An international approach to the cost of payment instruments: the case of cash

EXECUTIVE SUMMARY

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1. Aims, methodology and outreach

MAIN AIM

Analysing the cost of cash compared to debit cards

Identify and estimate the resource (operating) and private (fees) costs to determine the total social cost

Retailers

Consumers

Brief summary

- *This study estimates and compares the cost of cash and debit cards in 52 countries. It distinguishes a comprehensive set of resource (operating) and private (fees) costs for both consumers and retailers.*
- *The results show that* ***the unit cost of debit cards is 2.8 times larger than the cost of cash globally.***
- *The biggest share of the cost of cash for consumers corresponds to ATM fees (92.21%), mostly to ATM own fees although foreign fees are also quite relevant.*
- *As for retailers, cash in transit and other infrastructure and operation represent 67.25% of the unit costs while opportunity cost of time per transaction weight 23.14%.*
- *The results are in line with international public/independent studies suggesting cash remains the cheapest payment instrument for small denomination transactions.*
- *The study also shows that ATM revenues exceed ATM costs at banks, suggesting that the idea that cash is subsidized by banks is merely a myth.*

1. Aims, methodology and outreach

Preliminary considerations

- The study focuses on the two main ends of the market (consumers and retailers). Other agents (commercial banks, central banks, government) are left out of the sample due to data availability and simplicity purposes.

- By focusing on consumers and merchants, any social costs estimated refer to these two agents and do not include any net social costs imposed by (or to) other agents. This allows us to compare exactly the costs bear by consumers and merchants and to reflect some important sources of costs imposed by other agents (in particular, fees).

- Estimating/identifying some cost items require to make some assumptions. All of our assumptions are motivated or validated by common practices in some previous well-known studies. However, given that our main benchmark is cash, we take a cautious approach: any time there is a choice between different criteria regarding cash, we take the one that looks less convenient (more costly) for cash. By following this approach we assume that the estimated cost of cash may come out slightly larger than the "true" cost of cash but we avoid downward biases in the estimation of the cost of cash.

1. Aims, methodology and outreach

Contributions

- To our knowledge, this is the first study to consider a comprehensive range of cost items for a large global sample.
- The study provides a measure of the global unit cost of cash compared to the global unit cost of debit cards for consumers and merchants and several combined breakdowns by:
  - Geographic area (Europe, North America, Central and South America, Asia-Pacific and Africa)
  - Country
  - Individual cost items
  - Resource costs vs. private costs (fees)
- The study also offers a measure of the economic impact of the cost of the payment instruments, as a ratio of each country GDP.
- Estimations on the change in unit cost with transaction size
- We also provide evidence that cash is not subsidized by banks as they obtain more revenues that cost from ATM cash distribution.

1. Aims, methodology and outreach

Methodology

Time reference: estimations correspond to 2017

We follow an additive approach:

- Identify the main cost items of cash and debit cards for consumers and retailers. 19 different cost components are considered.
- Go to the original sources to extract the information (e.g. public statements and memos of banks in a given country to compute the average fees).
- Aggregate the cost components distinguishing resource costs (operating cost to execute/process the payments) and private costs (incurred fees).
- Add the different sources to compute a unit cost (of cash/debit card) in percentage.

1. Aims, methodology and outreach

Methodology (cont'd)

COST OF CASH FOR CONSUMERS				
COST STRUCTURE BY ITEM				
ATM own fee	ATM foreign fee	Cashback	ATM shoe-leather/Time	Security, fraud

COST OF CASH FOR RETAILERS				
COST STRUCTURE BY ITEM				
Cash in transit	Float	Time per transaction	Security, fraud	Infrastructure/ operational

COST OF DEBIT CARDS FOR CONSUMERS			
COST STRUCTURE BY ITEM			
Annual fee	Surcharge	Time per transaction	Security, fraud

COST OF DEBIT CARDS FOR RETAILERS				
COST STRUCTURE BY ITEM				
Merchant discount fee	Time per transaction	Infrastructure/ operational	Float	Security, fraud

Methodology (cont'd)

Important issues addressed in this study

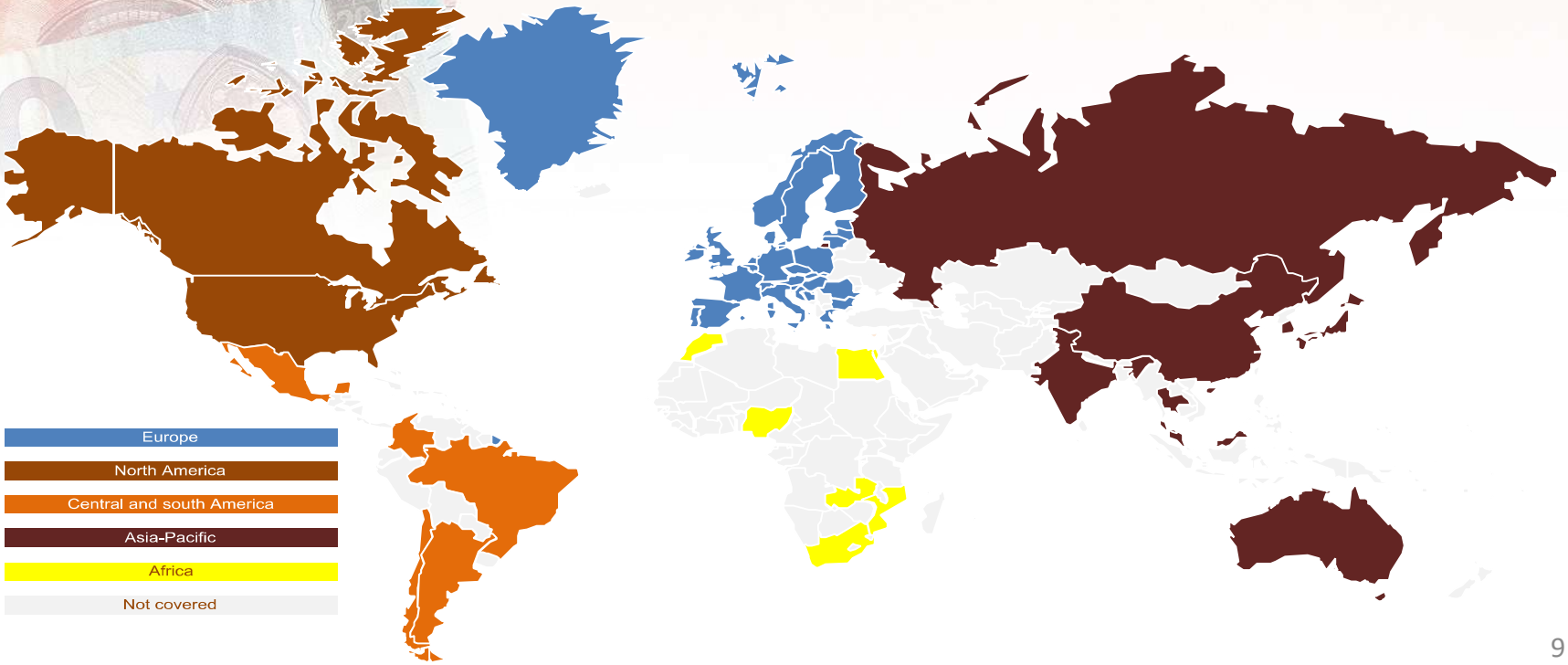
- Some prices involve implicit fees. Some payment services are only apparently free but they are part of a bundle of services that do involve a fee.

- Shoe-leather cost of cash are measured following a cash-management model (see methodological appendix). Other estimations based on "observed time"provide incorrect figures as they ignore consumers are able to manage time efficiently and minimize the number of times of going to an ATM.

- Changes in regulation are important drivers of the cost of payment instrument. We have considered the relevant regulatory issues in play by 2017 (e.g. no-surcharge rules, regulated fees).

1. Aims, methodology and outreach

Outreach: Five geographic areas



1. Aims, methodology and outreach

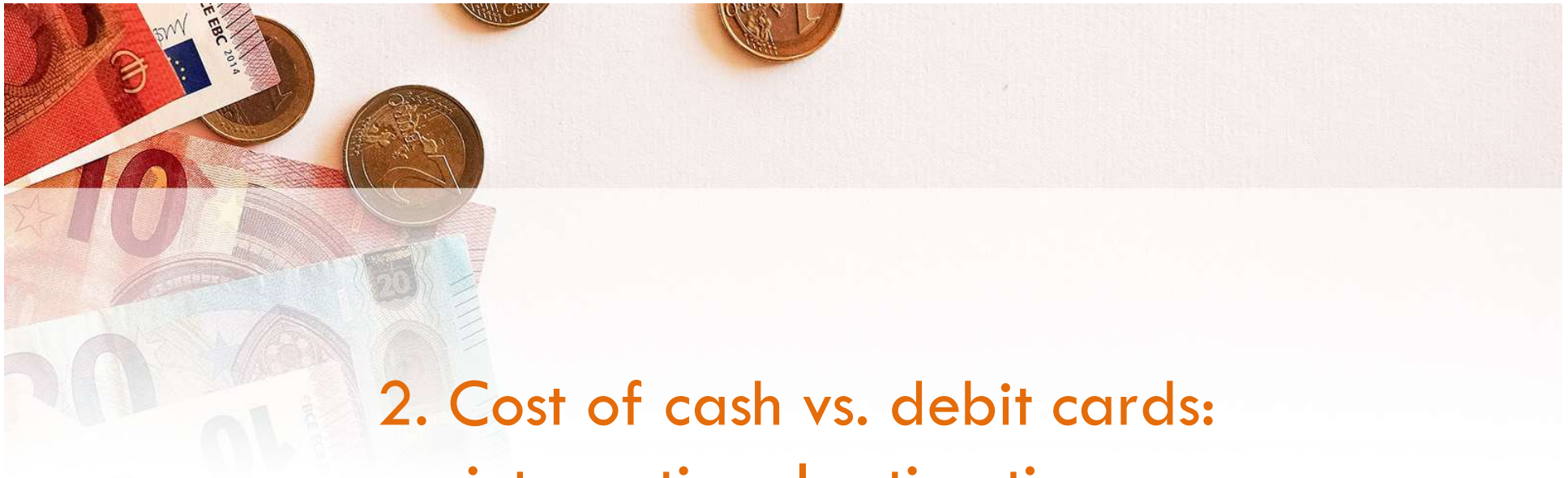
Outreach (cont'd): 52 countries

EUROPE: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia; Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Switzerland, Norway

NORTH AMERICA: United States, Canada

CENTRAL AND SOUTH AMERICA: Brazil, Mexico, Colombia, Chile, Argentina

ASIA-PACIFIC: Australia, Japan, India, China, Malaysia, Thailand, Hong Kong, South Korea, Russia, South Africa, Nigeria, Egypt, Morocco, Zambia, Mozambique



2. Cost of cash vs. debit cards: international estimations

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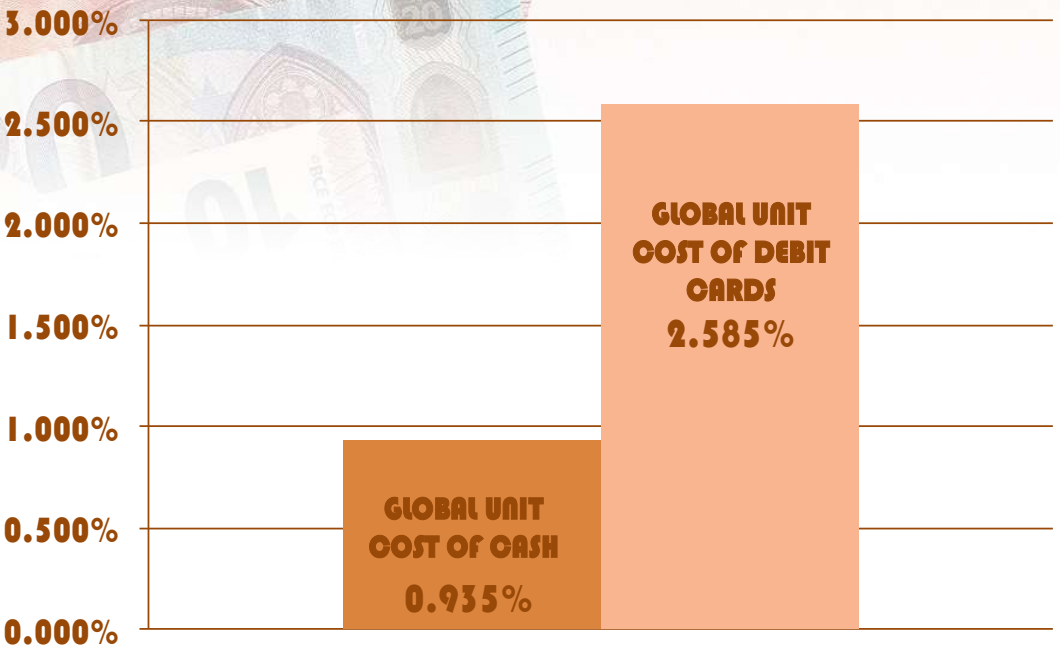


Chart 1. Global unit cost of cash vs. debit cards

- Globally, **the cost of debit cards is 2.8 times larger than the cost of cash.**
- Given that the average global retail transaction is 59 dollars, this would imply:
  - A cost of cash of 0.54 dollars per transaction
  - A cost of debit cards of 1.52 dollars per transaction.

2. Cost of cash vs. debit cards: international estimations

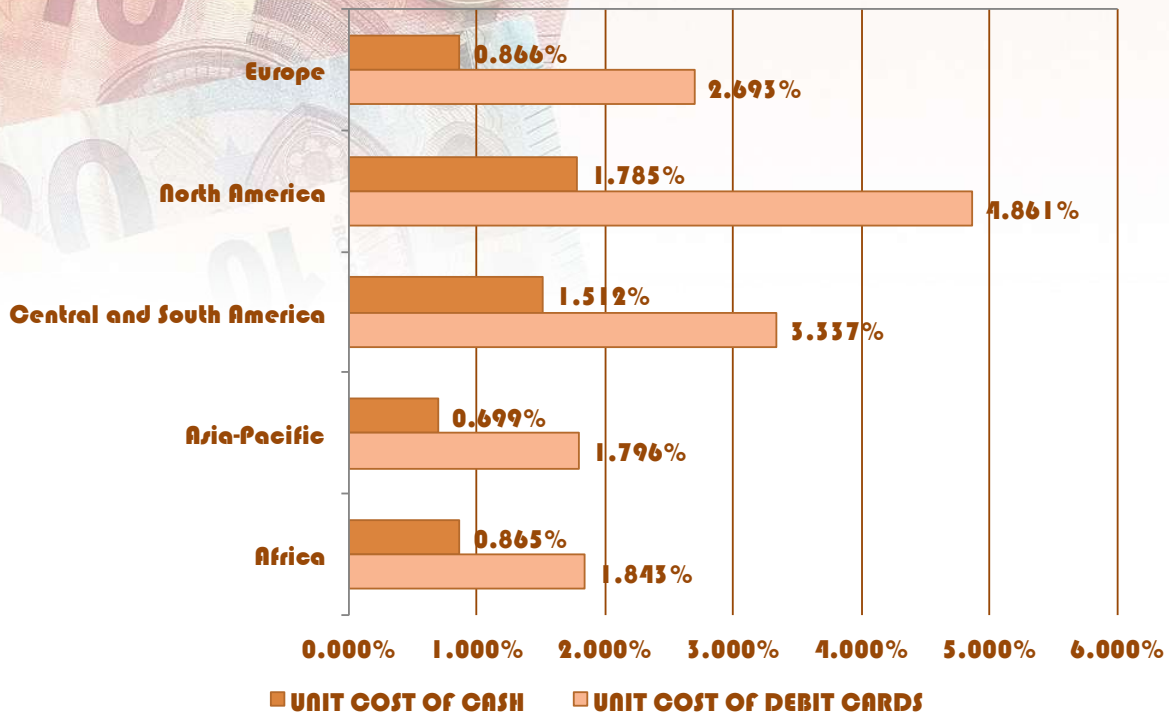


Chart 2. Global unit cost of cash vs. debit cards. Breakdown by geographic area

- There is significant variation across geographic areas but in all of them cash if found to be cheaper than debit cards.
- The area with the lowest unit cost of cash is Asia Pacific (0.699%) and the location with the largest cost of cash is North America (1.786%). In the case of debit cards, the lowest cost is found in Central & South America (1.512%) and the largest in North America (4.861%).

2. Cost of cash vs. debit cards: international estimations

- The breakdown by consumers and retailers suggests most of the cost is borne by retailers. In the case of cash, merchants bear 56.14% of the cost. As for debit cards, 54.7% of the costs are assumed by retailers.

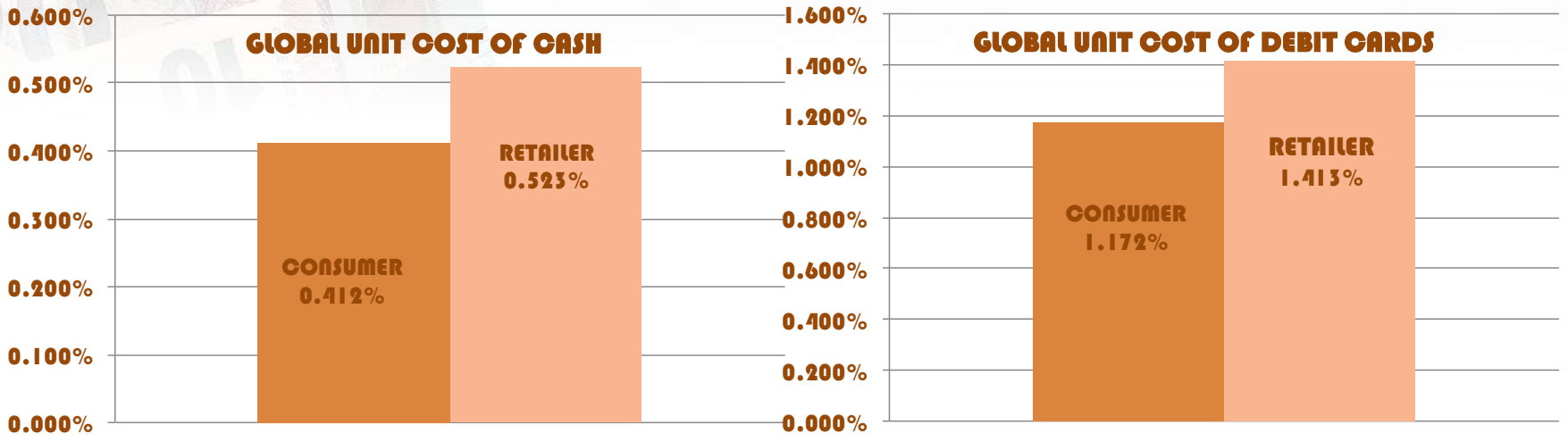


Chart 3. Global unit cost of cash vs. debit cards. Breakdown by consumers and retailers

2. Cost of cash vs. debit cards: international estimations

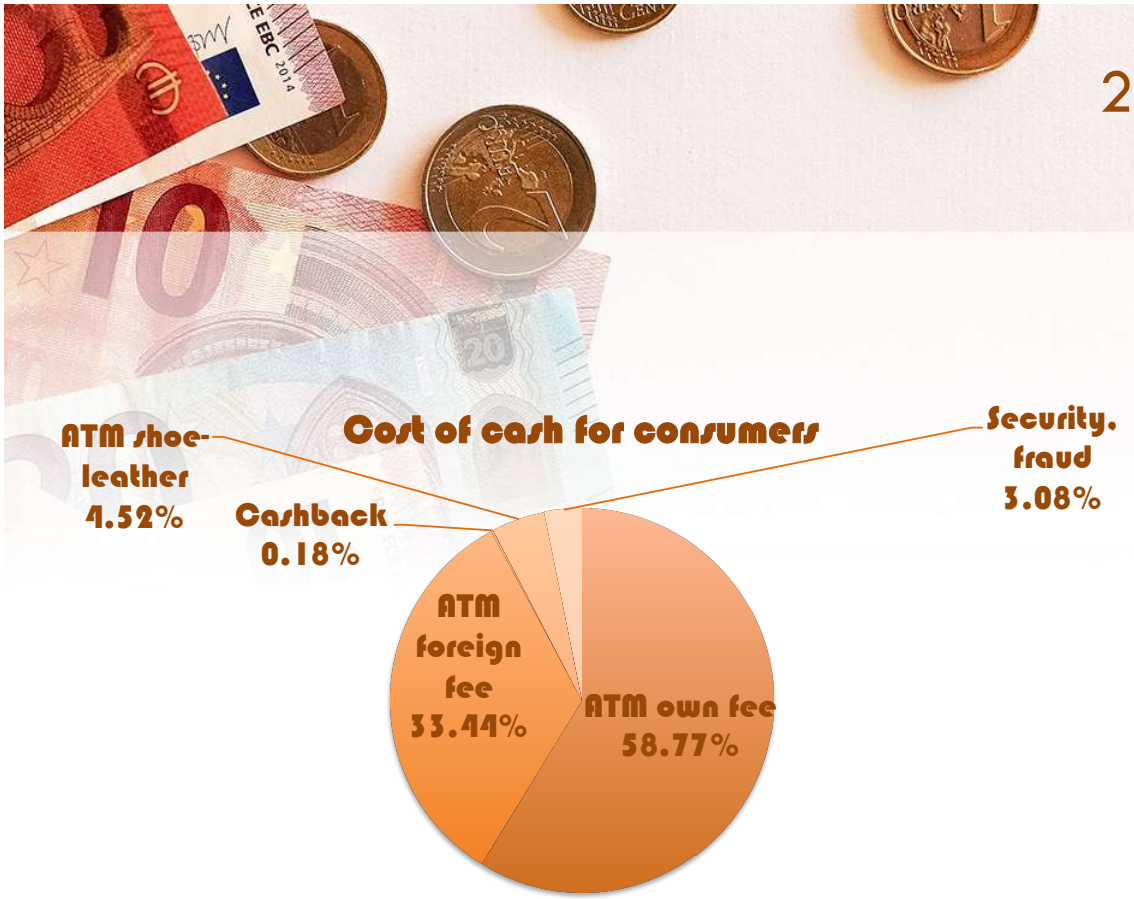


Chart 4. Cost of cash for consumers. Breakdown by cost item

- The largest share of the cost of cash for consumers corresponds to ATM fees (92.21%), mostly to ATM own fees although foreign fees are also quite relevant.
- Travel (shoe-leather) costs account for 4.52% of the costs and security and fraud 3.08%.

2. Cost of cash vs. debit cards: international estimations

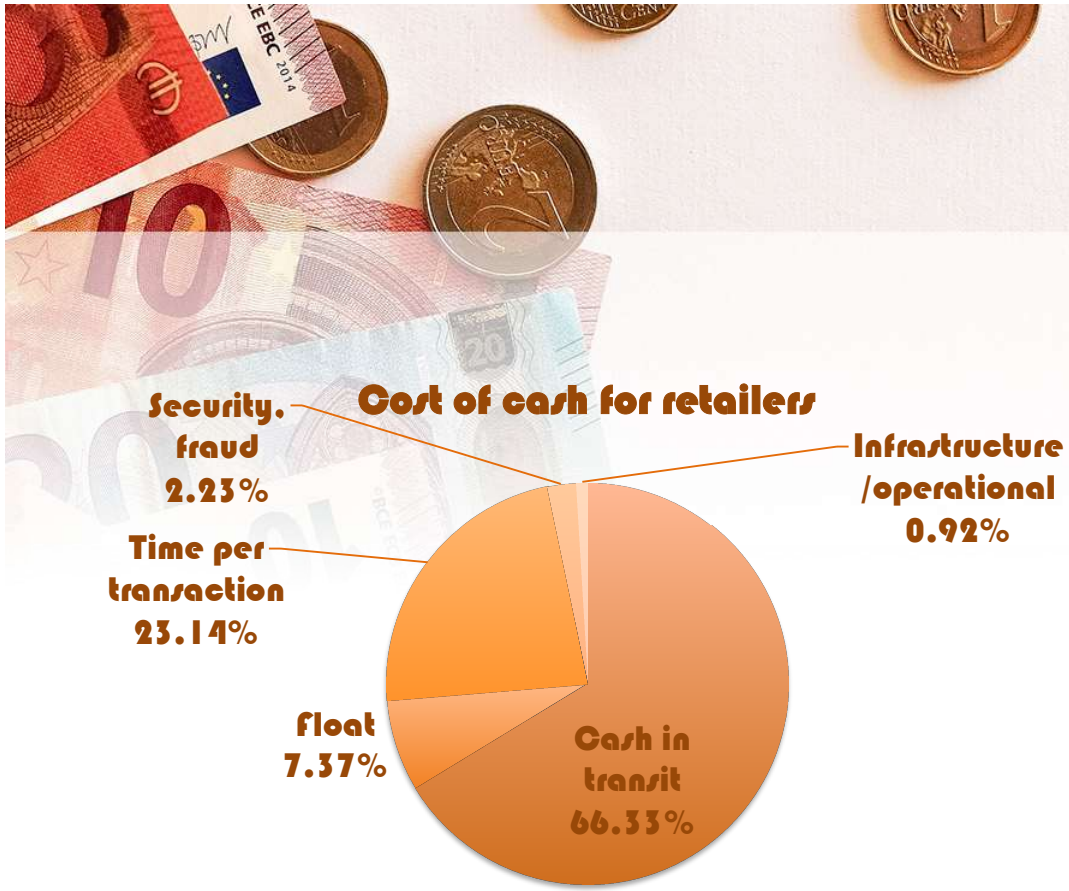


Chart 5. Cost of cash for retailers. Breakdown by cost item

- In the case of retailers, the cost sources are more diversified. Cash in transit and other infrastructure and operation costs are 67.25%, and the opportunity cost of time per transaction 23.14%.
- Although efficiency in cash inventory management has improved over the years, float still represents 7.37% of total costs of cash for retailers.

2. Cost of cash vs. debit cards: international estimations

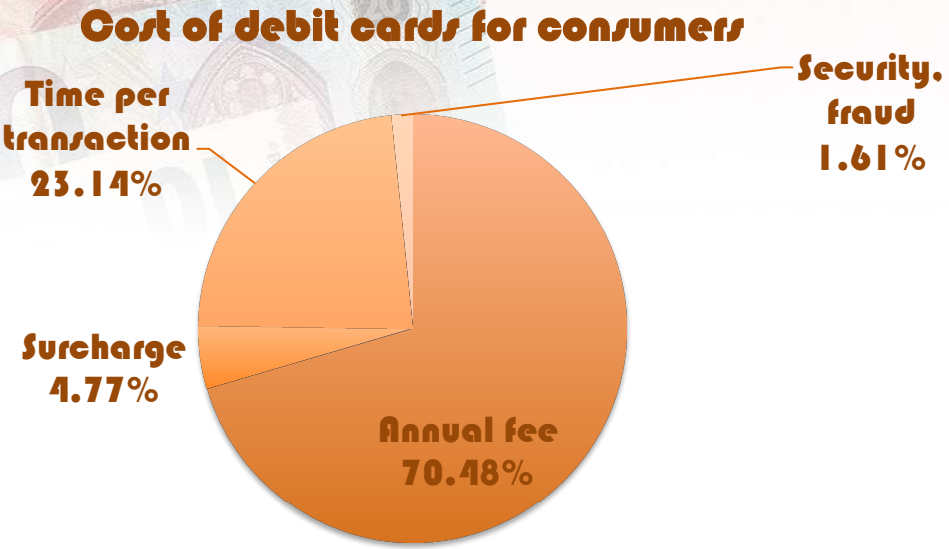
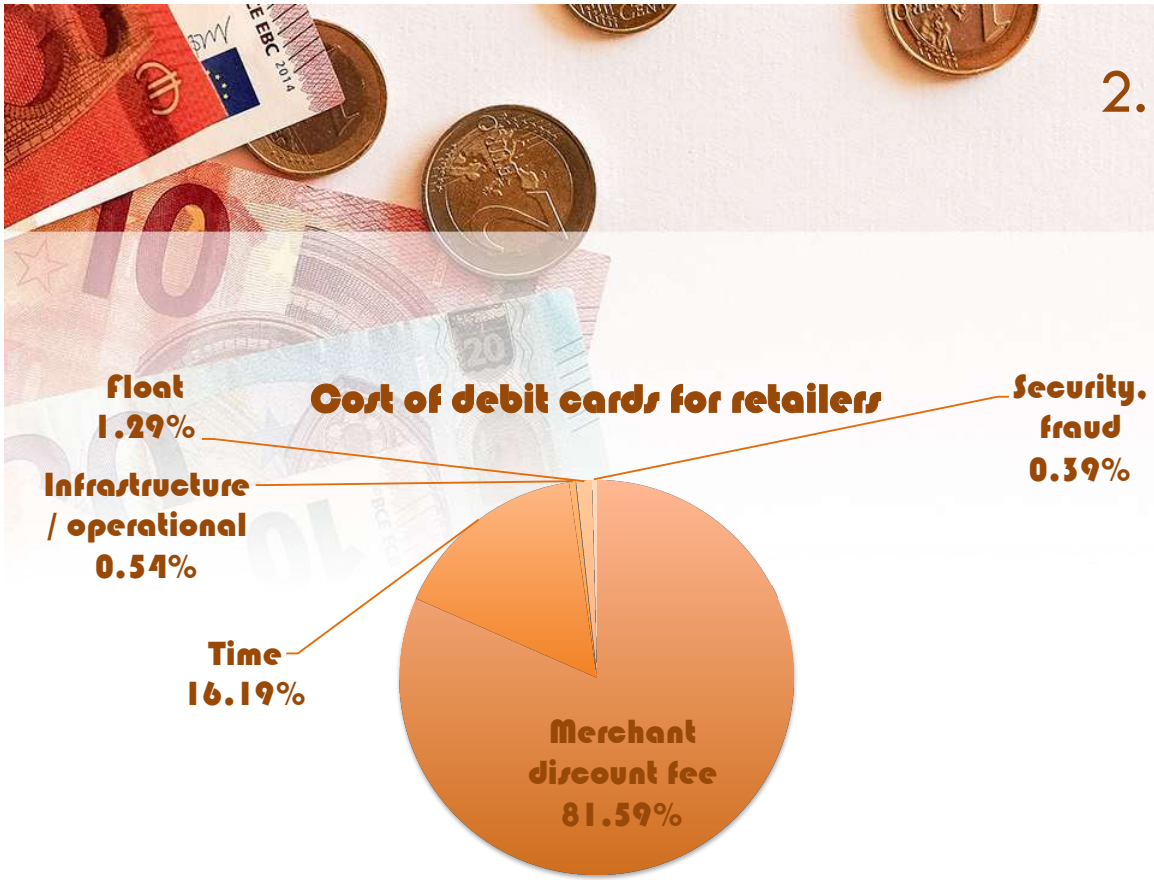


Chart 6. Cost of debit cards for consumers. Breakdown by cost item

- The annual fee explains a large share of the cost of debit cards for consumers. Particularly, when not only implicit but also explicit fees (cards included in a bundle of current account services) are considered.
- The opportunity cost of time accounts for almost ¼ of the costs.

2. Cost of cash vs. debit cards: international estimations



- In the case of retailers, despite of the generalized reduction in merchant fees in many jurisdictions, discount fees still represent most of the cost of debit cards for them.
- Opportunity costs of time represent 16.19% of the debit card cost for merchants.

Chart 7. Cost of debit cards for retailers. Breakdown by cost item

2. Cost of cash vs. debit cards: international estimations

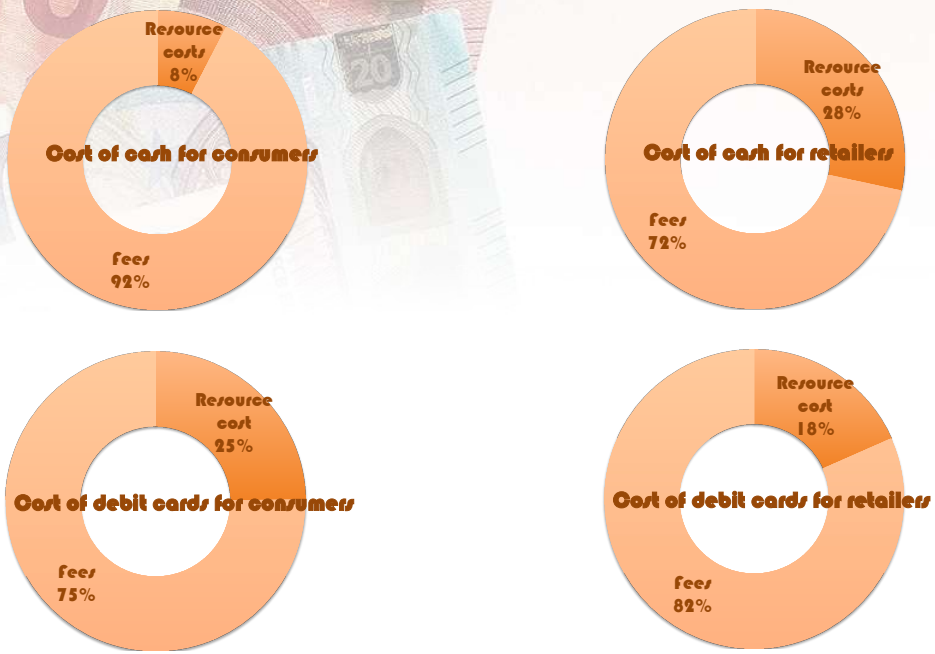
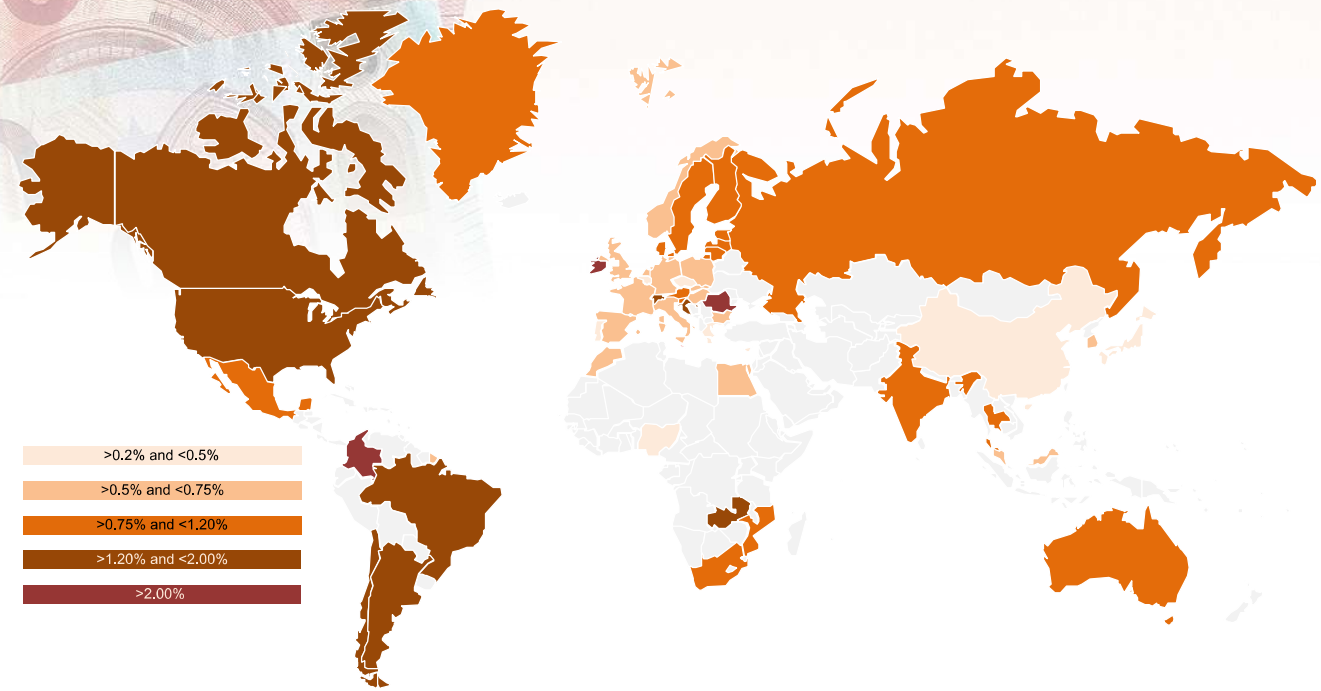


Chart 8. Cost of cash and debit cards for consumers and retailers. Breakdown by resource costs and fees

- Overall, the costs of cash and debit cards are mostly driven by fees.
- The largest proportion of fee costs correspond to the cost of cash for consumers (92%) which suggest handling cash is relatively costless if only operating costs are considered. The higher weight of resource costs are those of cash for retailers (28%).

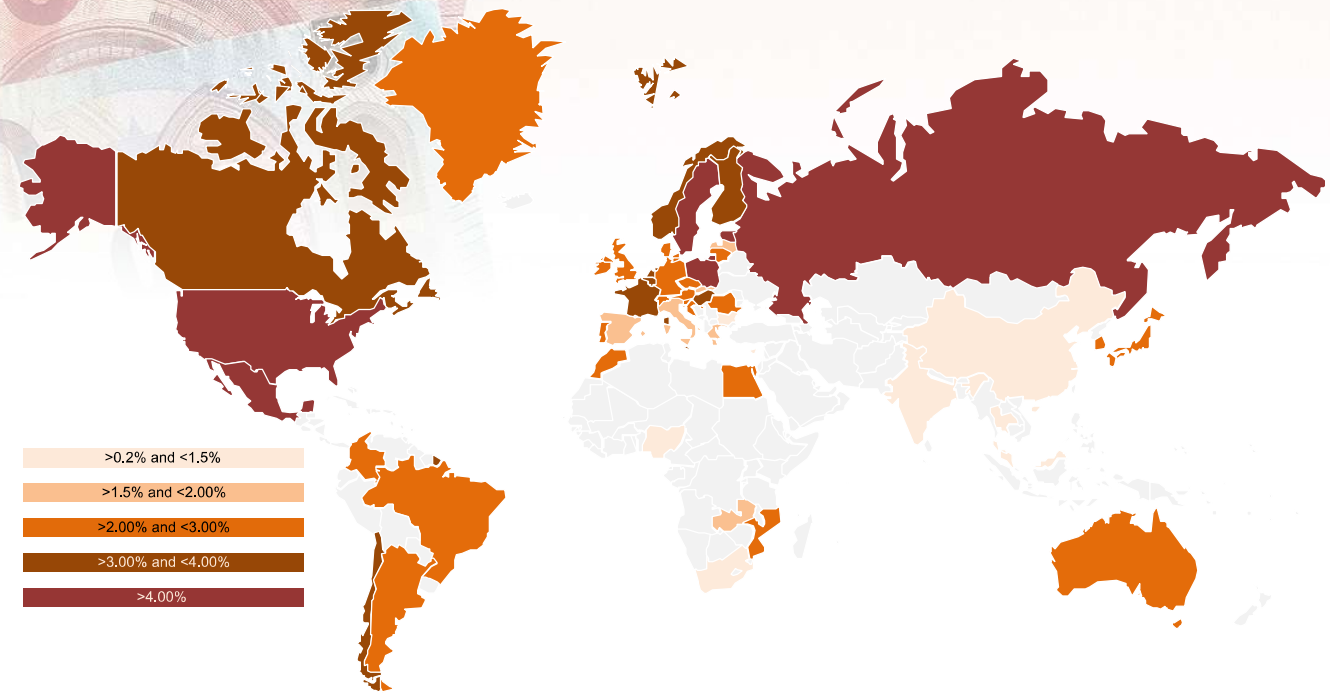
2. Cost of cash vs. debit cards: international estimations



- Overall, there seems to be two geographic clusters regarding the cost of cash: a low-to-medium cost cluster in Europe, Africa and Asia-Pacific and a medium-to-high cost cluster in North America and Central & South America.

Chart 9. Global map cost of cash

2. Cost of cash vs. debit cards: international estimations



- In the case of debit cards the identification of cost clusters is more complex as they are quite mixed geographically.
- The costs are comparatively high in countries like the United Sates or Russia.

Chart 10. Global map cost of debit cards

3. The debate on the social cost of cash: economic impact

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After surveying academic, central bank and industry studies, **there are two general observations and trends that need to be reconciled:**

- Cash is consistently found to be a cheaper and mostly preferred payment method for transactions of a relatively small size.
- Policies and opinions suggesting the need to substitute cash payments for other electronic payment methods.

Preview of our conclusions for this section:

- **Cash persistence is not only related to (old) habits but also to a number of convenience and cost advantages. This view is shared by recent studies from independent public and international bodies on the subject.**
- **Cash can live together in the payment system with other non-cash instruments. Contactless payments is the closest attempt to provide some electronic alternative to cash for small-size payments but, according to most studies, it does no meet (up to date) the necessary attributes to substitute cash.**

3. The debate on the social cost of cash: economic impact

Examples of stylized myths not supported by data/studies:

- ***MYTH: Cash incorporate substantial travel costs and it is inefficient.***

Evidence: cash is cheaper in most cases than other alternatives except for payments of a high amount. Studies suggesting travel (shoe-leather) costs are high are based on wrong assumptions. Modern cash management models reduce the amount of those costs to a significant extent.

- ***MYTH: Cash will be substituted as long as modern and faster payments are introduced.***

Evidence: Bills and coins continue to increase as a percentage of GDP in countries where strong regulatory and policy incentives are introduced to favour other electronic payment methods, including contactless devices.

- ***MYTH: Fraud and robbery are mostly connected to cash payments while other electronic alternatives do not share this problem.***

Evidence: debit and credit card fraud continue to grow. Attempts from contactless alternatives to substitute cash involved lower security standards and also incorporate robbery and fraud risk (e.g. no PIN required for small transactions with contactless devices). Simple regulatory measures (as limiting cash payments over certain amounts or augmenting disclosing requirements) can also do the job for more secure and transparent cash payments.

3. The debate on the social cost of cash: economic impact

Our estimations on the change in cost with transaction size and the economic impact. Previous considerations:

- *Our data seem to support the conclusions from previous studies on the persistence of cash and, on top of that, offers wide international evidence.*
- *We also compute how the unit cost of cash changes with transaction size compared to the unit cost of debit cards (as a non-cash benchmark).*
- *We also estimate the economic impact of the results by presenting the cost of cash and debit cards as a percentage of GDP. This provides a measure of the economic impact but it is not as easy to interpret as unit. The main reason is that the use of cash is very high in many jurisdictions and this could make the cost estimations look larger than those that rely on unit costs.*

3. The debate on the social cost of cash: economic impact

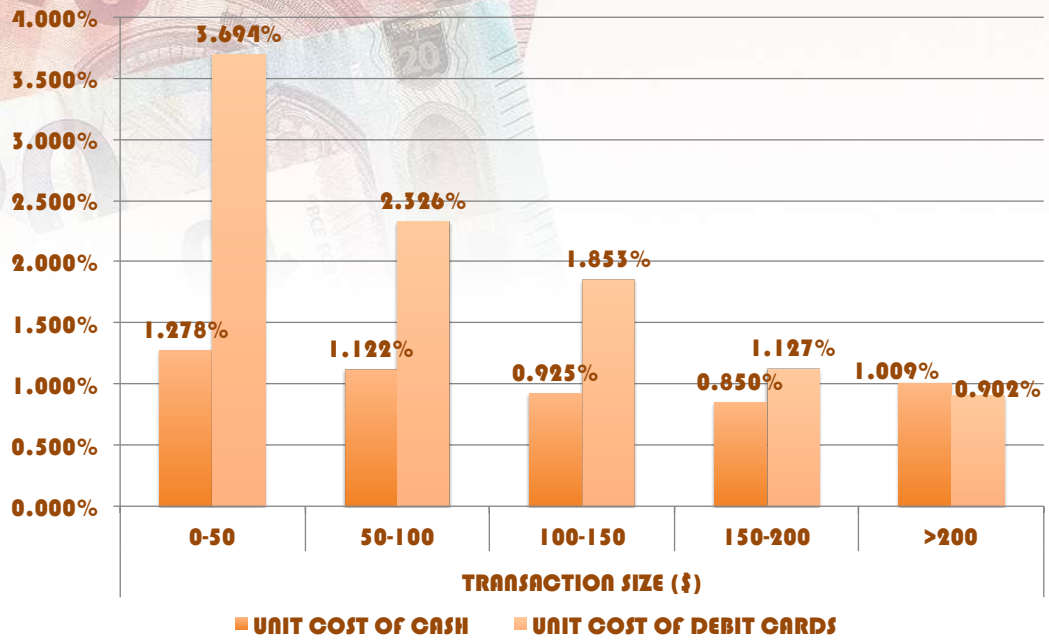

Chart 51. Estimation of the change in unit cost of payment instruments with transaction size

Our estimations on the change in cost with transaction size and the economic impact (cont'd)

- On average, cash remains the cheapest payment instrument for most of the transaction sizes. Only over 200 dollars debit cards seem cheaper than cash.

3. The debate on the social cost of cash: economic impact

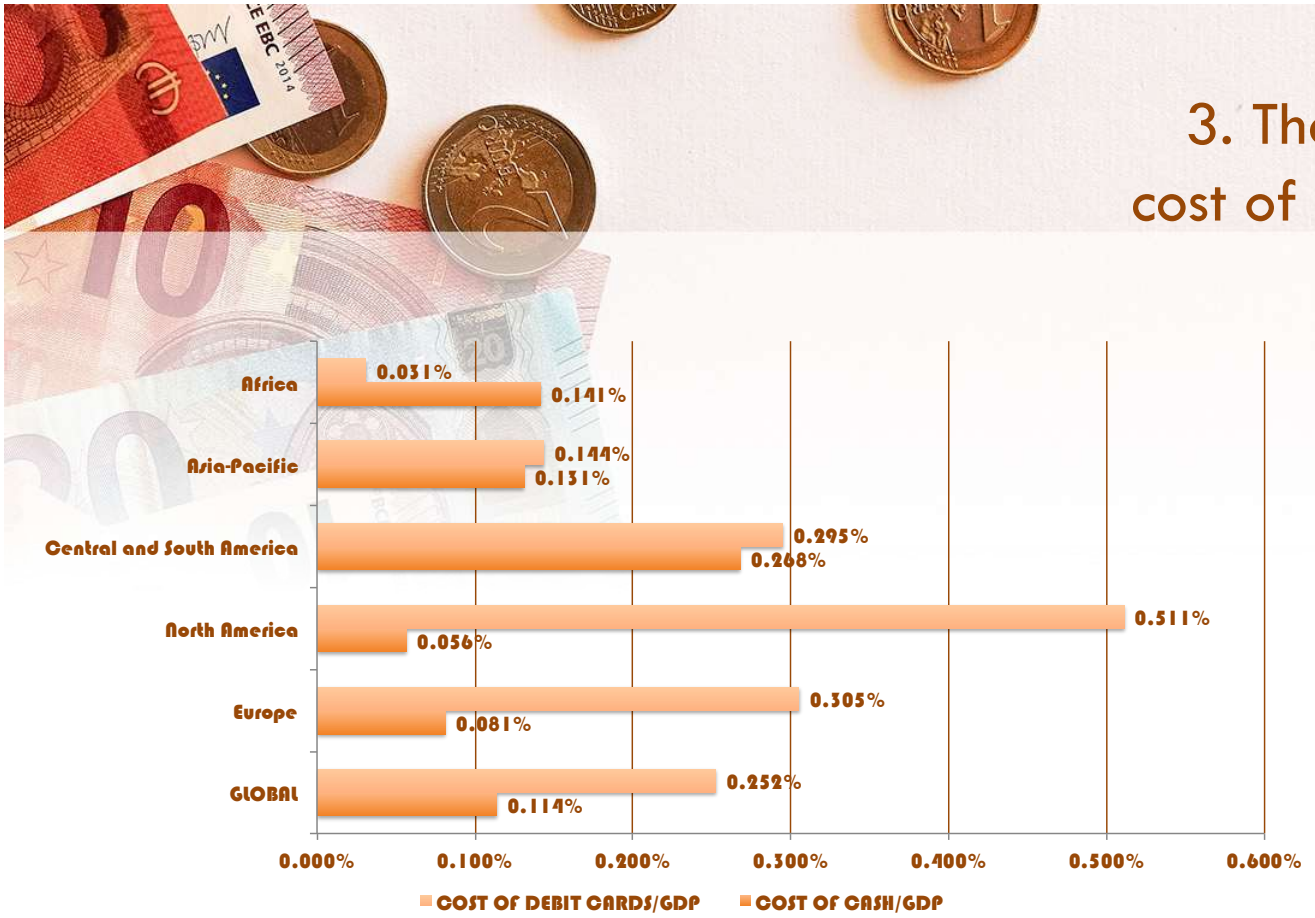

Chart 52. Economic impact of the cost of payment instruments. Cost over GDP

Our estimations on the change in cost with transaction size and the economic impact (cont'd)

- *The average global cost of cash/GDP is 0.114% compared to 0.252% of debit cards. This happens even if the average cost of cash is affected by larger cash transaction size in many countries.*

4. Is cash subsidized?

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Another myth in the cash world is that cash is subsidized. The "cash subsidy" process would work as described below:

Central banks produce cash → Banks and cash-in-transit companies assume the cost/benefits of transportation/distribution → Consumers do not pay for cash production/manipulation/distribution

However, this view ignores several aspects of the cash cycle as well as the true distribution of these costs and benefits in, at least, two dimensions:

- **Central banks assume the cost of producing cash but they have seigniorage benefits across almost all the bills and coins denominations.**
- **Banks are distributing cash with a (positive) margin**

4. Is cash subsidized?

A. Central banks assume the cost of producing cash but they have seigniorage benefits across almost all the bills and coins denominations

- **The maths are simple. Central banks (governments in some cases) obtain benefits any time the face value of the bills and coins they issue exceeds their production costs. Additionally, this issuance also produces interest or is backed with interest bearing assets given by the private banks in exchange for the bills and coins.**

- **There are exceptions for some small denomination coins where seignorage could have a negative value. However, there are other implicit benefits of using the smaller-denomination coins (inflation control, efficiency in payment transactions). This is, for example, the view of the European Commission regarding the 1 and 2 cents euro coins (more social benefits than costs): https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0281&from=et**

4. Is cash subsidized?

- **The cost origination happens at central banks, as they bear the cost of producing the bills and coins (printing and replacement).**

- **From that point onwards in the cash-cycle, other stakeholders bear the other costs and benefits. However, if we take the strong assumption that consumers are fully subsidized on the original cost of producing cash by central banks (and also taking the strong assumption that this subsidy is maintained through the cash cycle) we could then re-estimate the cash cost figures by assigning customers the full cost of producing cash.**

4. Is cash subsidized?

- In any event, if we fully assign the cost of cash production to consumers (printing and replacement costs), cash remains cheaper than cards globally:

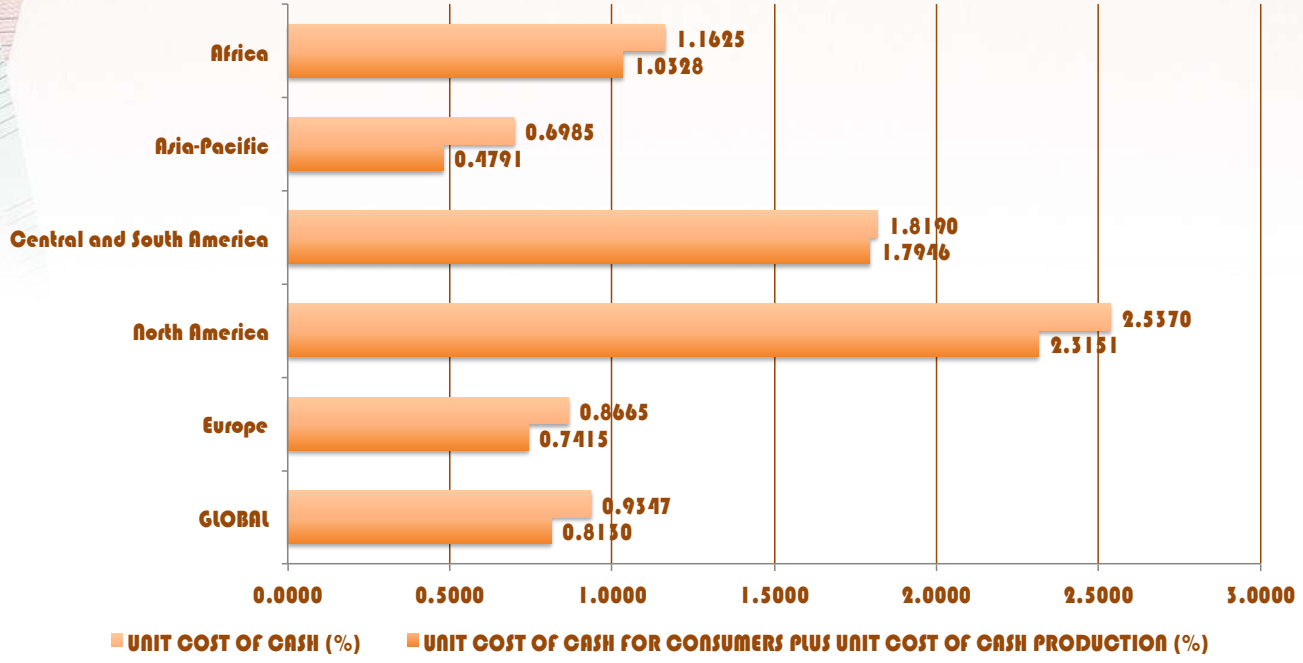

Chart 53. Unit cost of cash for consumers incorporating cash production costs (%)

4. Is cash subsidized?

B. Banks are distributing cash with a margin

- Our database allows us to measure the average cost of ATM withdrawals per transaction for consumers. This is the revenue banks obtain for distributing cash.
- We can also estimate the average cost of cash distribution by banks. This includes the cash-in transit cost for banks plus ATM maintenance.
- If we compare these figures, we find out that the cost of cash distribution by banks is smaller than the ATM revenue that they obtain. Therefore, they operate with a margin in ATM cash withdrawals.

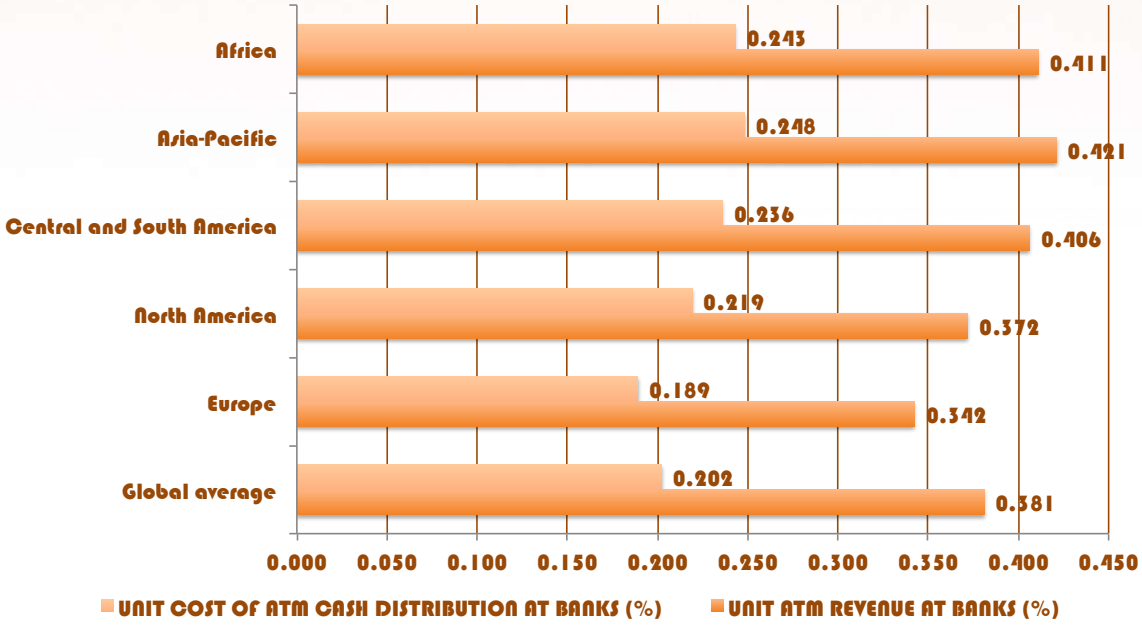

Chart 54. Unit ATM costs and revenues for banks (%)

5. Conclusions

5. Conclusions

- This study analyses the cost of cash compared to debit cards in 52 countries. It identifies and estimates the resource (operating) and private (fees) costs to determine the total social cost of both payment instruments for both consumers and retailers.

- The study provides a breakdown by geographic area (Europe, North America, Central and South America, Asia-Pacific and Africa), country, individual cost items, and compares resource costs vs. private costs (fees).

- **The results show that the unit cost of debit cards is 2.8 times larger than the cost of cash globally.**

- **It also shows there is significant variation across geographic areas but in all of them cash is found to be cheaper than debit cards (with very few exceptions a a country level). The area with the lowest unit cost of cash is Asia Pacific (0.699%) and the location with the largest cost of cash is North America (1.786%). In the case of debit cards, the lowest cost is found in Central and South America (1.512%) and the largest in North America (4.861%).**

- **Importantly, it is shown that banks distribute cash through ATMs with a margin (ATM cash distribution revenues are larger than costs).**

5. Conclusions

- Most of the cost is borne by retailers. In the case of cash, they assume 56.14% of the cost and 54.7% in the case of debit cards.
- The biggest share of the cost of cash for consumers corresponds to ATM fees (92.21%), mostly to ATM own fees although foreign fees are also quite relevant. Travel (shoe-leather) costs account for 4.52% of the costs and security and fraud 3.08%.
- As for retailers, cash in transit and other infrastructure and operation represent 67.25% of the unit costs while opportunity cost of time per transaction weight 23.14%. In spite of improvements in efficiency in cash management over the years, float still represents 7.37% of total costs of cash for retailers.
- The annual fee explains the largest of the cost of debit cards for consumers, in particular when not only implicit but also explicit fees (cards included in a bundle of current account services) are considered.
- In the case of retailers, the merchant discount fees account for most of the cost of debit cards (81.59%) for them. Opportunity costs of time represent 16.19% of the debit card cost for merchants, which is important given that cash is a relatively faster payment method for them.

5. Conclusions

- Overall, most of the costs of cash and debit cards are fees. In the case of cash, fees (mostly imposed by banks) represent 92% of the costs. The higher weight of resource costs are those of cash for retailers (28%).

- Geographically, Europe, Africa and Asia-Pacific seem to be low-to-medium cash cost areas while the unit cost of cash seems to be larger in North America and Central & South America. In the case of debit cards it is more difficult to identity comparable geographic regions. The costs of debit cards are quite high in countries like the United Sates or Russia.

- **As for the changes in the estimation with transaction size, cash remains the cheapest payment instrument for most of the standard transaction sizes.** Only over 200 dollars debit cards seem cheaper than cash.

- **In terms of the economic impact, the average global cost of cash/GDP is 0.114% compared to 0.252% of debit cards.**

- **The results are in line with international public/independent studies suggesting cash remains the cheapest payment instrument for small denomination transactions and that this seems to explain the persistence of coins and bills over GDP in most countries, including those that incorporate more aggressive policies to promote non-cash payments.**