MARKET PLATFORM DYNAMICS

Payments Innovation and the Use of Cash*

Will Cash Really Die – and if so When?

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People have been predicting the death of cash for at least the last 60 years – maybe more. It started in earnest when the plastic credit card was introduced back in the 1950's. That seemed to uncork an avalanche of opinions about not whether cash would disappear but when. This paper presents 6 observations about why cash won't die, or at least not any time soon. These observations are based on work done by Market Platform Dynamics which resulted in an entirely new methodology for measuring the use of cash as a payment method.

THE END OF CASH … OR IS IT?

People haven't been predicting the death of cash for nearly as long as they've been predicting the end of world, but both groups are equally convinced that they have irrefutable evidence to support their conjectures.

For instance, in 1524, a group of London astrologers predicted the world would end by a giant flood, based on calculations they made the year prior. They were so convincing that 20,000 Londoners left their homes and headed for higher ground. When 1524 came and went, those same astrologers backtracked a bit, saying that they had discovered an error in their calculations and revised their end of the world prediction date to February 1, 1624. Some 388 years later, I guess we're still waiting.

Now, let's take cash.

People have been predicting the death of cash for at least the last 60 years – maybe more. It started in earnest when the plastic credit card was introduced back in the 1950's. That seemed to uncork an avalanche of opinions about not ***whether*** cash would disappear but ***when***. Even as recently as a year ago, pundits, including a former US Secretary of Labor and a journalist who devoted an entire book to cash-bashing called *The End of Money*, have gone on record saying that they are dead certain that cash will go the way of the buggy-whip and the manual typewriter – very soon. But, perhaps cognizant of the prognosticators of centuries ago, they have stopped short of announcing the exact date and time that it would happen.

So, that brings us to the question of today and a topic of conversation around the payments industry worldwide - will cash die, and if so, how long will it remain alive? And if it does die, where will it die first and who will be the last to hold on, tightfisted, to their paper currencies - refusing to accept the notion that the world has proclaimed it as useful for payments as vinyl records are for listening to recorded music?

Those are the questions that will be addressed in this piece, based on work that was done by our firm over the last year. This work took a very careful look at cash usage historically, and created a methodology for measuring its usage by people to pay for things accurately. The result is a brand new methodology and framework for projecting cash usage on a country basis into the future.

So, let's begin with the answer to the question – will cash die? For those of you who don't like having the answer until the very end, please feel free to skip ahead a few pages.

Cash isn't going to die – or not at least any time soon, in spite of the explosive growth of electronic payments, in spite of the bulls eye that it has on its back from players who want to see it dead and buried, and in spite of the convincing narrative that electronic payments pundits deliver.

We concluded this after looking at and interpreting a lot of interesting data in very new and different ways. The result is a number of interesting observations that support this assertion.

OBSERVATION NUMBER ONE. NO ONE ACCURATELY MEASURES HOW PEOPLE USE CASH TO PAY FOR THINGS.

As much as this may make the payments cards networks cringe, cash is the largest payments network on the planet- yet it is an orphan. No one really manages it as a global payments network. Sure, Central Banks and the Federal Reserve manage it for their respective countries. They print currency and track how much is in circulation. But hardly anyone measures how much cash consumers are using to pay for things. There is no global standard for how cash is reported, how it should be measured and therefore, how it is used. As a result, no one really knows how its usage for payments has changed over time or even what the differences are between countries. And, we found that what is reported isn't really all that useful in helping to answer the question. In fact, a lot of what is reported is, to use a 7-letter work, garbage.

Cash in circulation tells us absolutely nothing about how the American greenback is used by people in the US to pay for things and how that usage has changed over time. It's the same story everywhere else.

To do that, one has to look at things that measure the flow of cash. The best way to get info on that is to count how much cash people are taking out of the various places they can get cash to spend in year in a country.

Take for example the commonly used proxy for cash usage, cash in circulation. Cash in circulation measures the inventory of cash in the market – what is available for people to use or hoard. That last word—"hoard"—is important since two-thirds of the US dollar currency, much of it in denominations of $100 or more, is not even kept in the United States, and much of that is probably used for safekeeping and not spending. The same is true for the Euro. But, cash in circulation tells us absolutely nothing about how the American greenback is used by people in the US to pay for things in the US, and how that usage has changed over time. It's the same story everywhere else in the world.

To do that, one has to look at data sources that measure the flow of cash. The best way to get information on that is to count how much cash people are taking out of the various places they can get cash to spend in a country. That, obviously, helps to inform whether people are using cash, how much of it they are consuming and how quickly they are consuming it – its velocity. And, that starts with looking at the four outlets where cash is available to people:

- **Bank branches.** This is commonly referred to getting cash "over the counter."

- **ATMs** . The rapid deployment of ATMs and the wide-scale issuance of ATM/debit cards has helped to fuel the use of cash since it makes getting access to it much easier. Before ATMs, people had no choice but to stand in line at banks during normal banking hours and that made getting cash very inconvenient.

- **At the point of sale in stores.** In some countries like the US, consumers can get cash back from the cashier after paying for something using their debit cards.

- **From each other**. Sometimes people give each other cash as a gift – grandmothers or great aunts who like to put crisp bills in a card, to take one example. Some employers also may pay workers in cash off the books. This is often referred to as "cash recycling" and is quite hard to track. A study done by researchers at the European Central Bank, finds that this cash recycling amounts to about 15% of all cash in the several European countries they looked at.

There are two ways of looking at cash and they are related: *the share of spending* that consumers make with cash and *the total amount of cash* that consumers use in a country.

Cash usage can grow even if consumers use less cash simply because the economy is growing and

Amazingly, until our work, no one had ever organized information about cash into these categories, over time, and across countries, much less used it to calculate cash usage. So, not surprisingly, not every country has these data at their fingertips. Our team was a bit shocked to learn, for example, that the US has no data on cash taken out of bank branches and most countries don't have data for cash back at the point of sale. Some countries, like the UK, had pristine records, which make it easy.

But since this is the only way to measure cash used for payment, we devised a way to get or extrapolate the data in those cases where it was unavailable.

We conducted our analysis for 10 very diverse countries: France, Germany, Italy, Poland, Portugal, Sweden, Turkey, United Kingdom, and the United States.

We then used that information to help us understand historical cash usage – a baseline - that as you will see, also plays an important role in projecting future cash usage.

That work led us to our second insight.

OBSERVATION NUMBER TWO. OVERALL CASH USAGE CAN GROW EVEN IF THE SHARE OF SPENDING IN CASH BY CONSUMERS IS DECLINING.

There are two ways to look at the use of cash and they are related.

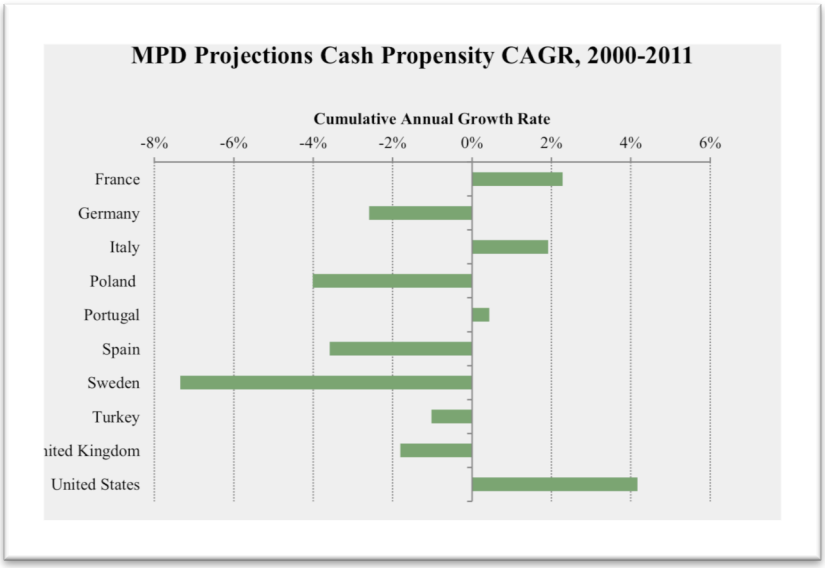
The first is the share of spending that consumers make with cash. We call that the "propensity of consumers to pay with cash" rather than electronic methods. You can think of it as the fraction of every 100 euros that a consumer uses cash to transact versus other methods, like credit or debit cards. So, this is the *slice of the pie* that is cash versus something else.

The second is the total amount of cash that consumers use in a country. This is influenced by the economic growth in a country which is highly correlated to consumer spending. We get this by multiplying total spending overall by the share of that spend done via cash. We refer to this as the total *size of the pie*.

Most people focus on the slice of the pie that is getting smaller as electronic methods increase in adoption. It's possible—and our research concludes this – that as a country's GDP grows, so does total spending, and therefore, so does total cash usage—just by virtue of having the pie grow larger. That happens because there are more people in a country, the country is growing and those consumers are spending more, overall.

With that as a backdrop, let's now take a look at the countries we studied to get a sense of how our methodology helped us understand the usage of cash by consumers over the last ten years.

Here's what we found.



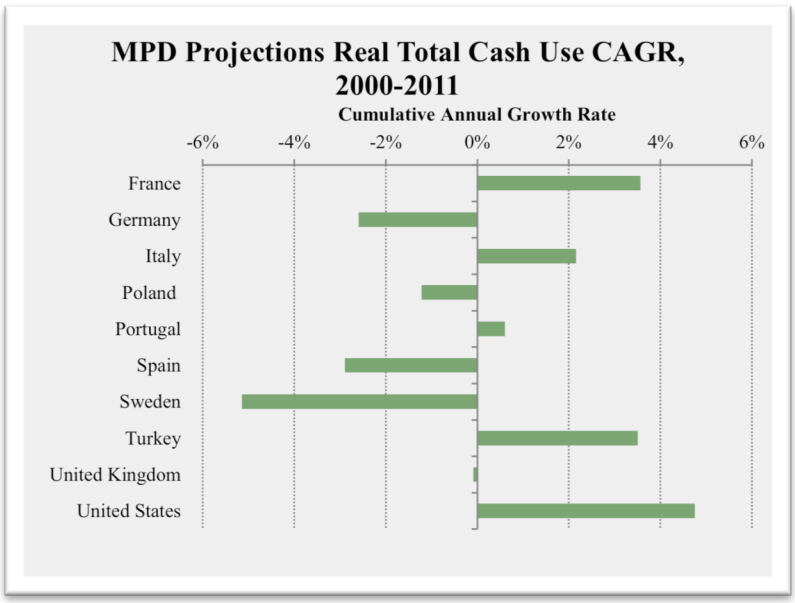
This chart shows the compound annual growth rates in the share of spending made with cash for the ten countries mentioned earlier – the slice of the pie.

As you can see, the slice of the pie related to the consumers' use of cash declined in six countries. Sweden had the biggest decline—more than 7 percent a year. But Germany, Poland, Spain, Turkey, and the UK also saw declines in the consumers' propensity to use cash, too.

But four countries actually saw an increase in the consumers' propensity to use cash, in fact that increase was more than 4 percent a year in the US and more than 2 percent in France. If we weighted this by GDP, the US and France really pull the average up and the propensity to use cash increases by 1.6%.

Now, let's look at the total size of the pie – total spending by consumers ***times*** the total use of cash.

This is where the story gets a bit different, but not dramatically so given the fact that the financial crisis really depressed overall growth in GDP/consumer spending between 2000 and 2011. For about half of that time, the world was in the middle of a financial meltdown, and that exerted downward pressure on consumer spending. In some countries, it still does.



When looking at cash usage thru this lens, the total size of the pie, now five countries – up one from four - shows an increase in total cash use. Turkey was added to the growth list. The UK goes from a decline to being about flat. Four countries still show the total amount of cash used for spending decline – with Sweden holding the top spot at more than 5% per year, along with Germany, Poland, and Spain.

So when looking historically, it certainly does appear that cash is on the decline in some countries. But other than Sweden, where it is almost, but not quite, against the law to use cash, it doesn't look like it is in a death spiral anywhere else in the world, up through 2011.

So, to this point at least, we have proven wrong those pundits several decades ago who said that cash would be on life support by the time we hit the 1990s. It is really anything but that.

But the past decade or so is a tale of two payment dynamics: a story about the increasing use of credit and debit cards, but one that also was pretty nice to cash. It became a lot easier to get cash because of the increased availability of ATMs – there is one literally on just about every corner in some cities. And, the financial crisis led many consumers to flee to cash as a safe harbor or just a better way to manage their spending.

But as we all know, the future is about mobile payments and contactless cards and efforts on the part of innovators to move us very quickly to using our phones or fingerprints or retinas to pay merchants and make cash irrelevant. There's a lot of intensity around these innovations and momentum that seems to

be pointing daggers right at the heart of cash. From the looks of it, these developments could surely spell the death of it.

To explore the future of cash, here is another important observation.

OBSERVATION NUMBER 3. THE FUTURE OF CASH WILL BE DETERMINED BY SEVEN INFLUENCERS THAT HAVE THE POTENTIAL TO PUT CASH AT RISK IN ANY GIVEN COUNTRY.

In order to be both methodical and comprehensive about what could affect the future of cash, we identified seven sources of influence that could directly impact its usage by consumers as a payment method. Those influencers are:

- **Governments** and their interest in and need to sustain cash, which will differ country by country. For instance, there could be efforts undertaken in countries to clamp down on the shadow economy thru tax policies that make it harder to shield cash from the taxing authorizes, like is being done in several European countries today.

- **Banks** and their interest in and cost to support cash. For instance, banks may make it easier or harder for customers to access cash based on their cost of handling it; some countries have also made it harder to access cash by eliminating the ability to get cash over the counter or by consolidating ATM networks.

- **Innovators** and the level of innovation in mobile and payments taking place in a country. For example, the adoption of innovation differs widely across countries and conditions for innovations and innovators varies based on the availability of capital and other factors.

- **Merchants** and their acceptance of electronic payment alternatives. For example, merchants have varying degrees of interest in investing in the point of sale equipment needed to enable new forms of payment acceptance and some countries may even lack point of sale acceptance equipment entirely.

- **Card networks** and their interest in accelerating the move away from cash. For example, networks may want to subsidize merchant or consumer acceptance of electronic alternatives in order to gain the revenues associated with electronic payments transacting.

In order to thoroughly assess the degree to which each influencer could drive interest for or against cash usage in each country, we identified particular factors for each influencer.

There are 35 such factors across all seven influencers that were fairly exhaustive and included everything from whether mobile payments initiatives getting traction in a country to government clampdowns on using cash to avoid taxes.

- **Consumers** and their interest in adopting non-cash payment alternatives. For example, there may be differing attitudes and incentives (driven by taxes, security concerns) to consider using digital money as well as differing access to digital money by country, irrespective of the degree to which innovation is happening in that country.

- **The Economy** and it impact on spending, including the extent to which there is an immigrant population in a country that uses cash for payments. For example, there are differing growth rates in economies that lead to varying growths in overall spending and cash demand, as well as the financial ability for merchants to invest in new point of sale acceptance methods even if they may wish to.

MPD Cash at Risk Scoring (CaRS™) Framework ***Factors Considered in Analysis of Future Cash Use***
Economy
Trend in inflation rate
Political and economic stability
Trend in unemployment rate
Trend in immigration rate
Trend in size of underground economy
Government
Government efforts to reduce cash for efficiency reasons
Social service making social benefit payments available on stored value cards
Regulatory hurdles for mobile payments
Regulations that will change interchange fees
Merchants
Cost of electronic payment acceptance
Opportunity for further increase in card use
Investment in terminals for EMV/contactless
Merchant surcharging of cards
Move to electronic payments in cash-intensive sectors
Trend in cash back at point of sale
Consumers
Smartphone penetration
Trend in percent unbanked
Ability to increase carded portion of population
Percent of purchases online
Cultural preference for cash
Trend in average size of payment card transaction
Perception of security for new cash-substitute payment types and offers
Banks
Trend in ATM availability
Implementation of mobile payments schemes
Likely increases in cash withdrawal fees
Contactless cards issued per capita
Trends in restrictions on consumers access to cash
Payment networks
Success in contactless card penetration
Likely early implementation of mobile payments schemes
Capital investments in alternative payment technologies
Innovators
High degree of new players with alternative solutions
Traction in market: active trials with consumers and merchant involved
PayPal penetration
iTunes penetration
Capital investment in payments

In order to thoroughly assess the degree to which each influencer could drive interest for or against cash usage in each country, we identified particular factors for each influencer. There are 35 such factors across all seven influencers that included everything from whether mobile payments initiatives were getting traction in a country to the existence of government clampdowns on using cash to avoid taxes.

We then used those factors and influencers to create a ***Cash at Risk Score*** (CaRS™) score for each country. A higher CaRS™ means a higher likelihood that cash will be at risk – or the propensity of consumers to use cash for payment will decline.

To make this a bit more tangible, let's look at three different people in three different countries.

John in the US

John is 34 and lives in the US. Like most people his age, he owns a

smartphone and uses it 24/7. In fact, two out of every three new phones purchased in the US are smartphones and more than 50 percent of all mobile phones now are smart mobile devices. He has the Starbucks app on his phone which enables him to buy his lattes at Starbucks without using cash. That said, John and most US consumers still voice concerns over security when using mobile phones for payment, which tempers what would otherwise be a highly positive scoring with respect to consumers and the availability of electronic payments methods that could displace cash.

On the opposite end of the scoring spectrum, there are literally hundreds of *innovators* in the US who are chasing the mobile payments brass ring. Players like PayPal and Square and LevelUp and many, many others are working hard to get people like John to give up their plastic cards and cash for mobile phones and are capitalizing on the vast opportunities that lie at the intersection of on and offline transacting made possible by mobile devices, cloud computing and the availability of data. In terms of calculating the CaRS™ in the US, it is the sheer presence and importance of these innovators that drives more than half of the overall scoring. *Payment networks* like Visa, MasterCard, American Express and Discover are also working aggressively to ignite mobile payment solutions, too. Unlike their innovator compatriots, regardless of which solution wins in the end, they will likely reap the benefits since most of the innovators, today, at least, ride "their rails."

US Influencer Assessment	
Influencers that put cash at risk	Influencers that favor cash
Innovators	Consumers
Payment Networks	Merchants
	Economy
	Governments

The US *government* has adopted a fairly neutral position on cash since it has said that it will continue to support it so long as consumers want to use it. In comparison to the other influencers in the US, it did not score all that high but remains somewhat relevant given government's focus on implementing a fully electronic payment mechanism for the delivery of all federally-funded social services benefits over time. This is relevant because it eliminates the need for consumers to get and cash checks, and then to have that cash readily available to them to use at merchants. On the regulatory side, both the Senate and the FTC have had hearings on mobile payments related to issues involving privacy, security and how to "protect" consumers all of which could throw sand into the wheels of digital payments progress.

And, finally, *merchants* in the US—as in every country—have the ability to accelerate or stop new payments innovation dead in its tracks given the need to accept new payment options at the point of sale for it to get any serious adoption. In the US, this scored relatively low in terms of influencing the reduction in cash since merchants are unlikely to invest in new terminals until a persuasive case can be made to do so. This investment is a function of having some clarity around the mobile payments technology standard, some glimmer of hope that fees associated with acceptance can be reduced if they adopt something new and some sense of how mobile payments can gain them closer customer access and ownership. That clarity and resolution is a long way off.

To conclude, even though the US economy is still recovering and pace of immigration in the US will likely continue—both of which may give cash use a boost—the conclusion is that in the US, all factors taken

together will tend to reduce the consumers use of cash as a payment method relative to the historical trend.

Jane in the UK

Jane is 53 and lives in the UK. She, too, lives in a smartphone-centric county, with 43 percent of its citizens as smartphone owners. She's also noticed the many mobile initiatives popping up all over the country driven by *innovators* like PayPal who are introducing new ways to use PayPal accounts at High Street merchants as well as the efforts of p*ayments networks*, specifically Visa and MasterCard who are both are promoting contactless payments quite heavily. In combination with the merchant acquiring banks, the networks are also subsidizing contactless terminal installations by merchants, which could lay the groundwork for mobile payments by removing a big obstacle to adoption—*merchant* acceptance at the point of sale. Part of the network's ability to make new initiatives such as contactless so pervasive is that unlike the US, there are a small number of *banks* in the UK for them to get on board to do so. All of that combined suggests that the UK, relative to other countries, is likely to have a much higher degree of contactless terminalization and so, in theory, is a country that could more easily support a mobile payments program that is based on NFC.

UK Influencer Assessment	
Influencers that put cash at risk	Influencers that favor cash
Innovators	The Economy
Payment Networks	Consumers
Merchants (subsidized by banks)	
Banks	

The flip side of this is the strong headwinds that these players face given their significant bet on the future of NFC payments. It's not at all clear that *consumers* will see value in paying by waving with their cards or mobile phones and contactless creates negative security impressions on the part of consumers (rational or not). In fact, recent surveys of UK consumers like Jane find that they really aren't all that interested in using NFC payments and don't see much value in it. By contrast, in the US, Square and Starbucks and others have been more successful in igniting mobile payments using barcode technology. Thus, it's possible that the contactless initiative in the UK, by locking merchants into a particular technology choice, may limit other solutions that consumers may prefer and could ultimately become the standard.

One influencer that bodes well in favor of cash in the UK is the *economy*. As with most of the countries in or near the Eurozone, the European Union-wide recession and severe financial instability have had impacts on the country's core measures of economic health, such as unemployment, which is already high and expected to rise even higher over the next several years. Further, there is a prevailing and general nervousness on the part of consumers over the security of their money. Keep in mind that the UK experienced a run on a bank at the beginning of the financial crisis (Northern Rock) and one of its largest banks had to be nationalized (RBS) and experienced technical failures in 2012 that wreaked havoc with its customers' checking accounts. The potential instability of banks remains a fresh memory. It is likely that such forces, in particular, may favor the use of cash if the economic conditions don't improve (or get worse) over the coming years.

Jacques in France

Jacques, at the age of 27, is one of the many unemployed young males in his age cohort. In fact, in France, as well as a lot of the Eurozone, it is the *economy* that may evolve to become an important influencer of cash usage, particularly if the Eurozone crisis becomes more severe and France in particular falls into a long recession. Recent reports suggest that the economy is beginning to show signs of further weakening as unemployment rates, for people like Jacques hover around 22%. Tax increases and persistent high unemployment may stimulate the growth of the underground economy over the next 1 to 3 years in spite of the government's efforts to crack down on it. Smaller merchants will likely favor cash and so will consumers who wish to supplement the social benefits they receive with non-taxable cash payments for work.

France Influencer Assessment	
Influencers that put cash at risk	Influencers that favor cash
Government	The Economy
Innovators	Consumers
Payment Networks	Merchants

This is happening against a backdrop of initiatives set in motion by the French *government* that are designed to move transactions to secure digital forms over the next 4 years. However, these efforts to push consumers like Jacques from existing cards to the new forms of payment have gotten little traction with merchants or consumers, at least so far.

That said, in France, we find that the *banks*, *payment networks*, the *government*, *merchants*, and *innovators* are all influencing a slight decline in the propensity to use cash relative to the historical trend. Several large pilots with large merchants are testing innovative solutions for consumer speed and convenience (e.g. PayPal and McDonald's). However, that doesn't seem to be enough to trump the dampening effect that the economy and consumer resistance to non-cash methods of payment has on the adoption of new ways to pay. That hasn't stopped banks, partly in collaboration with the MNOs who represent the large majority of innovators, the payment networks, and some innovators, from doing their best to promote contactless payments including mobile payments quite heavily. Banks are making it harder for consumers to access cash by implementing "cashless" branches, which, among other things, make it harder for consumers to access cash over the counter. Taken together, banking, networks and innovators account for nearly all of the cash at risk scoring.

From the perspective of Jacques and people like him, there is evidence from attitudinal surveys that *consumers* are very concerned about payments security – as they are in most countries – but also with ubiquity. The French are used to having one payment card that works just about everywhere that they want to shop (and that payment method is free to them). Contactless experiments held in several French cities and subsidized by the government were slow to catch on with consumers, in part because they failed to see the benefit of tapping versus "dipping and PIN-ing" and only being able to use that form of payments at select merchants. These security and ubiquity concerns, combined with a cultural

MPD CaRS™ For Ten Study Countries 2000 - 2011

Country	Historical Growth in Consumer Use of Cash 2000-2011	Cash-at-Risk Score CaRS™
France	2.3	282
Germany	-2.6	17
Italy	1.9	25
Poland	-4.0	74
Portugal	0.4	6
Spain	-3.6	6
Sweden	-7.4	429
Turkey	-1.0	67
United Kingdom	-1.8	418
United States	4.2	441

preference for cash particularly among older people, makes us believe that mobile payments will be slow to catch on and will take share, when it does, more so from cards (and even checks which are highly popular and widely used) than cash.

So, let's see what kind of an impact the influencers have on putting cash at risk, or reducing John, Jane and Jacques' propensity to use cash to pay for things over the next ten years.

As you can see, the CaRS™ analysis suggest that cash is at risk significantly in the US and the UK, but less so in France. Looking more broadly at the other countries in our study, we also find Sweden at risk, but not much at all at risk in Spain, Portugal and most of the other countries.

Is that where the story ends?

We think not.

OBSERVATION NUMBER FOUR. THE FUTURE OF CASH IS HIGHLY CORRELATED TO THE SPEED AT WHICH PAYMENTS INNOVATION IS ADOPTED BY THOSE WITH SPENDING POWER.

One of the things that we know with certainty is that payments innovation takes a long time to really work its way through the economy and to be adopted by enough people with enough spending power to make it a standard. And that has a big implication for the future of cash. Here's why.

One of the things that we know with certainty is that payments innovation takes a long time to really work its way through the economy and to be adopted by enough people with enough spending power to make it a standard. And, that has a big implication for the future of cash.

It's a fact that younger people are much more likely to adopt new payment innovations than older people. They are the ones using debit cards today, for example, to pay for just about everything at the point of sale, even if it a one Euro cup of coffee. They are also the ones using their mobile phones to pay at Starbucks in the US and trying many other mobile applications like PayPal and LevelUp and Square.

There are also a lot of young people. As a cohort, in the US, there are roughly 86 million people between the ages of 18 and 37 – called the Millennials – a group roughly 7% larger than their Baby Boomer

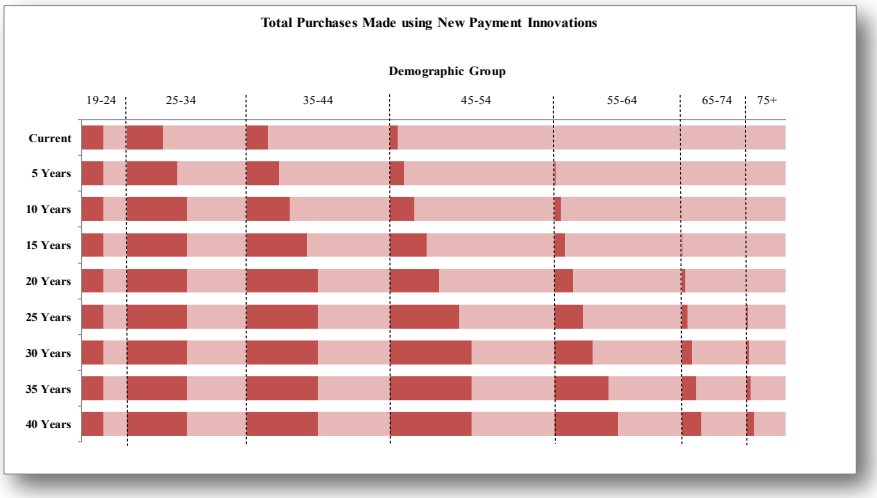
parents' generation. It also happens to be the most connected generation on the planet. Their early adoption of and subsequent addiction to smartphones has driven the explosive growth of new media channels. Pew Research reports that 75% of 25 – 34 year olds own a smartphone and 90% of them use the internet. Relative to payments and commerce, this connectivity and comfort level with accessing the internet using their mobile phones has also fueled their interest in using these devices as part of the shopping experience – checking in, downloading coupons and mobile apps that allow them to pay in store. On the flip side, the parents of these Millennials may also be smart phone aficionados, but are more or less stuck in their payment ways, many of whom even find it hard to shake using paper checks.

But – and it is a very important but—it is they, not their offspring, who hold the spending power—and will for some time to come.

Millennials are having a tough time of it. Unemployment in the US for people ages 18 – 35 is 13.1%, the highest generational unemployment rate in the country. In the Eurozone, the statistics are even more grim—unemployment for this group stands at 23.9%—nearly twice the overall unemployment average.

In the US, according to Nielsen, baby boomers will control 70 percent of all disposable income within the next five years and today drive about half of all consumer package goods spending. In part because they lost their jobs in the financial crisis, those 45 to 65 also dominate new business creation and not only generate income but spending in B2B categories, too. Even though the boomers have taken a hit in terms of median family net worth, the Economic Policy Institute says that their net worth is 3x that of Millennials and that those 55 and older control about 75% of the overall wealth in the US. The situation in Europe, is likely very similar, particularly given the very high levels of unemployment for people in the 18 to 37 age group.

This dynamic is important because even if the Millennials develop a new way of paying at the point of sale, it won't likely have much of an impact right away – they just don't have the spending power as a group to shift payment methods as a percentage of spending, which is what drives overall change. Over time though younger people get older, maybe they even move out of their parents house and get a job, they advance in their careers, they make more money, they get married, have kids and increase their spending, and the economy improves, they will. But that's not going to happen all at once and not much of it is even going to happen over the next decade.



We've developed a ***Payments Innovation Diffusion*** model (PID^{TM}) to simulate this behavior using demographic forecasts of

population and spending. Now suppose there's a payment innovation. This chart shows a plausible example of the adoption of that payment innovation by each age group today and then how that increases over time. Younger people adopt it disproportionately. The horizontal axis shows different age groups today. The size of the column reflects their spending power, based on how many of them there are and how much money they have to spend. So there's a small sliver for 19-24 year olds and a sliver for 75 and older. The big spending category consists of people between the ages of 45-54.

As time passes, the older cohorts consist more and more of the younger people of today who have aged and adopted the payments innovation. Eventually the older cohorts are entirely the younger people who have adopted the innovation. The people who use old payment methods eventually die off. But it takes time for the impact of the payment innovation to work its way through the system—about three decades in this hypothetical example. In addition to the lack of spending power, there just aren't - and weren't - as many people being born to accelerate or tip the new adoption curve any sooner.

Where does that leave us in terms of projecting the future of cash over the next decade or more?

OBSERVATION NUMBER FIVE. MEASURING THE FUTURE USE OF CASH AS A PAYMENT METHOD ISN'T SIMPLY ABOUT MAKING ASSUMPTIONS BASED ON THE HISTORICAL USE OF CASH

Our methodology for consistently and accurately projecting the future use of cash as a payment method is actually a mash-up of three proprietary data sets and estimation methods: (a) the ***historical trend*** in the propensity of consumers to use cash, (b) the ***cash at risk*** given the impact of influencers in each country and (c) the ***rate of adoption*** of new payment technologies.

To estimate the future use of cash in the ten countries we observed, we started with the *historical trend in the consumer's propensity to use cash.* We felt it best to be conservative in forecasting the future of cash so we assumed that countries that had a declining trend in the propensity to use cash would continue to decline at that rate. We also assumed that countries that had been increasing in their propensity to use cash would stop increasing on the basis that increases in cash appeared to be artifacts of the financial crisis and could be temporary. So, our forecasts of future cash growth are very conservative.

We then used our *estimates of cash at risk and CaRS™ scoring methodology based on our influencer analysis to predict the decline* in the use of cash by each age cohort. That helped us adjust the historical baseline up or down by a little or by a lot. Finally, we then let each age cohort get older and increased its spending power over time using our Payments Innovation Diffusion model (PID™) to determine how long it would take before the adoption of new technologies in payments would reduce cash usage. Only by looking at all three together can we

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confidently project the consumers' propensity to use cash as a payment method over the next ten years.

This is what we found.

MPD Projections Total Cash Usage in Ten Study Countries 2012 - 2022

Country	Annual Percent Change in Propensity to Use Cash	Real GDP Growth Rate	Real Annual Change in Total Cash
France	-0.5%	1.6%	1.0%
Germany	-2.0	0.8	-1.2
Italy	-2.3	1.0	-1.4
Poland	-2.0	3.1	1.0
Portugal	-0.2	1.5	1.2
Spain	-0.2	0.9	0.7
Sweden	-4.3	2.7	-1.6
Turkey	-0.7	4.0	3.2
United Kingdom	-1.9	2.0	0.1
United States	-1.4	3.2	1.7
GDP Weighted Average	-1.5	2.4	0.9

Column 1 shows that annual change in the share of cash spending by consumers. We predict that the propensity to use cash is going to decline in every country. That ranges from a whopping 4.3 percent a year in Sweden, to only about .2 percent a year in Spain and Portugal.

Column 2 shows the rate of GDP growth, which we take as a proxy for increases in spending by consumers. GDP and spending have a 99% correlation and we used IMF forecasts of GDP.

Column 3 shows the overall growth in the use of cash after we have accounted for changes in the share of spending with cash, the growth in the total amount of spending, the impact of influencers on cash and the adoption of new payments innovations. ***The growth in spending exceeds the decline in the use of cash in 7 countries, so total cash use grows.***

In the US and France, John and Jacques and their generation's enthusiasm for new payments innovation isn't enough to propel it forward, and Jane in the UK isn't likely to embrace these new techniques until she is absolutely convinced, or forced to. Both scenarios are likely to take a lot of time to unfold, and will certainly require more than a decade to do so.

The bottom line is this: cash is declining in many countries but as a result of economic growth real spending in cash still increases. Payments innovation is cutting into cash use—but it is happening very slowly.

FINAL THOUGHTS

Where does this leave us? Well, in a world that will continue to have and use cash, for one. Like the quote that Mark Twain made famous, "the reports of its death are greatly exaggerated," then and now.

OBSERVATION NUMBER SIX. INNOVATIONS AROUND MOBILE AND PAYMENTS WILL IMPACT THE USE OF CASH BUT IT WILL HAPPEN OVER THE LONG TERM.

A few closing comments about cash.

Cash is sort of like the payments version of Cinderella. It doesn't have a mom or dad to watch over it – just those horrible stepsisters that try to convince Cinderella that she is ugly. But she isn't. Cash has

survived for thousands of years because it is an exceptional innovation – easy to use, all merchants accept it and people like it. In many parts of the world, it is the only method of payment available, and in places like Kenya and Japan and China and India where mobile phones are well-penetrated and even mobile money schemes, like m-Pesa, have launched, cash is used more than ever. And, in a nod to its persistence in developed markets like the US, companies like Wal-Mart and others are innovating cash as a payment method so that its customers can shop online and pay using cash at the store to settle those transactions, right alongside the many innovations they are bringing to market with mobile. Frankly, we believe that governments should like cash too – it seems risky putting all of their payments eggs in the digital payments basket that could put everyone in jeopardy in the event of a systems failure.

The bottom line is this: cash is declining in many countries but as a result of economic growth real spending in cash still increases.

Payments innovation is cutting into cash use—but it is happening very slowly.

But, it is inevitable that as innovations around mobile and payments mature, the use of cash will be impacted – it will just take a long time. Changing anything in payments does, even if the change is for the better and more value is created for everyone. It has taken 17 years for the web to account for 5% of retail commerce and 25 years after the introduction of debit card in the US for it to ignite. Prepaid was introduced to great fanfare around 13 years ago is still a very small share of payments. Every prediction of NFC adoption has proved too optimistic – and in the US is really nowhere – five years after nearly every analyst forecasted that 50% of all payments transactions in the US would be done via contactless in 2012.

So, will cash last as long as the earth, which according to a group of scientists, will end in the year 5,000,000,000 A.D. when the Sun will swell into a red giant fireball and either swallow the Earth or completely scorch it? That's a long way from now – so it's anyone's guess and no one reading this will ever really know for sure. But, at least as we see it, cash will most certainly last many lifetimes beyond the many people in payments who are working hard today to replace it with the next new thing.

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