AN APPLICATION OF THE TOURIST TEST TO COLOMBIAN MERCHANTS

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Outline

Why does cash dominate retail payments?

- The use of electronic payments is growing rapidly in emerging countries, however the levels of acceptance by merchants is low.

- This is the case in Colombia (BR, 2020):

  - 88% of adults use cash as their main payment instrument.

  - the acceptance levels by merchants is 14.1% for debit cards and 13.4% for credit cards.

- Yet, access to deposit accounts reached 83.6% in 2020 and the number of cards has grown at 7.8% annually in the last decade (1.4 cards per adult).

- Businesses, particularly small ones, recognize the gains in efficiency and competitiveness of accepting electronic payment instruments but their cost-benefit analysis remains unfavorable (Arango et al., 2017).

High costs of cards and regulation

- Carbó & Rodríguez (2019) finds that the unit cost of debit cards is 2.8 times larger than the cost of cash in a sample of 52 countries.
- Most of the cost is borne by retailers (56.1% for cash and 54.7% for debit cards).
- Cash in transit and other infrastructure and operation represent 67.25% of the unit costs while the opportunity cost of time per transaction weights 23.14% and the float represents 7.37%.
- Merchant service charge (MSC) account for most of the cost of debit cards (81.59%).
- Many jurisdictions have regulated the fees charged by card networks (e.g., Australia, Argentina, Costa Rica, EU, Mexico, UK, US).
  - Cost based approach
  - Tourist test based approach

Tourist test: theory and application

- Rochet and Tirole (2011) developed a socially efficient benchmark called the "Tourist Test" or the **Merchant Indifference Test** (MIT).

- The MIT states that the merchant service charge (MSC) should be equal to the difference in benefits of accepting a card and accepting cash.

- Wright (2012) extends the result to the case of heterogeneous merchants.

- The MIT has been used in different studies. The European Commission (2015) used the MIT to set up caps on merchant interchange fees (MIF) for Visa and Mastercard.

- The MIF is the fee charged by issuing banks to acquirer banks for each card payment transaction.

- The MIF works as a price floor in the negotiation of the MSC between acquirer banks and businesses.
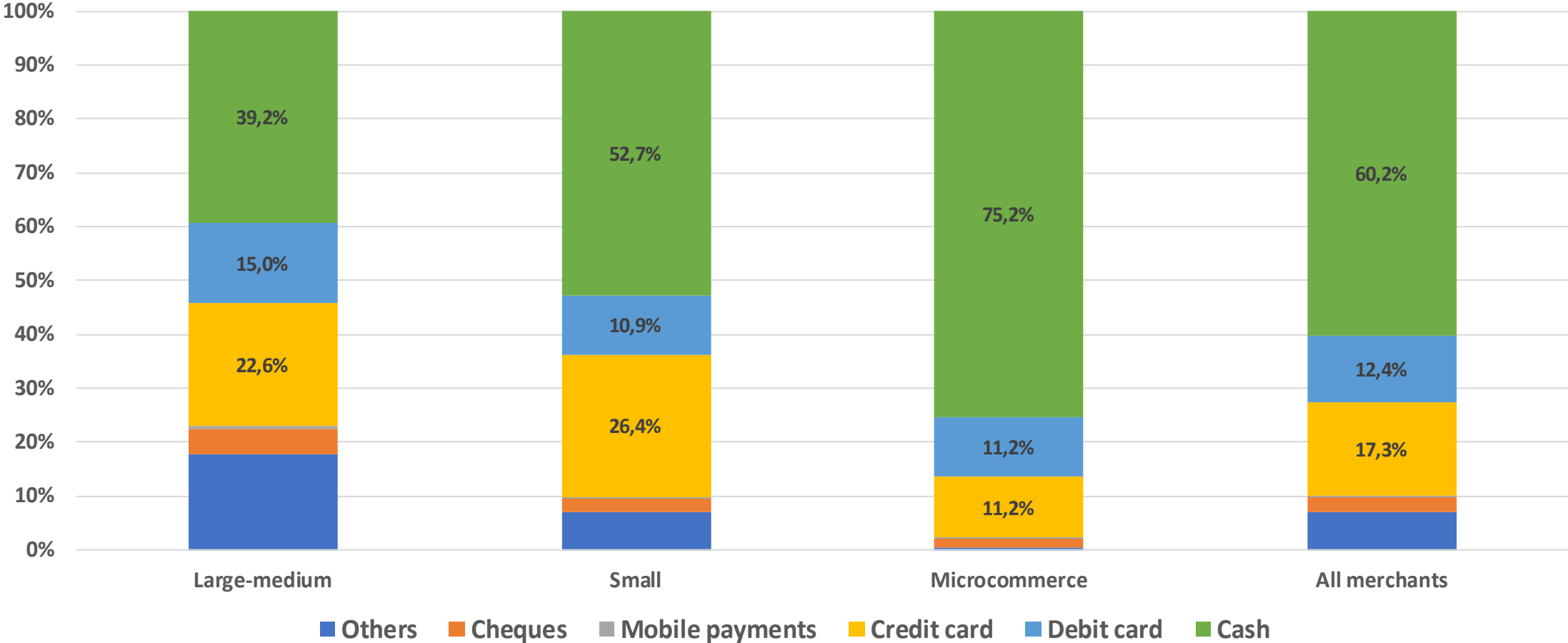
Colombian context

- There is a high degree of vertical and horizontal integration in the cards´ ecosystem.
- The major banks own Redeban and Credibanco, the two switches in charge of clearing debit and credit card payments of Visa and Mastercard.
- The banks have control of the acquisition side through Redeban and Credibanco, which carry out this activity on behalf of the banks.
- Likewise, banks control the issuance of payment instruments.
- In Colombia, the MIF have been subject to various interventions by the competition authority.
- Currently, the average MSC is 1.54% for debit cards and the average MIF is 1.28% (1.69% and 1.44% for credit cards).

The 2018 merchant cost survey

- Unit of observation: merchants that accept cash and card payments.
- Sample framework: commerce registries of businesses by city (Regional Commerce Chambers).
- Random representative sample (867 businesses).
- Random subsample for a time payments study (245 businesses).
- Stratified by merchant size and location.
- Incentives provided.
- 15 urban centers —large (5), medium (4) and small(6).

Cash dominates sales even at merchants that accept electronic payments

	Large-medium	Small	Microcommerce	All merchants
Cash	39,2%	52,7%	75,2%	60,2%
Debit card	15,0%	10,9%	11,2%	12,4%
Credit card	22,6%	26,4%	11,2%	17,3%

Legend: Others, Cheques, Mobile payments, Credit card, Debit card, Cash

Most variable costs of cards are acquiring fees

	Fixed costs	Acquiring fees	Processing costs	Opportunity costs	Froud/counter feiting/robber y losses
			All merchants		
Cash	43.60%	0.00%	55.67%	0.08%	0.65%
Debit card	50.43%	30.70%	18.87%	0.00%	0.00%
Credit card	49.55%	34.92%	15.53%	0.00%	0.00%
			Micro merchants		
Cash	43.49%	0.00%	55.71%	0.09%	0.71%
Debit card	51.57%	28.48%	19.95%	0.00%	0.00%
Credit card	53.73%	29.54%	16.73%	0.00%	0.00%
			Small merchants		
Cash	44.63%	0.00%	54.99%	0.05%	0.34%
Debit card	46.83%	39.74%	13.43%	0.00%	0.00%
Credit card	34.96%	54.18%	10.86%	0.00%	0.00%
			Medium and large merchants		
Cash	42.56%	0.00%	57.14%	0.14%	0.17%
Debit card	35.93%	50.06%	14.01%	0.00%	0.00%
Credit card	31.31%	55.89%	12.80%	0.00%	0.00%

Two thirds of merchants that accept electronic payments use some strategy to drive consumers to pay with cash (Merchants Payment Survey, 2020)
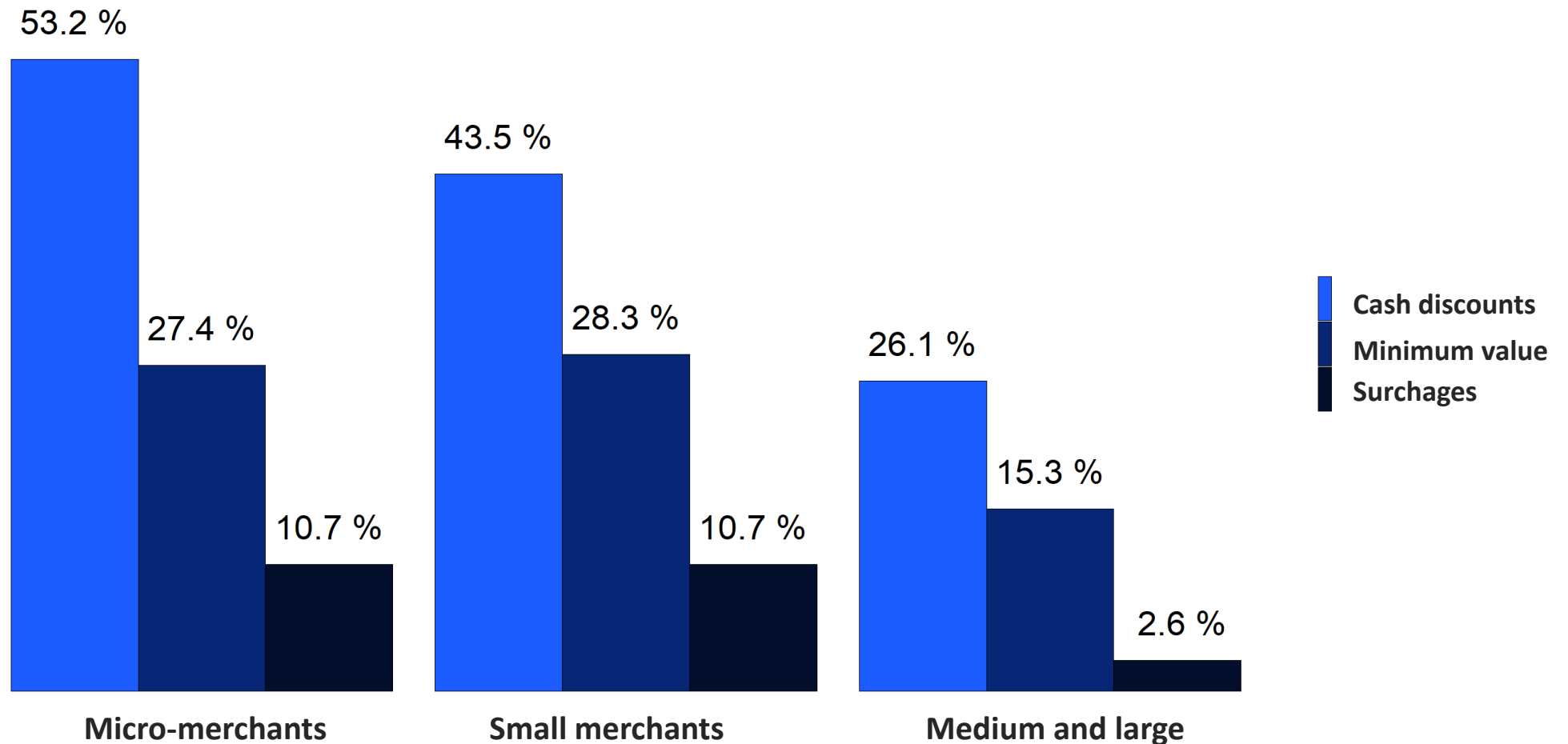
Merchant Indifference Test (MIT)
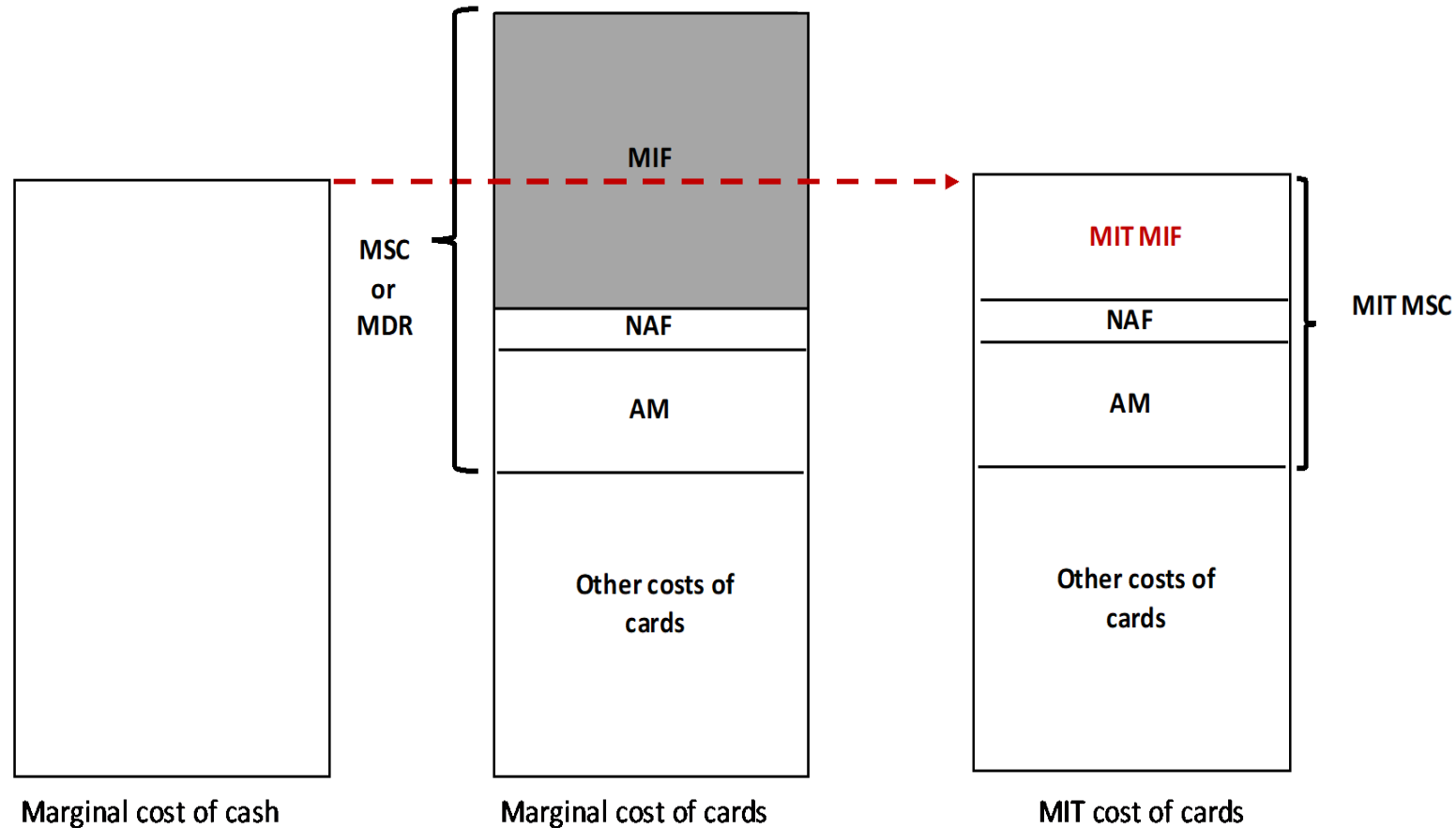
Note: MIF: merchant interchange fee; NAF: network access fee; AM: acquirer margin; MSC: merchant service charge; MIT: merchant indifference test.

Source: Fung et al. (2018) and ECDGC (2015).

Methodology for the arithmetic estimation of the MIT-MSC

- Linear cost function:

$$C_j = \alpha_{0j} + \alpha_j Q_j + \beta_j Q_j ATV_j$$

$$avc_j = mgc_j = \alpha_j + \beta_j ATV_j$$

$$MIT\ MSC\ = \frac{mgc_{cash} - mgc_{card}}{ATV} = \frac{\alpha_{cash} - \alpha_{card}}{ATV} + \beta_{cash} - \beta_{card}$$

Methodology for the arithmetic estimation of the MIT-MSC (cont.)

- We estimate:

$$MIT\widehat{-}MSC = \frac{\hat{\alpha}_{cash} - \hat{\alpha}_{card}}{ATV} + \hat{\beta}_{cash} - \hat{\beta}_{card}$$

  - Where $\hat{\alpha}_j$ and $\hat{\beta}_j$ are estimated as a weighted average of $\hat{\alpha}_{ji}$ and $\hat{\beta}_{ji}$ calculated for each merchant i.
  - Most variable costs of cash are associated with sales values and most variable costs of cards with sales volumes.

- Short-term MIT-MSC: Only variables costs.

- Medium-term MIT-MSC: Short term variable plus % of fixed costs that merchants declared variable in a medium-term scenario of 20% less cash.

Short-term arithmetic MIT-MSC: All merchants

		Midmean	p25	Median	p75
At USD 3.67	Debit card	-2.28	-7.24	-0.95	0.29
	Credit card	-2.81	-7.97	-1.02	0.34
At USD 12.27	Debit card	-0.32	-1.79	-0.10	0.90
	Credit card	-0.60	-2.76	-0.07	0.87
At USD 42.49	Debit card	0.16	-0.50	0.10	1.61
	Credit card	0.00	-1.10	0.02	1.26

Medium-term arithmetic MIT-MSC: All merchants

		Midmean	p25	Median	p75
At USD 3,67	Debit card	-5.34	-23.29	-2.54	0.01
	Credit card	-6.27	-24.83	-3.46	0.11
At USD 12,27	Debit card	-1.35	-6.55	-0.41	0.82
	Credit card	-2.05	-8.14	-0.99	0.54
At USD 42,49	Debit card	-0.20	-1.99	-0.02	1.26
	Credit card	-0.57	-2.67	-0.14	1.01

Short- versus medium-term arithmetic MIT-MSC (sample-weighted α and β)
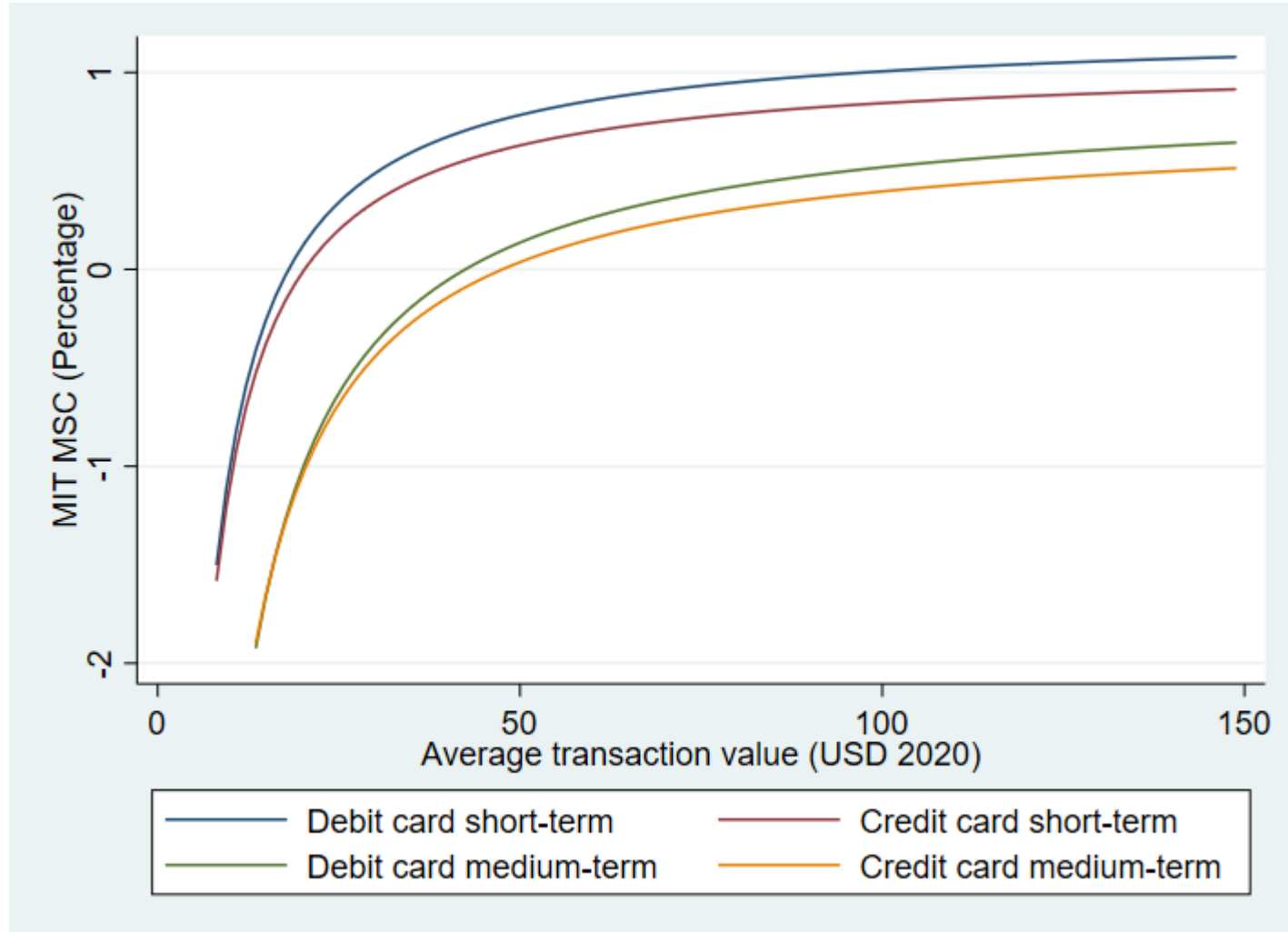
At the average card ticket value:
- The short-term weighted MIT-MSC is 0.74% for debit and 0.59% for credit.
- The medium-term weighted MIT-MSC is 0.06% for debit and -0.03% for credit.

Methodology for the econometric estimation of the MIT MSC
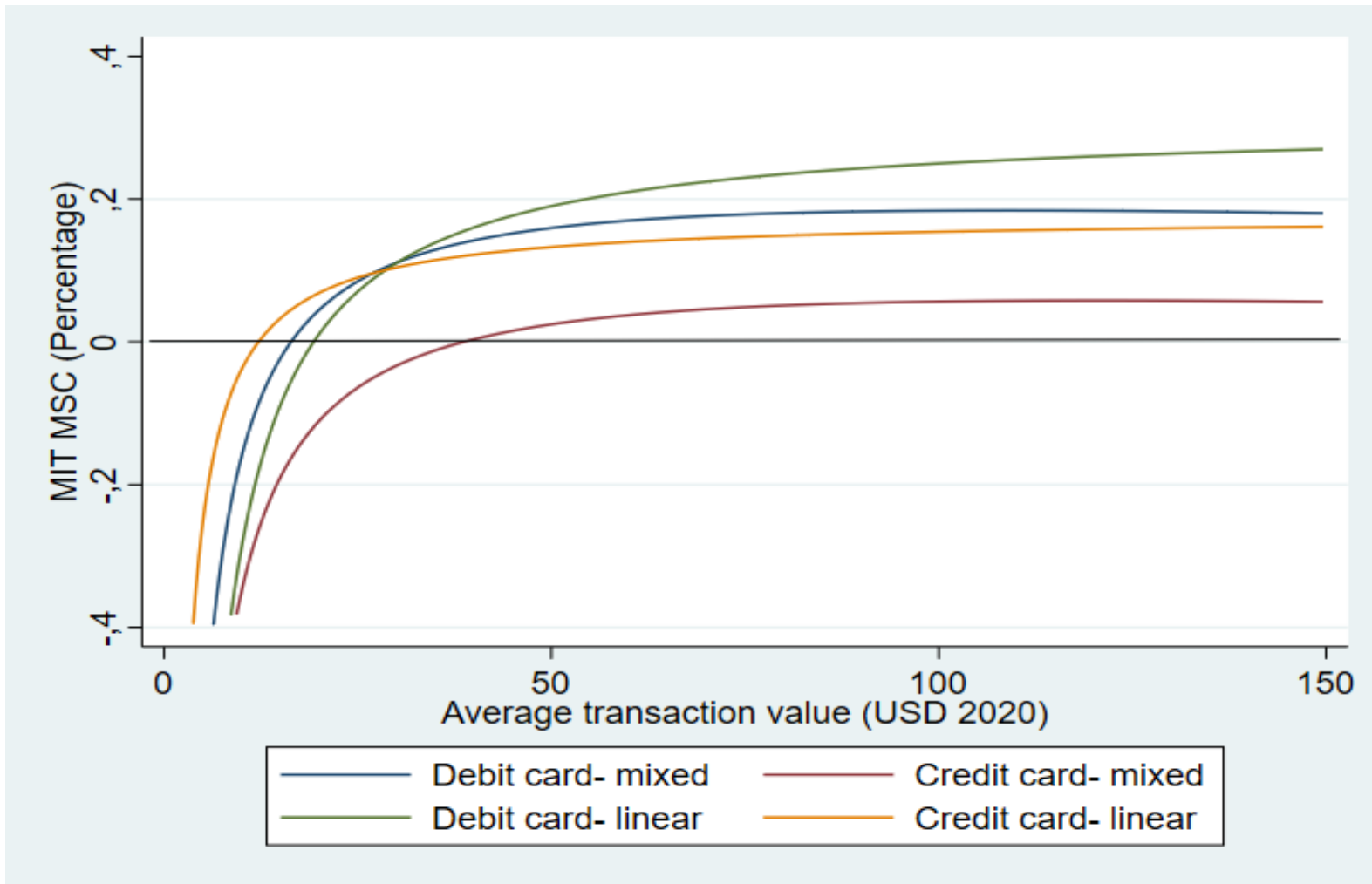
- Linear cost models:

$$C_j = \alpha_{0j} + \alpha_j Q_j + \beta_j SALES_j$$

- Mixed cost models:

$$C_j = \alpha_{0j} + \alpha_{1j} Q_j + \alpha_{2j} Q_j^2 + \alpha_{3j} SALES_j + \alpha_{4j} SALES_j^2$$

$$+ \alpha_{5j} Q_j P_e + \alpha_{6j} SALES_j P_e$$

- Robust regression based on Cook's D and Huber weights until convergence.

Linear versus mixed models

Linear model MIT-MSC results

	At USD 3.67	At USD 12.27	At USD 42.49
Debit Card	-1.306	-0.176	0.169
Credit Card	-0.403	0.002	0.125

Note: costs are modeled for a the most representative merchant´s outlet. Other variables included: number of branches, equipment type and sector dummies (not significative) .

Mixed model MIT-MSC results

		Midmean	p25	Median	p75
At USD 3.67	Debit Card	-0.86	-2.20	-1.11	1.45
	Credit Card	-1.29	-2.18	-1.48	0.41
At USD 12.27	Debit Card	-0.09	-0.50	-0.17	0.57
	Credit Card	-0.29	-0.60	-0.35	0.26
At USD 42.49	Debit Card	0.12	0.02	0.11	0.30
	Credit Card	-0.01	-0.13	-0.02	0.20

Summary of results for the MIT-MSC

	At USD 12.27		At USD 42.49	
	Debit Card	Credit Card	Debit Card	Credit Card
Short- term arithmetic (median)	-0.10	-0.07	0.10	0.02
Short- term arithmetic (weighted average)	-0.46	-0.57	0.74	0.59
Medium-term aritmetic (median)	-0.41	-0.99	-0.02	-0.14
Medium-term aritmetic (weighted average)	-2.00	-2.00	0.06	-0.03
Long-term econometric Linear	-0.18	0.00	0.17	0.13
Mixed	-0.17	-0.35	0.11	-0.02

Scenario with 30%-less dependence on cash

		Midmean	p25	Median	p75
At USD 3.67	Debit Card	1.42	0.17	1.17	3.23
	Credit Card	0.43	-0.63	0.15	2.05
At USD 12.27	Debit Card	0.53	0.15	0.45	1.10
	Credit Card	0.21	-0.11	0.14	0.73
At USD 42.49	Debit Card	0.28	0.16	0.26	0.43
	Credit Card	0.19	0.06	0.16	0.37

Estimation of the MIT-MIF

	Debit card	Credit card
Interchange fee		
Max	2.92%	2.50%
Mean	1.28%	1.44%
Merchant service cost		
Max	6.80%	7.74%
Mean	1.54%	1.69%
Aquiring and network fees (% of the merchant service cost)	16.81%	15.09%

- In the short-run a cap on the MIF would be 0.62% for debit and 0.50% for credit cards.
- In a 30%-less cash scenario a cap on the MIF would be 0.44% for debit and 0.18% for credit.

Caution

- The MIT is one-sided.

- Does not consider potential benefits of card holders that can be internalized by merchants.

- Counterfactuals do not consider changes in strategic decisions by the different parties in the market and are based on reduced-form cost functions.

- MIT-MSC and MIT-MIF estimates for credit cards are lower than for debit cards. Marginal costs only consider the transactional aspects of cards.

- All MIT-MSC and MIT-MIF estimates may need to be adjusted down to account for tax evasion. In many cases the optimal fees are negative for the representative merchant and only positive among those where cards are significantly more efficient than cash.

Conclusion

- The marginal cost of cash is lower than the marginal cost of debit or credit cards at the average retail transaction size (USD $12.27) implying a negative MIT MSC.

- Most merchants would prefer to be paid in cash rather than cards at any positive MSC.

- At the average card ticket of USD $42.49 and a short-term prospective of a sporadic consumer, the MIT MSC would be 0.74% for debit cards and 0.59% for credit cards (for the medium-term 0.06 and -0.03).

- In a 30%-less cash scenario a mean cap on the MIF compatible with the Tourist Test would be 0.44% for debit and 0.18% for credit and would accommodate the wide heterogeneity in cost structures.

- Yet, tax evasion could drive the MIT MSC and the MIT MIF substantially down for the representative merchant, even to the point of negative values, depending on the assumptions.

Thanks!