments are irrevocable transfers with no recourse

SOURCE: Central Bank of Nigeria, NIBSS (NEFT) Corporate User Guide, Lafferty World Cards Nigeria 2009,

How the system works by instrument (2/2)

✓ Further details follow

	Payer gateway	Payer intermediary	Clearing & Settlement	Payee intermediary
Debit Cards *# of Trx: 7.2m* *% of non-cash: 9%*	▪ Payer presents card or details through POS, internet or mobile channel	▪ Issuer processer (e.g. Interswitch) authenticates and notifies payer bank ▪ Payer bank authorizes payment and posts debit to payer account	▪ All transactions first routed to National Central Switch at NIBSS before routing to local card networks. ▪ Local card networks (Interswitch and Unified Payments) request and notify payee bank, perform authorization and settlement ▪ Payer bank settles payee bank on a net basis after 1 day via accounts at NIBSS or CBN	▪ Payee swipes card at POS device or receives details ▪ POS device or internet gateway forwards details to NIBSS and then from NIBSS to card network for processing
Credit Cards *# of Trx: 0.4m* *% of non-cash: 0%*	▪ POS Infrastructure: increased from ~12,000 in 2010 to ~150,000 in 2012 ▪ Card Brands: Visa, MasterCard and Verve (Interswitch) branded cards offered by major banks. ▪ Debit cards: Issued to all with bank account. Mainly used for ATM transactions. New cards are EMV compliant with chip and pin since 2010 ▪ Credit cards: Single or dual currency cards. Some cards still require collateral of up to 125% of limit. Limited local use of credit cards ▪ Prepaid cards: Offered by some banks (e.g. UBA). Negates need for formal bank account. Prefunded and reloadable. Usable at ATM, Web, POS	▪ ATM network: bank owned and Independent ATM Deployers (IAD)	▪ Card networks: Interswitch and Unified Payments provide issuing and acquiring processing. All issuing banks connected to Interswitch, Unified Payments or both. Card networks or PTSPs deploy and manage POS systems (hardware & software)	▪ Merchant Acquiring: Banks are the main merchant acquirers with the top 4 banks accounting for ~85-90%
Prepaid *# of Trx: n.a*				
Mobile *# of Trx: n.a*	▪ Consumer initiates transaction on mobile phone via USSD channel or via Java app ▪ Difference between mobile banking applications and new mobile money apps not linked to bank account	▪ MMO to authenticate and authorize payment ▪ "On-us" MM transactions cleared and settled ▪ "Off-us" MM transactions to be routed via NIBSS	▪ Inter-MM or inter-bank MM transactions to be routed through NIBSS	▪ Payee issues confirmation or sends verification that transaction has been accepted

SOURCE: Central Bank of Nigeria, NIBSS (NEFT) Corporate User Guide, Lafferty World Cards Nigeria 2009,

How clearing and settlement works by instrument

✓ Further details follow

		Large Value Transfer System		Automated Clearing House		Card Payment Network		Comments
		Public[1]	Private	Public[1]	Private	Public	Private	
Network Design	Network	CIFTS NIP[3]		NACS[2]; NEFT[2]	N/A	N/A	Local card switches[6]	
	Time to settle	Instant		1-3 day			1 day	
	Net/Gross	Gross		Net	Net		Net	
Clearing & Settlement by instrument[4]	Cheque			S C				▪ Automated clearing centers in Abuja and Lagos account for bulk of volume ▪ 28 manual clearing houses remain in other states
	Credit Transfer	S C		S C				▪ NIBSS Instant Payment (NIP) used by both consumers and banks for some net settlement ▪ NIP payee gets instant value but settlement takes 1 day which present risk to payor bank ▪ CIFTS used for market side securities settlements and some net settlement between banks
	Direct debit			S C				
	✓ Debit card							▪ Private switches (e.g. Interswitch, Unified Payments, eTranzact) all have to route via NIBSS for final settlement ▪ ATM transactions using Interswitch ▪ International transactions routed via Visa and Mastercard internationally
	Credit card					S C	S C	
	Prepaid							
	Mobile					S C	S C	▪ Off-us inter-scheme mobile money transfers to route through NIBSS

Public infrastructure

C Clearing

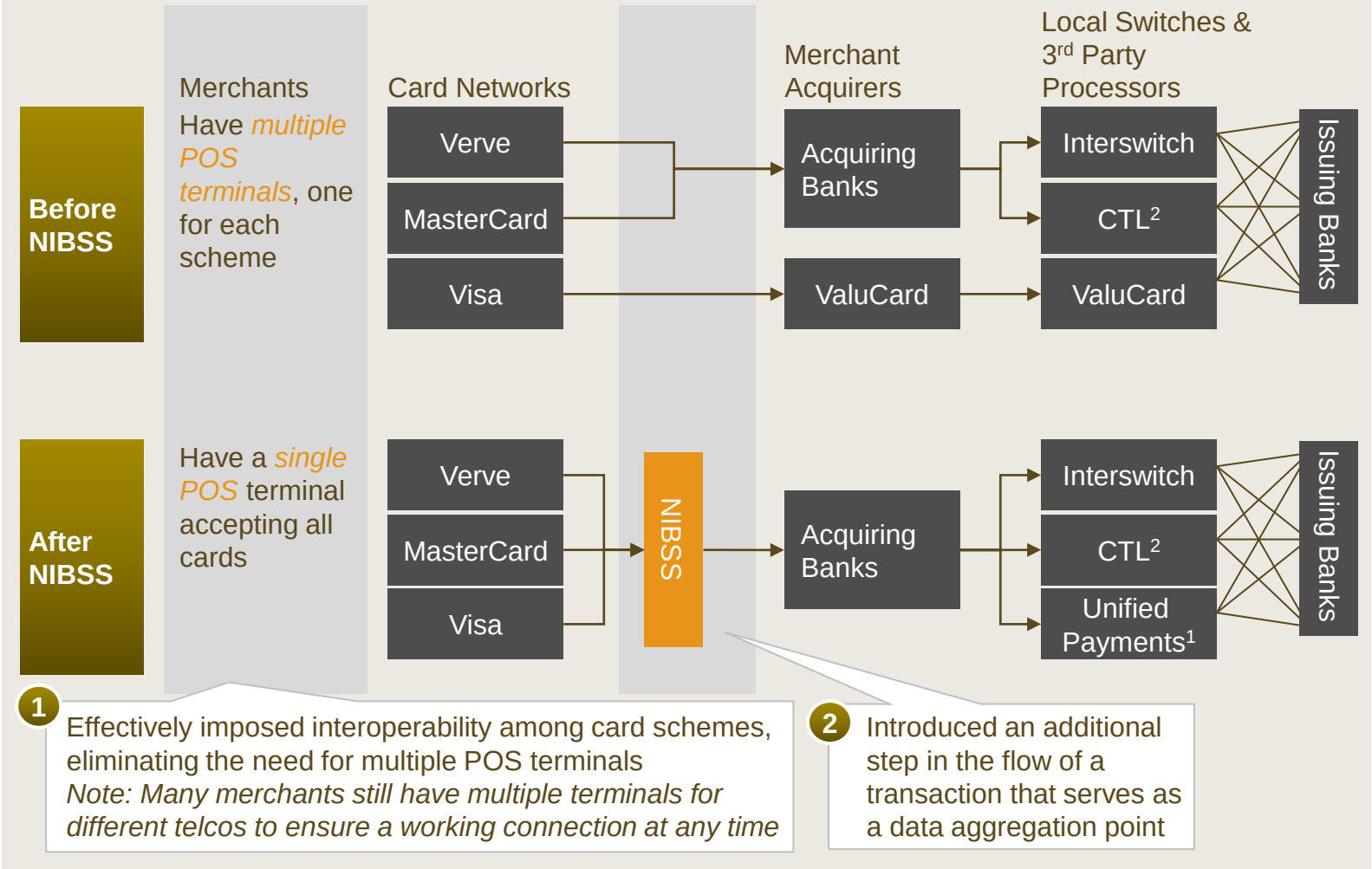
S Settlement

1 NIBSS is semi-public as it is owned by both the Central Bank and the banks. CIFTS is the only RTGS system exclusively owned by the Central Bank; 2 The Nigeria Automated Clearing System (NACS) used for cheques, NEFT system used for credit transfers and direct debits. Both fall under NIBSS umbrella; 3 NIBSS Instant Payment (NIP) used by both consumers and banks in lieu of CIFTS for both small and large value transfers; 4 Final net settlement by banks done through settlement accounts at the CBN or at NIBSS; 5 Quasi-public since the CBN has an ownership share and chairs the Board; 6 Valucard,Interswitch,CTL,eTranzact,3Line

SOURCE: Central Bank of Nigeria, NIBSS, Citi Bank Nigeria

Card information flow – NIBSS requires all card transactions to route via its central switch, imposing interoperability and aggregating data

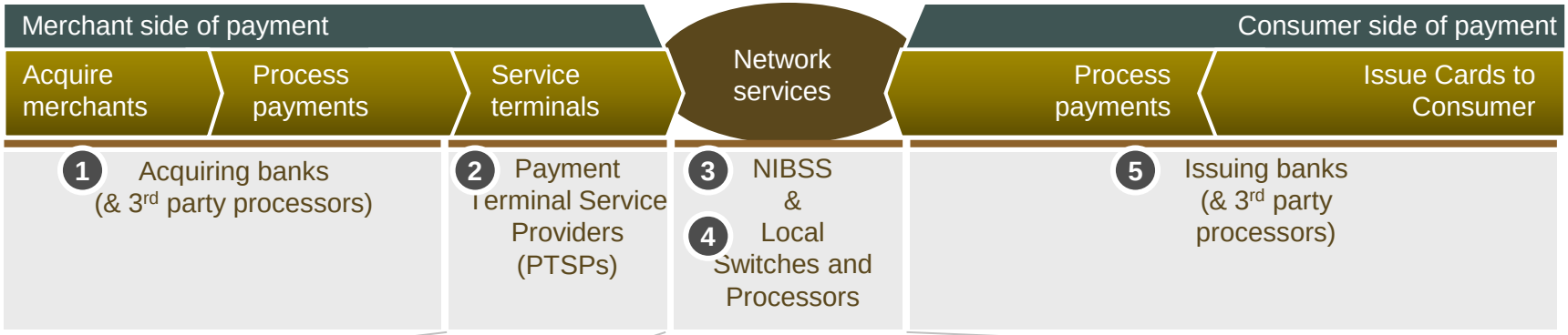
Simplified schematic – Flow of information when a consumer swipes a card at a merchant



NOTE: the flow looks similar for mobile transactions, with both Interswitch and e-Tranzact providing switching and processing services
1 Formerly ValuCard, liscenced as a Visa service provider; 2 Cards Technology Limited

SOURCE: NIBSS, Expert interviews

Card value chain – There are 5 main types of players in Nigeria



Who	▪ At least 18 of out 21 Nigerian banks	▪ Only 5 licensed PTSP in Nigeria[1]	▪ NIBSS NCS - owned jointly by CBN & banks	▪ 5 local switches, which also provide ATM switching[2]	▪ All retail banks act as issuers
Activities	▪ Sign-up merchants, negotiating pricing & managing accounts ▪ Responsible for processing payments, often using 3rd party processors ▪ Can own POS	▪ Deploy and maintain POS – sole entities licensed to do so by CBN	▪ All POS transactions are routed through NIBSS at authorization ▪ Provides settlement services	▪ Provide payment infrastructure & route among banks & NIBSS ▪ Also act as 3rd party processors (e.g., Interswitch largest in Nigeria)	▪ Issue cards, maintain accounts, provide customer service ▪ Responsible for processing payments, often via 3rd parties
Revenue *MDR capped at 125 bps or 2,000N (~$13) by CBN*	▪ Earn 32.5% of MDR (~40% pre-NIBSS) ▪ Rarely profitable; Banks use to secure broader corporate relationships and lower or waive MDRs in some industries (e.g. downstream oil)	▪ Earn 25% of MDR ▪ Also charge a flat fee per terminal plus incentive fee based on volume/value	▪ Earns 7.5% of MDR (this came from came out of acquirers share when NIBSS was introduced)	▪ Earn 5% of MDR ▪ Those acting as 3rd party processors are paid additionally by banks for their services	▪ Earn 30% of MDR on interchange

1 Unified Payments (formerly ValueCard, also a 3rd party provider), PayMaster, CITISERVE, E-Top, Itex; 2 Valucard,Interswitch,CTL,eTranzact,3Line

SOURCE: Expert interviews; company websites

Historical milestones – six major milestones for the payment system

	Description	Impact on Financial Inclusion
1 Formation of NIBSS	▪ NIBSS created (1994) to initiate and develop an integrated nationwide network for electronic transactions. NIBSS pioneers first inter-bank EFT (1994). NACS (ACH) dramatically improves cheque processing (2002). NCS brings interoperability to card (2011) and to mobile (expected 2013)	▪ NIBSS's role in payments has grown ▪ NACS improves efficiency and cost to cheque system. NCS solves inter-operability of card and MM
2 Bank branch and ATM expansion	▪ 1990s was the first wave of major branch expansion. Structural weaknesses led to consolidation in the 2000s, but this period also saw a return to branch expansion (from ~2,200 in 2000 to ~5,500 in 2010) and the widespread roll out of ATMs from 2006 onwards	▪ Retail banking penetration rose considerably in the 2000s, albeit from a low base
3 Establishment of Interswitch	▪ Interswitch (2004) solved the problem of inter-bank interoperability in their ATM networks. Went on to launch the Verve debit card (2009) which is a local and lower cost alternative to Visa and Mastercard.	▪ Interoperable ATMs effectively expanded access and convenience for banked consumers, facilitated deployment of off-site ATMs
4 Payment System Vision 2020	▪ CBN lays out seven end user initiatives (2007) to shift transactions to electronic methods. PSV2020 directly led to further initiatives such as Cashless Lagos (2011)	▪ Initiatives drove bank account adoption and shift to e-payments but did not directly improve inclusion among poor
5 Mobile money regulation	▪ CBN puts out Regulatory framework for Mobile Payment Services in Nigeria (2009). Framework implements tiered KYC but also host of other regulation such as preventing telcos from becoming MNO's	▪ Mobile money still in its infancy but offers vast potential for the poor. The success of a bank-led model remains to be seen
6 Financial Inclusion Unit at CBN	▪ Financial Inclusion unit at CBN established (2012) that will prioritize regulatory initiatives aimed at improving financial inclusion (e.g. National Strategy for Financial Literacy, regulatory framework for agent banking etc)	▪ Financial Inclusion Unit highlights CBN's focus on bringing financial services to the poor. Too early to tell effectiveness of unit

While cheque and electronic payment instruments have developed substantially over the past 10 years, cash remains dominant (1/2)

	1990's and prior	2000-2010	2010 and beyond
Cash	▪ 1946-1959, currency notes and coins were issued by the West African Currency Board ▪ 1959: Issuance of the first Nigerian Pound currency note ▪ 1973: Decimalization of the currency and switch from Pounds to Naira	▪ 2007: Development of Payment System Vision 2020 sets out CBN plans to move away from cash. Seven initials including government supplier payments, P2P trade, salary, bill pay, taxes and securities settlement which should be electronified	▪ 2011: Cashless Lagos launched which introduced cash surcharging by imposing defined penalties if daily limits for withdrawals and deposits are breached. Deployed POS infrastructure and implemented public awareness campaign
Cheque	▪ 1993: Implementation of MIRC technology to reduce processing cost of cheques. Took several years before benefits were realized as banks did not comply with standards	▪ 2002: National Automated Clearing System (NACS) runs live in Lagos. Clearing cycle improved – T+3 (local) and T+5 (upcountry) ▪ 2005: NACS deployed to Abuja ▪ 2006: cheque standards and cheque printer accreditation scheme implemented ▪ 2007/8: MIRC upgrade. All cheque clearing (local and upcountry) in	▪ 2010: CBN caps cheque payments to N10m. Any transfer above N10m should be made via the RTGS or via NIBSS EFT ▪ 2012: cheque truncation implemented allowing faster and more efficient cheque processing
ACH, Switches and CIFTS	▪ 1994: NIBSS established and pioneered inter-bank EFT in Nigeria ▪ 1999: NIBSS Fast Funds launched in 1999	▪ 2004: Establishment of Interswitch and connecting all banks achieves interoperability of across ATMs ▪ 2004: NIBSS EFT system launched to deliver direct debits and credit transfers via the ACH system. Settlement is typically T+1 ▪ 2006: First live-run of Nigerian RTGS system - CBN interbank funds transfer system (CIFTS)	▪ 2010: Nigeria Central Switch (NCS) platform was rolled out by NIBSS ▪ 2011: NIBSS Instant Payments (NIP) system launched to offer real-time transfers. NIP to serve as open platform for mobile, e-commerce and inter-bank transfers ▪ 2011: NIBSS commences POS aggregation via CTMS platform running on NCS

SOURCE: CBN – The journey so far and the road ahead, CBN website, Expert interviews

While cheque and electronic payment instruments have developed substantially over the past 10 years, cash remains dominant (2/2)

	1990's and prior	2000-2010	2010 and beyond
Cards		▪ 2000: First local card issued ▪ 2003: Mastercard enters Nigeria even though first card issued only in 2005 ▪ 2009: The Central Bank granted license for first credit bureau potentially allowing banks to do better credit underwriting in the future	▪ 2010: Switch to EMV standard on all cards. Market set back from ~34m in 2006 to ~20m cards in 2012 ▪ 2011: All POS transactions are routed via NIBSS achieving interoperability of terminals ▪ 2012: CBN "encourages" POS expansion. POS increase from ~12,000 to ~150,000
Mobile		▪ 2009: CBN puts out Regulatory framework for Mobile Payment Services in Nigeria. CBN stipulates that telco's cannot be MMOs. Mobile regulations establish tiered KYC	▪ 2012+: CBN close to issuing agent banking guidelines
General history (non-instrument specific)	▪ 1959: CBN is established ▪ 1961: First clearing house opens in Lagos ▪ 1990s: Period of significant bank branch expansion	▪ 2003: Guidelines issued for e-banking ▪ 2003-2007: Consolidation of the banking sector from 89 to 24 banks ▪ 2009: Nigerian Banking Sector Crisis. Down to 20 banks and regulatory overhaul	▪ 2012: CBN develops Financial Inclusion Strategy and appoints Financial Inclusion Unit ▪ 2013: New National Identity Number to be basis for new KYC verification

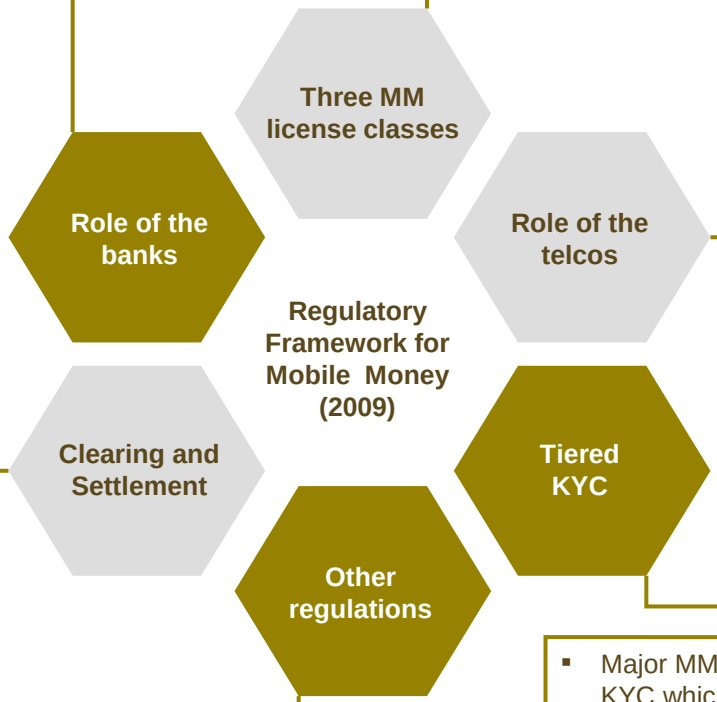
SOURCE: CBN – The journey so far and the road ahead, CBN website, Expert interviews

The Central Bank of Nigeria has taken a proactive approach to regulating mobile money

- Mobile money can be:
  - Card account based (linked to debit, credit, prepaid card)
  - Bank account based (current, savings, other)
  - Stored Value (no bank account necessary)
- Banks to provide financial, clearing and settlement services to mobile scheme operators where MM funds are held by the bank

- All final settlement processes to be routed through the Interbank Settlement System (NIBSS)
- All MM schemes to be inter-operable with other schemes, with channels (e.g. POS, ATM) and with central switch (NIBSS)
- Off-us inter-scheme final net settlement to be effected via CIFTS on T+1 basis

- Agent network guidelines:
  - MMOs can appoint agents for enrolling customers, deposits and withdrawals
  - Agents can be shared by multiple MMOs
- Dispute resolution guidelines
  - MMOs required to maintain complaints desks
  - CBN to set up the Office of the Ombudsman



- Bank focused: single financial institution provides MM services. Bank responsible for all aspects of MM scheme and reg. compliance.
- Bank led: consortium with financial institution as the lead. Banks provide clearing and settlement, risk management, and agent management.
- Non-bank led: 3rd party corporation, with stored value backed by settlement account at a bank. Must maintain ~$130,000 in paid in capital to offset risk

- Not allowed to receive deposits (i.e. cannot be MMOs)
- Must make network available to all MM scheme operators
- Must ensure its subscribers can sign up to and use any MM scheme

- Major MM regulatory reform was the introduction of tiered KYC which facilitates increased access for poor
  - Three tiers covering:
  - Unbanked (Least KYC): name and phone number. Transaction limit of $20 and daily limit of $190
  - Semi-banked (partial KYC): As per CBN KYC Manual. Transaction limit $64, daily limit $645
  - Fully banked (Full KYC): As per CBN KYC Manual. Transaction limit $645 and daily limit of $6,400

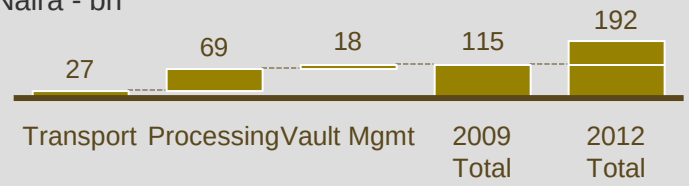
SOURCE: CBN – Regulatory Framework for Mobile Money Services, Expert interviews

Cashless Lagos aims to decrease cash use by cash surcharging and aggressive deployment of POS infrastructure

Context: Cash-heavy economy

- Cash accounts for ~99% of the total transaction volume and ~51% of transaction value; ~89% of C2B transaction value is in cash
- Cash management costs are expected to grow rapidly and to reach N192bn in 2012; banks pass very little of these costs directly on to customers

Cash Management Costs (CBN + Banks)
Naira - bn



- 10% of branch cash transactions are above N150,000 but account for ~71% of the value
- Opportunities to pay electronically were limited, with only ~13 POS devices per 100K people in 2011 (versus 192 in the Netherlands) and no mobile options

Objectives

- Improve control over monetary policy;
- Lessen corruption through shift to formal channels Increase tax collection;
- Reduce cash costs;
- Free up cash

Approach: Multiple prongs, first piloted in Lagos

1 Introduce cash surcharging
- CBN implements daily cash limits and penalties which are revised following protests:
  - *Corporate:* N3m (revised up from N1m). Penalties of 5% on withdrawals and 3% on deposits
  - *Individual:* N0.5m (revised up from N0.15m). Penalties of 3% on withdrawals and 2% on deposits

2 Deploy POS infrastructure
- Developed POS guidelines and regulations
- Acquiring banks encouraged to deploy terminals, the cost of which they bear (number of POS devices went from ~12,000 in 2010 to ~150,000 by Q2 2012)

3 Promote other electronic channels
- License mobile money providers
- Push electronic funds transfer instruments and platform

4 Increase public awareness
- Stakeholder engagement and mass communication campaigns

Grassroot communications

Weekly print ads

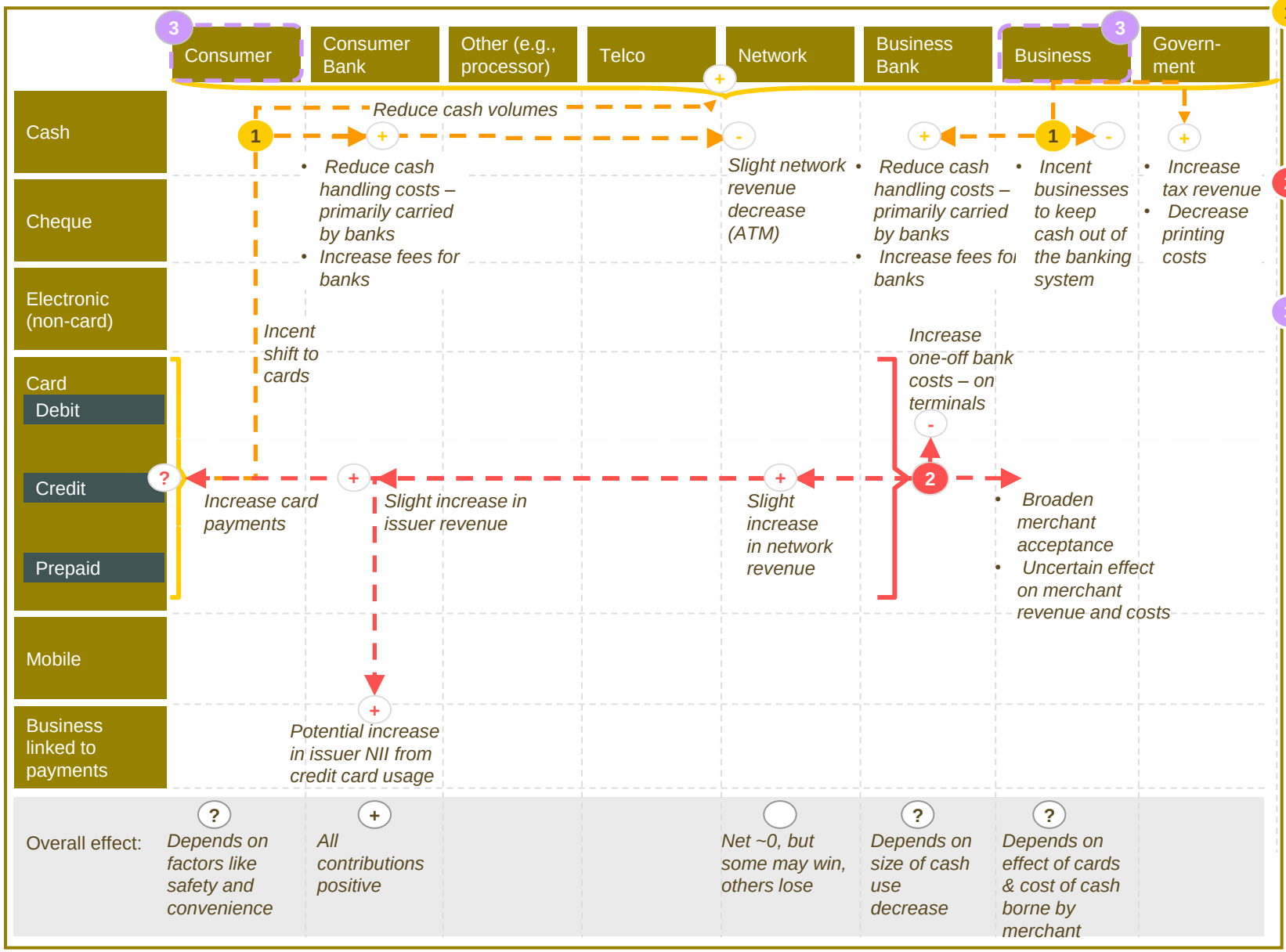
Cashless Lagos website

Banks Cashless FAQ sites

SOURCE: CBN, press search, New Cash Policy – Stakeholder Engagement Presentation Oct 2011

From a full system perspective, Cashless Lagos impact addresses multiple factors

ILLUSTRATIVE



1 Cash surcharge paid by consumers and businesses on all transactions and withdrawals over a threshold

2 POS expansion funded by banks

3 Education campaign to reinforce 1 and 2

- Net positive for consumers' (issuing) banks
- Effect on business' (acquiring) banks will depend on savings from cash reductions vs one-off terminal costs
- First order effects on users are undetermined but banks may pass on savings indirectly

Table of Contents

The payment system in the United States

Characteristics

- **A demand-driven system** is shaped by the requirements of a large and sophisticated financial sector
- **Strong competition among payments players** for profits stimulate high-levels of investment and innovation in new products
- **Bankcards** have become the predominant form of consumer payments at POS due to widespread issuance and broad acceptance infrastructure; consumer demand for card payments (e.g., loyalty and credit) was instrumental for historical success
- **Balanced development of a government-buttressed infrastructure** (e.g., ACH) and private sector systems (e.g., Visa/MasterCard) allowed for high scale, efficient central platforms at a broad set of institutions
- **Legacy chequing infrastructure is** well established and on a relatively slow decline path; exhibiting scale effects
- **The high-tech sector** has historically driven innovations in payment services (e.g., network computing, ATM systems); now it may provide the next wave of innovations (e.g., digital wallets, ecommerce)

Implications for financial inclusion

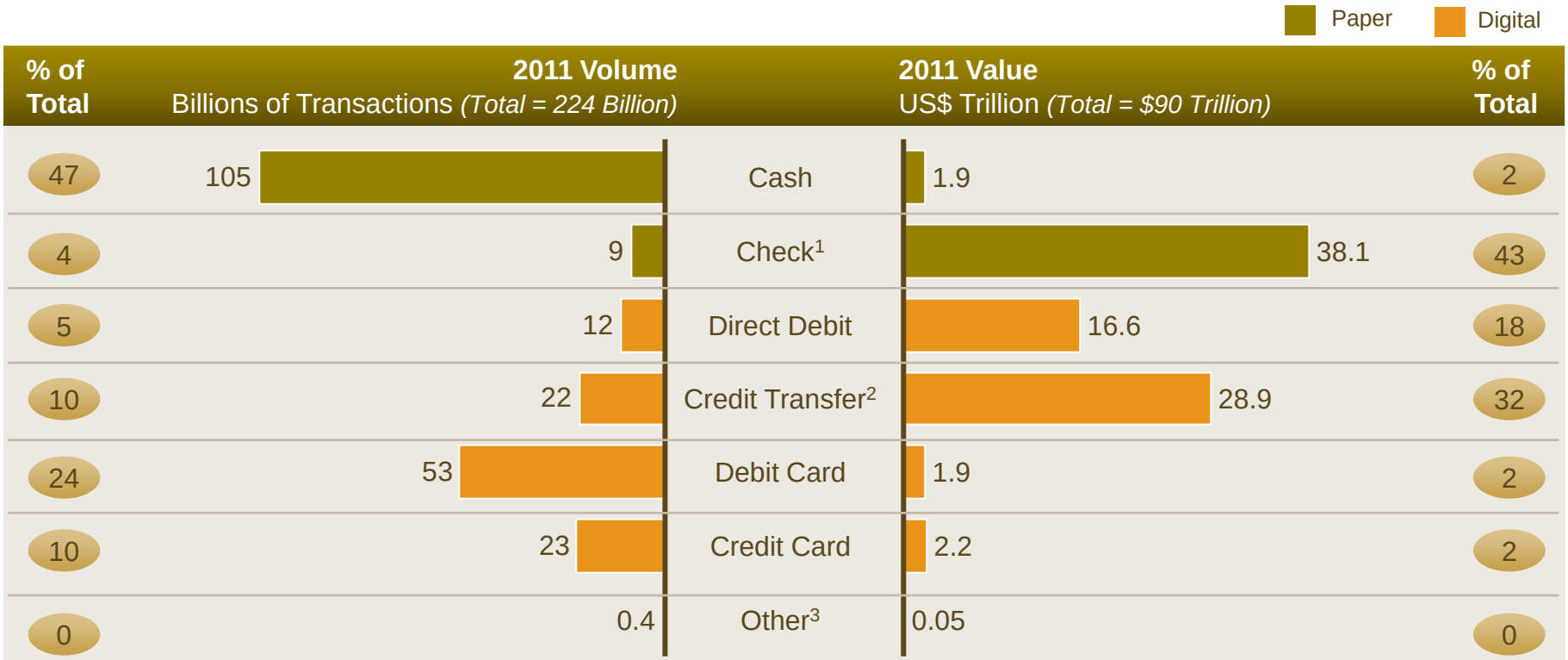
- **A market-driven, profit seeking** payments industry produces innovations that expand access (e.g., online banking, P2P payments), but also drives high prices to low-income consumers
- **Regulatory intervention focuses mostly on consumer protection** and overall system stability (e.g., Card ACT, CFPB) to correct market behavior; but it is not focused on systems solutions (e.g., mobile money strategy)
- **The U.S. has been a source of multiple innovations** with broad global impact on financial inclusion (e.g., bankcard networks, ATMs, e-commerce, mobile POS)
- **Consumer education and financial literacy** hold significant potential to improve outcomes for low-income consumers by strengthening cost-benefit decisions across instruments and providers

Payments in the United States by the numbers

Usage & Inclusion	Instrument usage	**High usage of digital payments and cheques** ▪ Market has rapidly adapted digital payments, particularly bankcard-based, with high paper-cheque usage ▪ Percentage digital payments: 64% of C2B, 7% of C2C, 64% of B2C
	Financial inclusion	**High: Broad reach and deep infrastructure provide wide access to system, though price remains an issue** ▪ Formal access: 88% of population has access to bank account, 82% of bottom 40%; 72% have access to debit cards ▪ Main issues with access involve fee levels and pricing for low-income consumer products and credit-driven models
Payment system	Network infrastructure	**Centralized, scale platforms** ▪ Major clearing & settlement occurs through established, high-scale clearing centers that are dependable and efficient ▪ Core platform technology capabilities are aging (e.g., less flexible than newer systems); reliability is extremely high
	Regulation	**Highly capable** ▪ Led by Federal Reserve, U.S. Treasury, and other bank regulatory agencies, the U.S. exhibits deep and capable regulatory and oversight structures; priorities tend to center on controlling illegal activity and consumer protection
Environment	Banking system reach	**High-reach, distributed: market has leading rates of branch, ATM, and POS access** ▪ Branches -- 36 branches per 100K (~120,000 total) ▪ ATMS – 174 ATMs per 100K (~418,000 total) ▪ POS – 2,156 per 100K (~5.4 MM in 2011) ▪ Online banking – 80% of banked customers
	Mobile & telecoms	**Established** ▪ Strongly growing market for telecommunications services, high smartphone adoption, one of largest markets in the world ▪ Mobile users: 83% of adult population has mobile phone; 80% have access to Internet
	Other market infrastructure	**High** ▪ Strong core infrastructure foundation across all elements, e.g., electricity, transport, delivery
	Economic environment	**Upper income** ▪ Nominal GDP: $48,261 / capita – U.S. is the 14th most affluent country in the world. GINI coefficient of 45 in 2007
	Demographics & geography	**Highly urban, middle-age population** ▪ 84% of population lives in urban areas; 16% in rural areas ▪ Moderate population growth for large, affluent market, driven mainly by immigration

SOURCE: Findex Global Database, FDIC report on low income consumers; CIA Fact Book; World Bank

The US payments system is largely digital, although cheques account for 30% of value, and cash is used in half of all transactions



- Payments system is mostly digital with two-thirds of transactions digital of some sort
- Cheques still account for almost a third of payment value but intermediation has become more efficient as cheque imaging has allowed cheques to become digital
- Cash remains the most popular payment instrument by number of transactions but mostly accounts for small-value transactions at point-of-sale

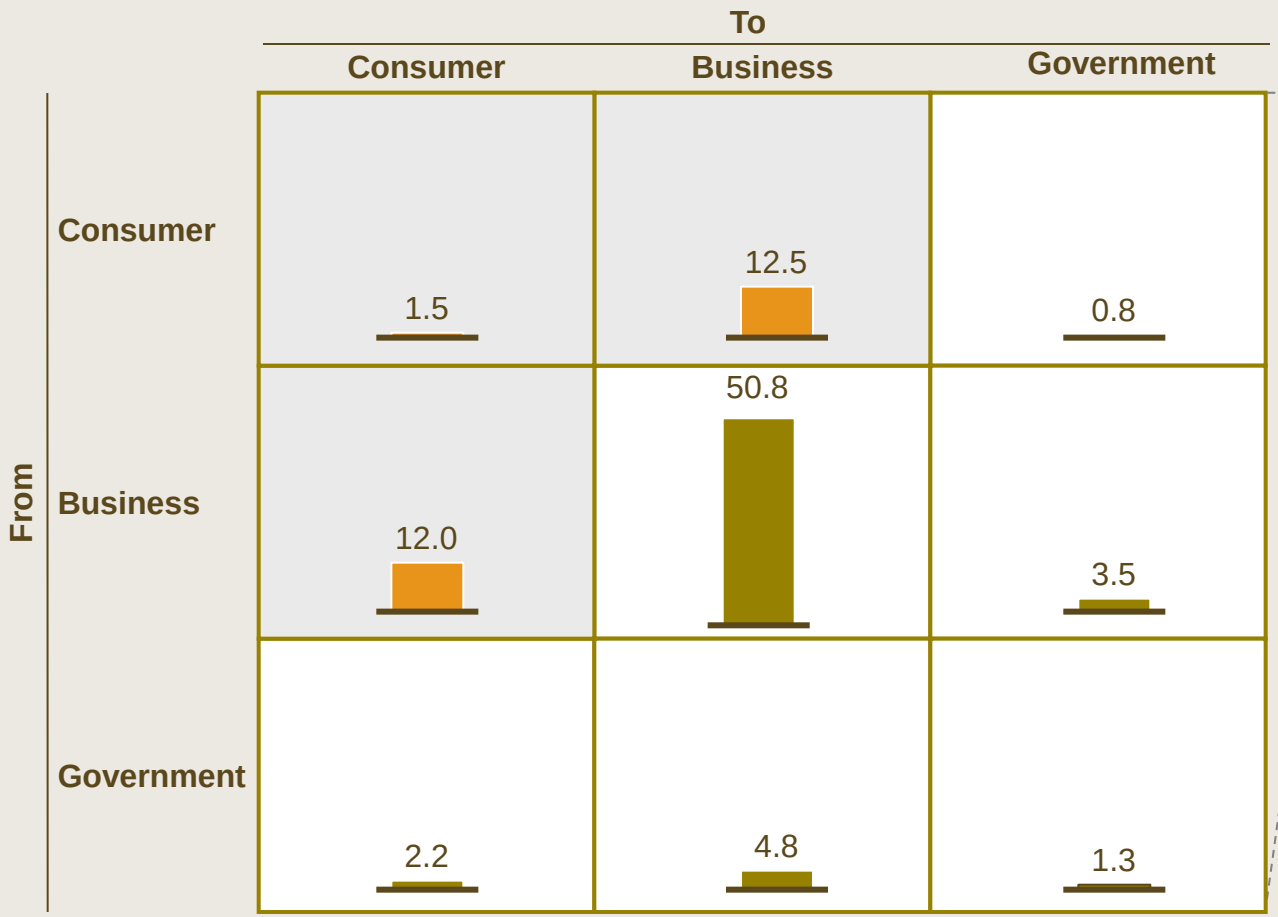
1 Reflects cheques paid, not cheques written. Cheques converted to ACH are counted in ACH. This convention is used throughout.
2 Includes WIRE and ACH. Excludes the majority of wire transfer dollars in an effort to approximate customer payments activity rather than FI settlement.
3 Includes deferred payments services (e.g. BillMeLater), book entry transfers, and cell phone/other bill charges

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012

The transactions most strongly impacting U.S. consumers account for about $26 trillion of payment flow

Area of focus

US trade payments by transaction parties, 2011
US$ Trillion



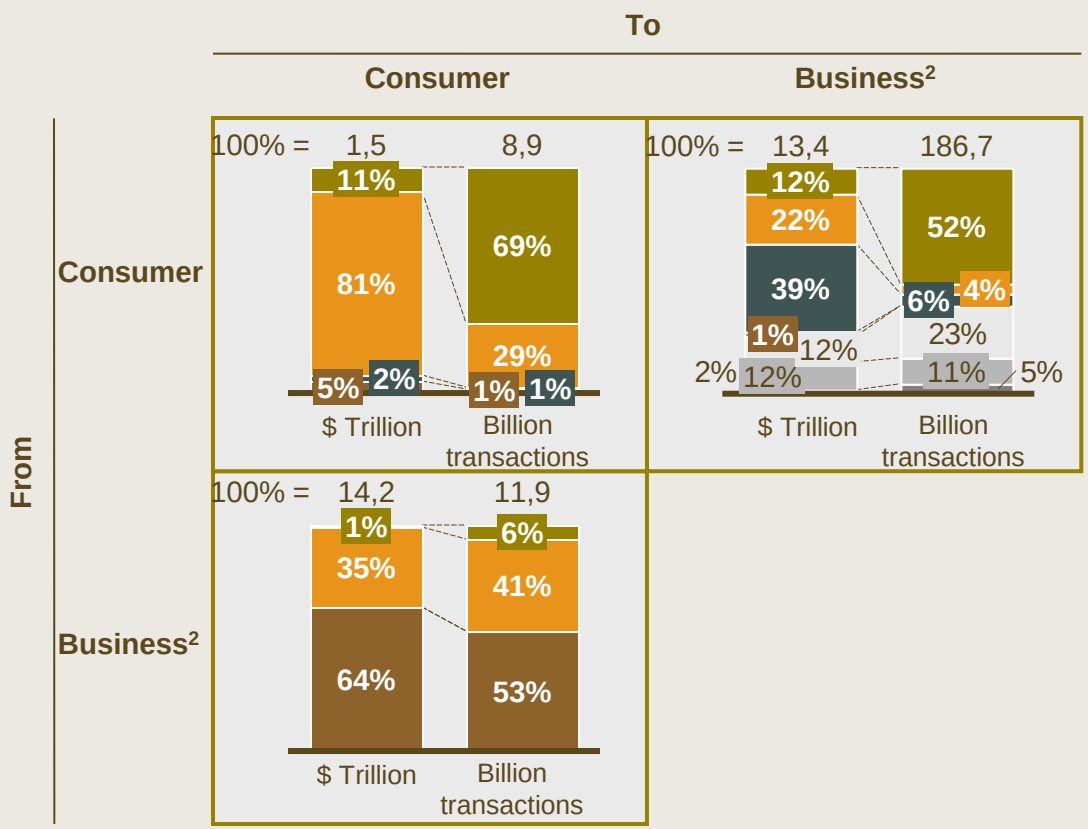
Total trade payments by value, 2011
US$ Trillion

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012, The Clearing House, Federal Reserve

Cheques are important in all transactions from and to consumers; cash, cards, direct debit, and credit transfers also play important roles

$ = High value (>20% use)
# = High volume (>20% use)

US trade payments by transaction parties, 2011
Value in US$ Trillions, Transactions in Billions



Major instruments used by transaction type

	C2C	C2B	B2C
Cash	#	#	$#
Cheque	$#	$	$#
Direct debit		$	
Credit transfer			$#
Debit card		#	
Credit card			
Prepaid card			
EMT[1]			
Mobile			

1 Includes money transfer services such as Western Union, and Moneygram.
2 Includes both business and government payments.

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012, The Clearing House, Federal Reserve

Financial inclusion in the United States

Overall financial inclusion performance: high

Percent with an account at a formal financial institution (Top 20%)

- Overall -- 88%
- Bottom 40% -- 82% have access to financial accounts
- Women -- 84% have formal financial accounts

Payment services access (Top 20%)

- Debit card access -- 72%
- Credit card access -- 62%
- Wages received in formal account -- 51%

Distribution access (per 100,000 people) (Top 10%)

- Bank branches – 36
- ATMs -- 174
- POS terminals -- 2,156
- Online access – 84% of population
- Mobile access – 88% of population

Additional comments:

- U.S. has high access to financial services, putting it in the top 20% of countries, but below average for high income OECD countries and Western Europe (i.e., 90% with a formal financial account)

Key takeaways

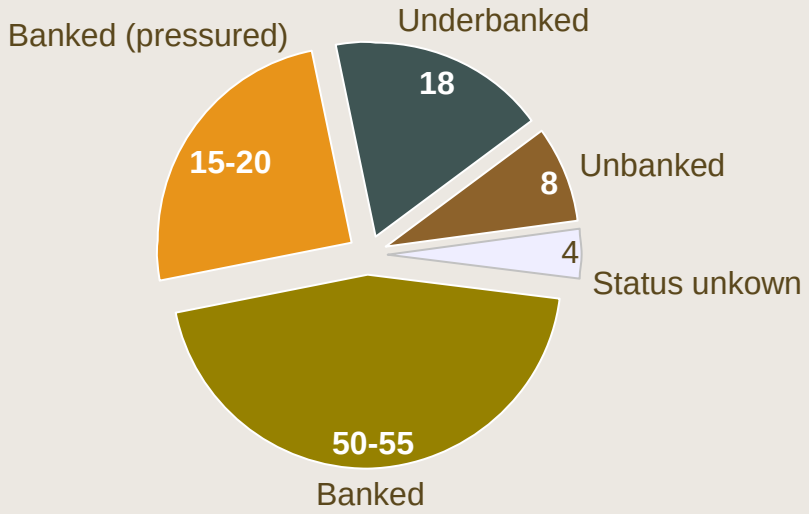
- **Wide reach and coverage** of financial system provides services to a broad set of consumers, largely riding on infrastructure and distribution built for more affluent consumers – poorer users can be priced out
- **Unbanked consumers largely choose to opt out** of the financial system, usually because of high, unpredictable fees from formal providers, low account balances, and irregular service needs
- **Non-prime credit is often linked to payments products for low-income users**, providing an adjacent revenue stream to ensure profitability
- **The market-driven system** often levies high fees on low-income consumers (maximizing willingness to pay); regulators often police fees and consumer protection
- **Financial literacy** is a major issue; low-cost products exist, yet customers have issues in (i) knowing about them and (ii) making informed long-term cost-benefit decisions

SOURCE: Findex Global Database, FDIC report on low income consumers

Roughly one-quarter of U.S. households are unbanked or under-banked

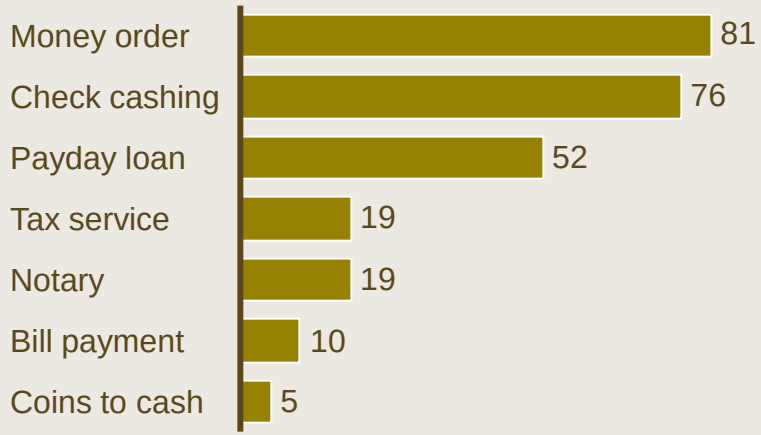
About 1/4 of households are underbanked or unbanked…

Banking Status of U.S. Households
Percentage



…although they can be active users of alternative financial services

Product usage frequency within 12 months
Percent of current sample customers who used product or service at least once[1]



Comments

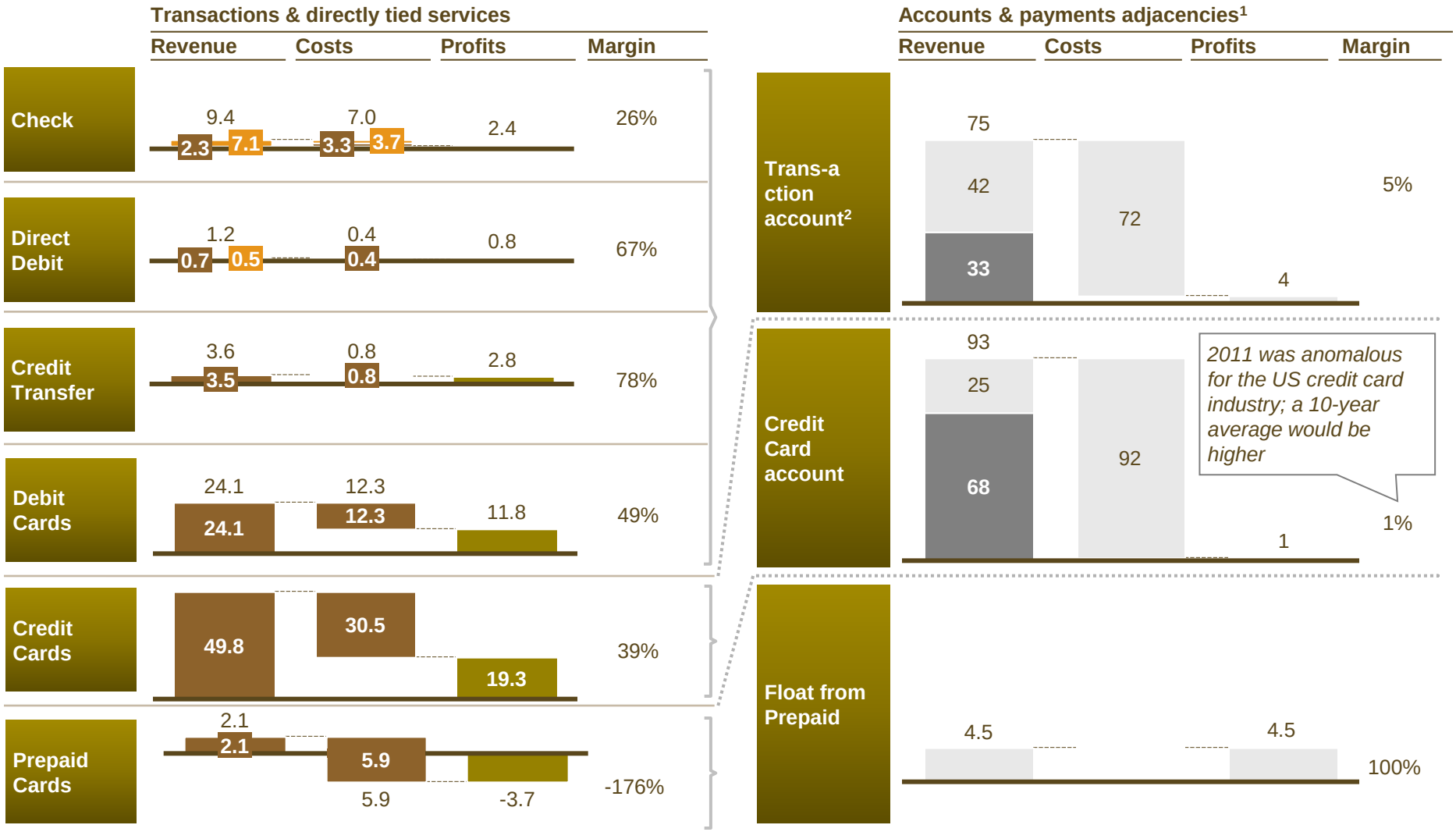
- Approximately half of the unbanked have previously had bank accounts but no longer have them – many have been pushed into financial stress and would re-establish accounts when stabilized
- Lack of money, no perceived need, and high fees are the top three reason that unbanked and underbanked cite for not having bank account
- Convenience and security are two drivers for unbanked to retain mainstream financial services
- Traditional branch operations (e.g., cost, atmosphere) have impeded penetration of these segments
- Quality and sustainability of financial services are the main needs for the U.S. market; innovation is critical

SOURCE: FDIC report on U.S. unbanked and underbanked, December 2009, customer focus groups

Revenue stream: Transaction | Related | Other revenue | Net interest income

Providers make profits from transaction fees and linked revenue streams; adjacency income is small in today's low rate environment

USD Billions, 2011



1 Includes penalties, maintenance fees and net interest income. Note that additional revenue, not included, comes from cross-selling. Both revenues and costs related to cash are also excluded; 2 Known as a Direct Deposit Account DDA in the US

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012, Federal Reserve, Public Reports, McKinsey ACH, Check, WIRE benchmarks

Banks, who bear risk and own retail relationships, earn highest profits; card networks profit more modestly from a coordination role

Profit from payments and immediately adjacent businesses, 2011 USD billions

		Creditor bank	Creditor-side processors	Infrastructure & Network: LVTS	Infrastructure & Network: ACH	Infrastructure & Network: CCS	Card network	Debtor-side processors	Debtor bank
Transaction account	Check	0.26	0.09			0.03		0.01	2.03 X
	Direct debit	0.87	<0.01		<0.01			<0.01	-0.04
	Credit transfer	1.22	0.01	<0.01	<0.01			0.02	1.59
	Debit card	-0.84	0.72				2.72	0.98	8.20 X
	Adjacencies								3.61 R
Credit card	Trans-actions	-0.53	0.36				2.98	0.51	22.63 R
	Adjacencies								-12.74
Prepaid card	Trans-actions	-0.12	0.08				0.30	0.00	-1.97
	Adjacencies								2.55 X
	Total profit[1]	$0.86	$1.27	$<$0.01	<$0.01	$0.03	$6.00	$1.53	$25.86

What drives profitability?

R Bearing risk

C Coordination role

X Retail relationship

< 0

0 – 2

2 – 10

10 – 20

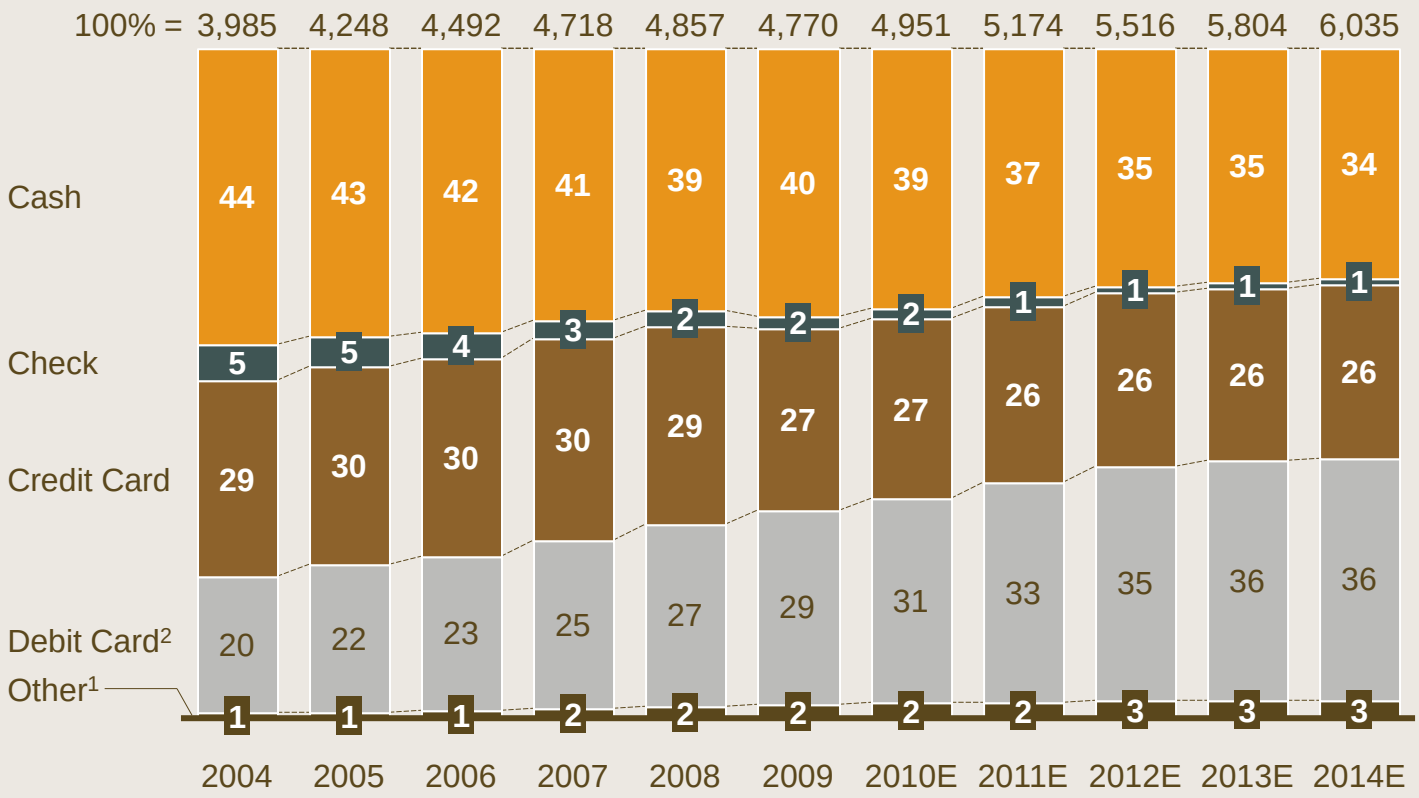
> 20

1 Costs and revenues associated with cash not included

SOURCE: McKinsey U.S. Payments Map Release Q1-2012; Expert Interviews

Credit and debit card use for POS purchases has been increasing at the expense of cash, and growth is expected to continue

Share of C2B POS Purchase Volume[3]
Percent, Billions USD purchases



- Cash volumes will hold steady or increase as total POS spending increases
- POS check volume will further decline in coming years, while check will remain a major instrument for other C2B payments (e.g., rent, utilities)
- Credit will grow strongly, while losing share to debit payments
- Debit will see rapid overall growth and share gains

1 Includes wire transfer and book entry transfers; 2 Includes signature debit, PIN debit, prepaid

SOURCE: McKinsey U.S. Payments Map 2009-2014, Release Q2-10, Baseline scenario

Businesses pay the bulk of fees for all payment instruments, while consumers pay nothing

Transaction fees by instrument[1,2]
$/transaction

Merchant transaction fees per dollar transacted, BPS

Description of fees

	Net	Gross	BPS	Description of fees
Check	0.10	0.19	0.8	▪ Consumer fees are negligible at transaction level ▪ Merchant pays majority of check transaction fees to both issuer and creditor banks
Direct Debit	0.06	0.07	0.4	▪ Consumer pays no fee at the transaction level ▪ Merchant pays the majority of the fees to the creditor (originating) bank
Credit Transfer	0.39	0.41	0.9	▪ Consumer pays fees for originating WIRE transfers (rarely used) but ACH fees are negligible ▪ Merchants pay for originating WIRE and ACH transactions
Debit Card[2,3]	0.54	0.70	140	▪ Consumer pays no fee at the transaction level ▪ Merchant pays value-dependent transaction fees to acquiring banks. This is lower for debit cards than for credit cards ▪ Internal: Acquiring bank pays a per-transaction value-dependent fee to issuing bank and network. Banks also pay processors per transaction
Credit Card[2,4]	1.81	2.08	232	
Prepaid[5]	0.35	0.46	123	▪ Consumer pays no fee at the transaction level. Not shown are user maintenance fees to get a card that average ~$0.50 per transactions ▪ Merchant pays transaction fees to acquiring bank, which pays part to the issuing bank and part to the card network ▪ Internal: Acquiring bank pays a per-transaction value-dependent fee to issuing bank and network. Banks also pay processors per transaction

0 0.5 1.0 1.5 2.0 2.5

1 System and other internal fees are paid by banks or others to networks or other payments service providers, redistributing fees directly paid by users; 2 For cards, banks also pay an annual licensing fee to the card network. This averages to $0.02 for debit cards, $0.06 for general purpose consumer cards and $0.2 for general purpose prepaid cards; 3 Weighted average of PIN and signature debit; 4 General purpose consumer credit card; 5 General purpose prepaid cards

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012, Federal Reserve, Public Reports, McKinsey ACH, Check, WIRE benchmarks

Acceptance of, and access to, most instruments is widespread, facilitating consumer choice

C2B TRANSACTIONS

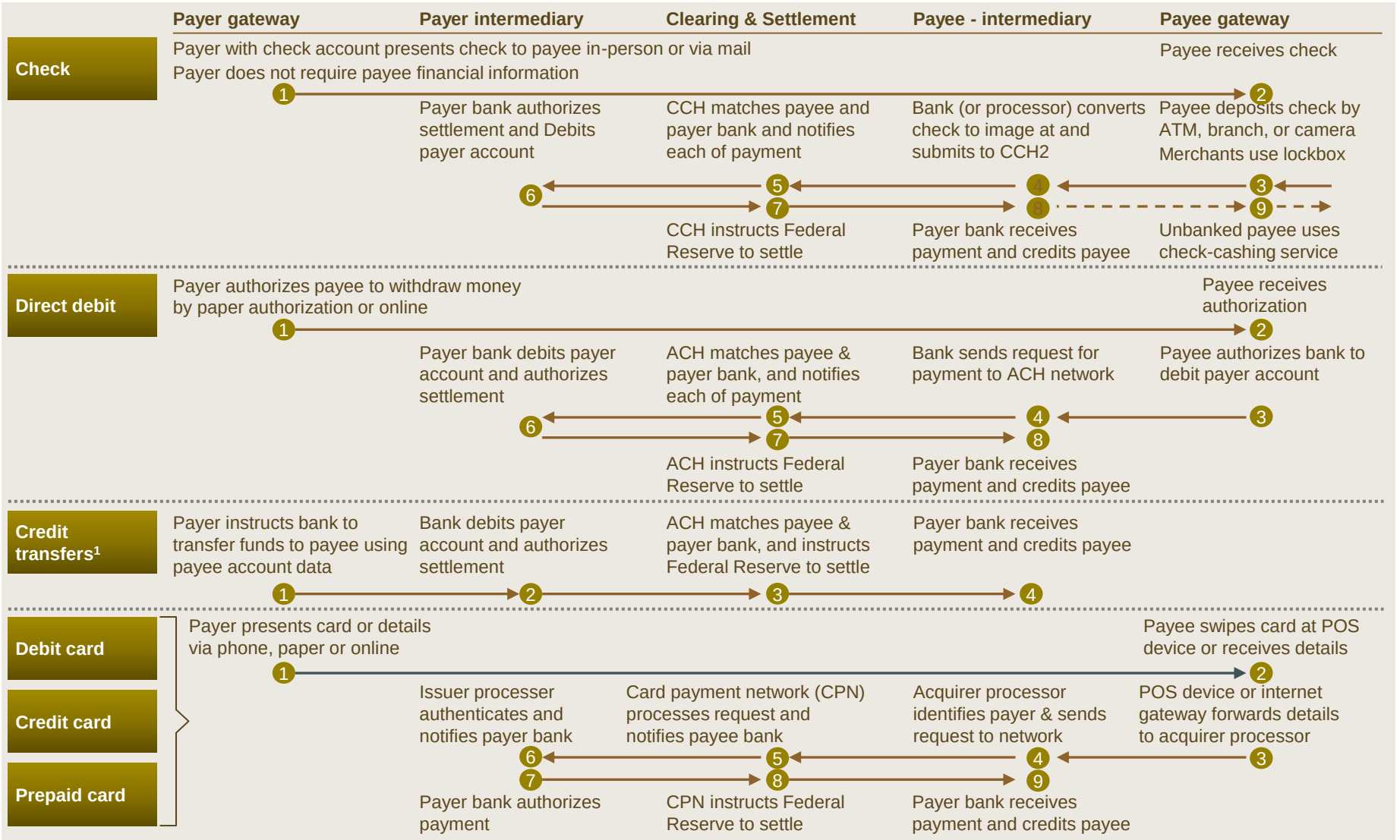
	Consumer						Merchant					
	Requires Bank Acct	Direct Fees (USD)	Indirect Fees (USD)	Benefits	Merchant Accept. (%)	Actual Use (Vol, %)	Consumer Access (%)	Requires Bank Acct	Direct Fees (USD)	Indirect Fees (USD)	Benefits	Sample use cases
Cash		-	▪ 6.00 (off-bank withdrawal)	▪ Accessible ▪ Ubiquitous	100	52	100		0.02	▪ 0.12 (labor)	▪ Ubiquitous ▪ Immediate	▪ In-store ▪ COD
Check	✓	-	▪ 0.45 (stamp)	▪ Convenient for large txs ▪ Float benefit	90	4	99	✓	0.10	▪ 0.32 (cashing, float)	▪ Convenient for large txs ▪ Widely used	▪ Bills ▪ In-store ▪ Remittance
Direct Debit	✓	-	▪ -	▪ Convenient for large txs	N/A	6	99	✓	0.06	▪ 0.05	▪ Convenient for large txs	▪ Bills ▪ Online purch.
Credit Transfer	✓	-	▪ -	▪ Convenient for large txs	N/A	-	99	✓	0.39	▪ 0.01	▪ Convenient for large txs	▪ Large purchases ▪ Remittance
Debit Card	✓	-	▪ -	▪ Convenient to carry	90	23	72	✓	0.54	▪ -	▪ Direct credit ▪ Minimizes cash handling	▪ In-store ▪ Online purch. ▪ Bills
Credit Card	✓	-	▪ -	▪ Float and liquidity benefit	90	10	62	✓	1.81	▪ 3.71 (losses, collections, customer serv)	▪ Direct credit ▪ Minimizes cash handling	▪ In-store ▪ Online purch. ▪ Bills
Prepaid		~5-10 / month	▪ Card purchase (~4.95)	▪ Accessible	90	5	100	✓	0.35	▪ -	▪ Direct credit ▪ Minimizes cash handling	▪ In-store ▪ Online purch. ▪ Bills
Mobile		N/A	▪ N/A	▪ N/A	N/A	N/A	N/A		N/A	▪ N/A	▪ N/A	▪ In-store ▪ Remittance

1 Depends on merchant size

SOURCE: Expert interviews, World Databank, Bankable Frontier Associates, CBK, EFInA

Distinct processes and combination of players underpin each transaction type

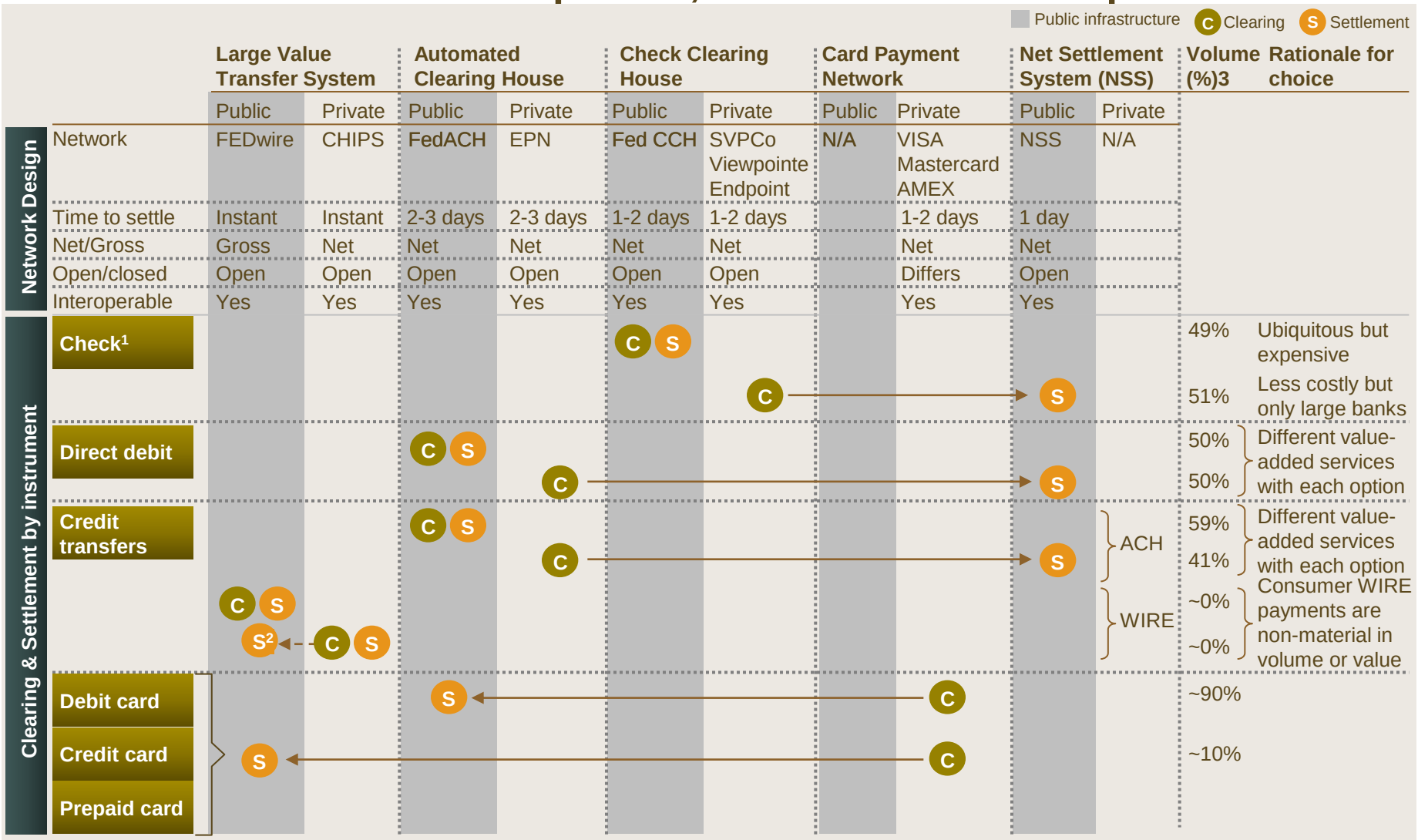
SIMPLIFIED



1 WIRE payments not shown due to small WIRE volumes for consumer payments. 2 At this stage some checks are converted into an ACH payments.

SOURCE: BIS CPSS Red Book, “Payment Systems” – Rambure & Nacamuli

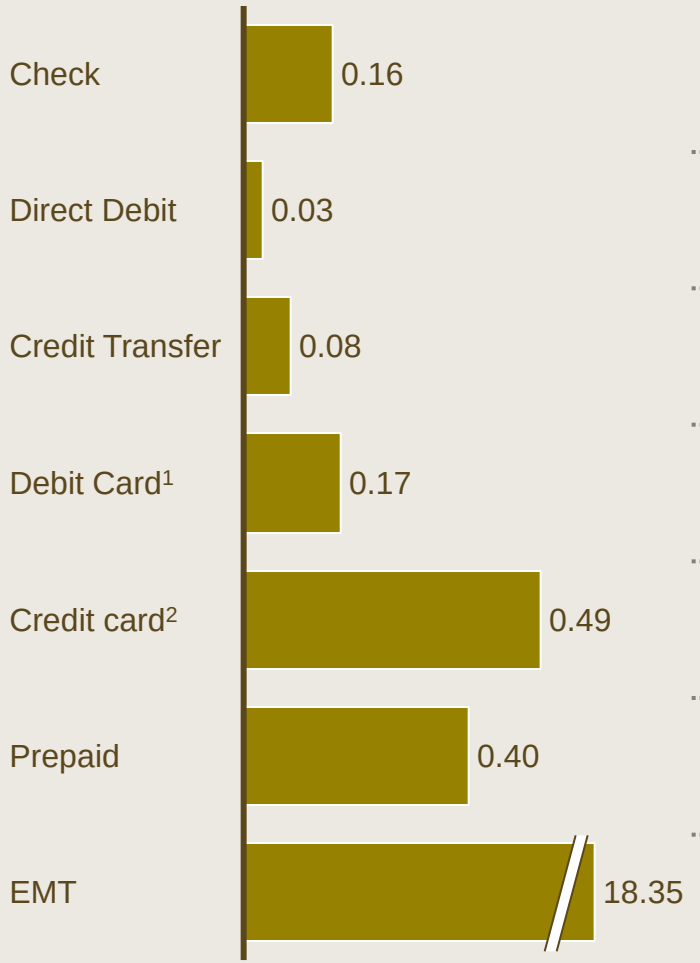
Both public and private networks play a central role in clearing across all instruments except card, where networks are private



1 Excludes a small percentage of checks that are cleared bilaterally or through correspondent banks; excludes ARC transactions.
2 Transactions cleared through CHIPS are settled instantly through correspondent accounts at the New York Federal Reserve, end-of-day balances are settled via FEDWire.
3 Estimated based on 2010 figures; WIRE represents all WIRE transactions including non-trade payments; Card payments are rough estimate.

SOURCE: BIS CPSS Red Book, "Payment Systems" – Rambure & Nacamuli

Per-transaction costs to provide payments are smaller for remote instruments



Cost per dollar transacted, BPS	Drivers of cost
1	▪ Level of digitization in the check system ▪ Economies of scale
<1	▪ Level of digitization in the gateway system ▪ Economies of scale
<1	▪ Level of digitization in the gateway system ▪ Degree of high-touch customer service ▪ Economies of scale
43	▪ Customer service ▪ Fraud management/compliance ▪ Economies of scale
63	▪ Collections ▪ Overhead and compliance ▪ Economies of scale
141	▪ Distribution ▪ Economies of scale
568	▪ Size of required agent network

1 Weighted average of PIN and signature debit
2 Credit card loan losses are not included, but amount to ~40% of total operating costs

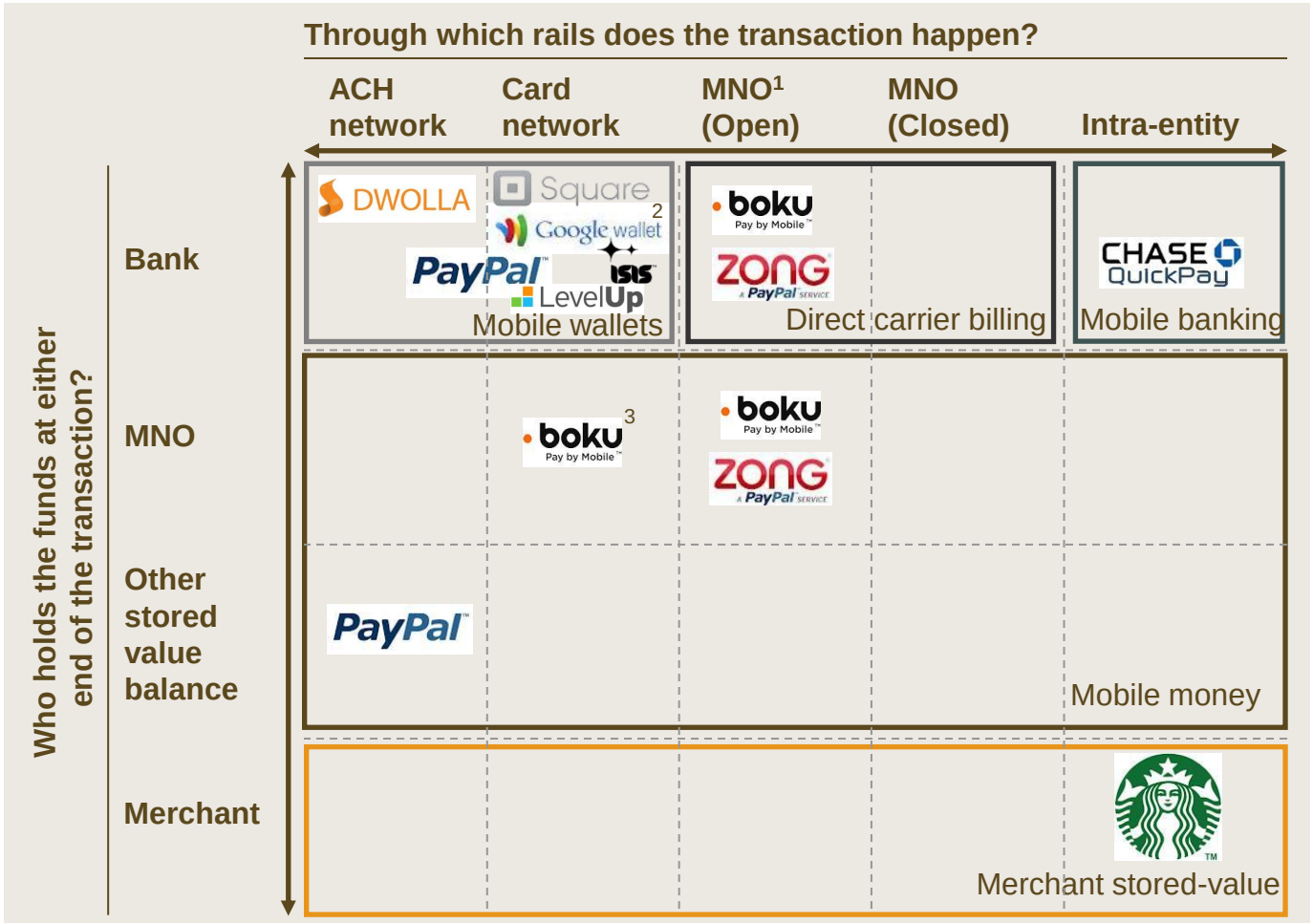
SOURCE: McKinsey U.S. Payments Map, Release Q1-2012, Federal Reserve, Public Reports, McKinsey ACH, Check, WIRE benchmarks

Networks bear only a small fraction of transaction cost across instruments

Distribution of transaction costs across players
Indexed to 100% for each instrument

SOURCE: McKinsey U.S. Payments Map, Release Q1-2012; Expert Interviews

The high-tech sector is driving innovation in payments involving mobile phones, most of which ultimately rely on traditional networks (ACH and card) and banks



Services not relying on AHC/card networks

- Closed-loop 'mobile payments' methods such as Chase QuickPay and Starbucks keep transfers in-house since they do not need to transfer funds between entities
- Only the MNO-supported 'mobile payments' methods rely on alternate funds transfer methods, and only where regulation permits

1 Mobile Network Operator; 2 Has begun to shift away from relying on MNOs and towards 'the cloud'; 3 Developing card-based MNO funds transfer

SOURCE: Expert interviews

Payments using mobile wallets differ most in how payment credentials are transmitted in order to initiate the money transfer

C2B TRANSACTIONS

PayPal	Transaction information and login credentials are securely transmitted over a regular data network (e.g., 3G). Payment credentials are extracted form account and payment is initiated through ACH/CPN
Square	Smartphone dongle gathers and encrypts payment credentials to transmit over a regular data network, payment is initiated through CPN
Google wallet	NFC transmits payment credentials to payment terminal or user ID information is routed over data network to 'cloud', where transaction is processed through CPN
ISIS	NFC transmits payment credentials to payment terminal, where transaction is processed through CPN
DWOLLA	Transaction information and login credentials are securely transmitted over a regular data network (e.g., 3G). Payment credentials are extracted form account and payment is initiated through ACH
LevelUp	Transaction information and user ID (through a QR code) are securely transmitted over a regular data network (e.g., 3G). Payment credentials are extracted form account and payment is initiated through ACH

SOURCE: Expert interviews

Five major milestones of the U.S. payment system

	Description	Impact on Financial Inclusion
1 Creation of Federal Reserve	▪ Establishment of Federal Reserve System (1913) created foundation for monetary policy, centralized inter-bank payments and check clearing infrastructure, as well as anchoring payment system regulation and oversight structures alongside the U.S. Treasury	▪ National clearing infrastructure allows banks to expand payment services and increases reliability of payment among consumers and businesses
2 Formation Of Visa / MA	▪ Formation of BankAmericard program (1958) set in motion Visa network as non-profit association marked new access to common infrastructure that allowed economies of scale, as well as changed the focus of competition among banks	▪ Provided core infrastructure and allowed banks to drive product innovation on top of this system (e.g., debit card, credit card, prepaid card, ATM switching)
3 ATM & Bankcard Infrastructure	▪ First ATM machine deployed (1959) in Ohio, sparking a surge of usage across the U.S. and in international markets by providing 24/7 cash access outside of traditional bank branches	▪ ATM channel has been primary cash-access channel for consumers with increasing functionality
4 Check 21 Act	▪ Check 21 Act (2003) marked pivotal shift in digitization of paper check clearing by allowing institutions to image paper checks. It did not require conversion, but banks adopted due to cost savings and operating efficiency gains	▪ Enabled ATM channels to accept check deposit, expanding functionality in primary channel ▪ Accelerated clearing times and allowed cost savings for banks
5 Financial Crisis Regulation	▪ Collection of banking regulation (2010) substantially impacts requirements and pricing on multiple consumer payment products – debit cards, DDA, credit card – reducing fee income but effectively ending ‘free checking’ in the U.S.	▪ Multiple impacts, including creation of Consumer Financial Protection Bureau and increased transparency, but spurred fee hikes as banks sought to adjust

SOURCE: Federal Reserve of Atlanta, NACHA, “Payment Systems” – Rambure & Nacamuli

Despite significant innovation in U.S. payments, check and cash retain their historic dominance (1/2)

	Pre-1950	1950-70	1970-1990	1990-present
Cash	▪ Federally issued bank-notes and coins are widely used at POS spurred by creation of Federal Reserve and Civil War era banking laws		▪ Following its invention in 1969, ATM's are rolled out by large banks ▪ Shared ATM networks develop as local banks cooperate regionally	▪ ATM's continue to grow, as smaller banks and non-bank roll out ATM infrastructure incentivized by ATM fees
Check	▪ Dominant form of non-cash payment in the US ▪ Initial growth promoted by restrictions on interstate banking and suppression of bank notes during Civil War ▪ Branch banking restrictions and spread of railroads and telegrams, enable establishment of correspondent banks and, later, central clearing houses (e.g., NY Clearing House (1853)) resulting in significantly lower costs ▪ Formation of Federal Reserve national clearing house (1913) ends practice of discounting by refusing to clear checks from nonpar banks	▪ Volumes grow substantially as post-war prosperity enhances access to check accounts for households ▪ Establishment of standards such as Magnetic Ink Character Recognition in 1956 (led by BofA) led to drop in processing costs & time	▪ High interest rates in 1980's spur growth through benefit of float for payers ▪ Monetary Control Act, lowers system clearing costs but forces Federal Reserve to charge banks for their clearing services ▪ EFAA in 1987 clears legal obstacles to returns and sets standards for funds availability	▪ Prompted by 9/11 and ongoing cost reduction efforts by large banks, Check 21 legislation is passed allowing check image to replace physical check in processing, spurring innovations such as camera deposit ▪ Clearing houses merge to lower costs with declining volumes ▪ Other innovations such as ARC processing allow checks to be converted in direct debit transactions leading to lower cost ▪ With check imaging several low-cost image clearing houses emerge e.g., SVPCo from TCH

SOURCE: Federal Reserve of Atlanta, NACHA, "Payment Systems" – Rambure & Nacamuli

Despite significant innovation in U.S. payments, check and cash retain their historic dominance (2/2)

	Pre-1950	1950-70	1970-1990	1990-present
ACH		▪ In 1968 large banks form ACH's run by local Federal Reserve banks in an effort to replace checks and reduce interbank clearing costs ▪ NACHA formed in 1974 to standardize ACH rules, standards and procedures	▪ The Clearing House forms the first electronic ACH, NYACH, in 1975 to lower costs of regional ACH;s ▪ Regional public-run ACH's consolidate into single national ACH ▪ Government begins use of ACH for payrolls and social security	▪ Consumer solutions such as online bill-pay develop in the early 1990's and begins rapid growth with the support of large banks and merchants ▪ EPN expands nationally and drives down cost of ACH
Cards	▪ Small use of private-label charge cards are used for applications	▪ Diners Club issues first general purpose charge card in 1950 ▪ BofA releases first credit card in 1958 in Fresno, Ca ▪ First card payments networks emerge in late-1960's to enable inter-operability across states	▪ Despite restrictions on card mailings, penetration rises nationally encouraged by inter-state banking restrictions	▪ Online bill-pay develops in the early 1990's and begins rapid growth with the support of large banks
WIRE & NSS	▪ FEDWire created in 1918 to allow settlement of check balances in gold between Federal Reserve banks; also allowed Federal Reserve to settle accounts rather than require banks to ship cash to settle payments	▪ 9 large banks form CHIPS to compete with FEDWire and replace high value checks for securities settlement with lower liquidity and credit restrictions	▪ Foreign banks join CHIPS offering clearing and settlement to international institutions through CHIPS accounts ▪ CHIPS membership grows to 140 banks	▪ Large banks begin to offer smaller institutions access to CHIPS through correspondent banking services

SOURCE: Federal Reserve of Atlanta, NACHA, "Payment Systems" – Rambure & Nacamuli