Burden of Credit Card Payments *onto Non-Credit Card Users*

- *Mechanics and Calibrations*

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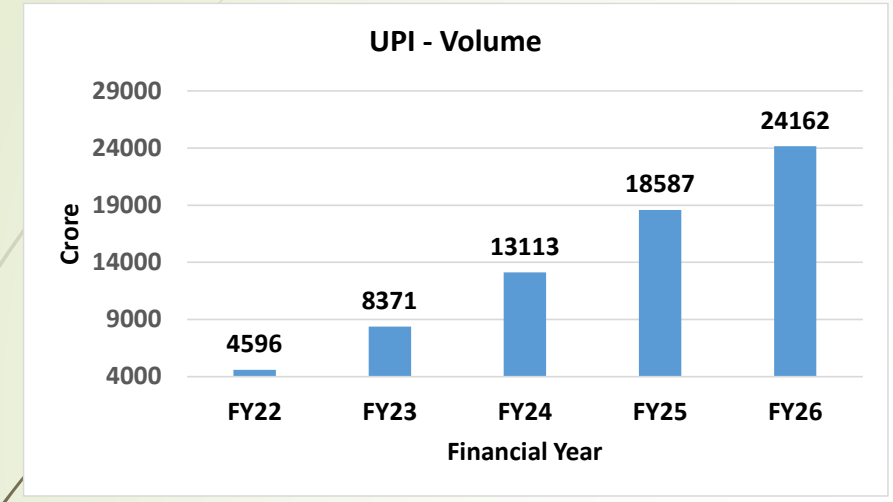
The credit card

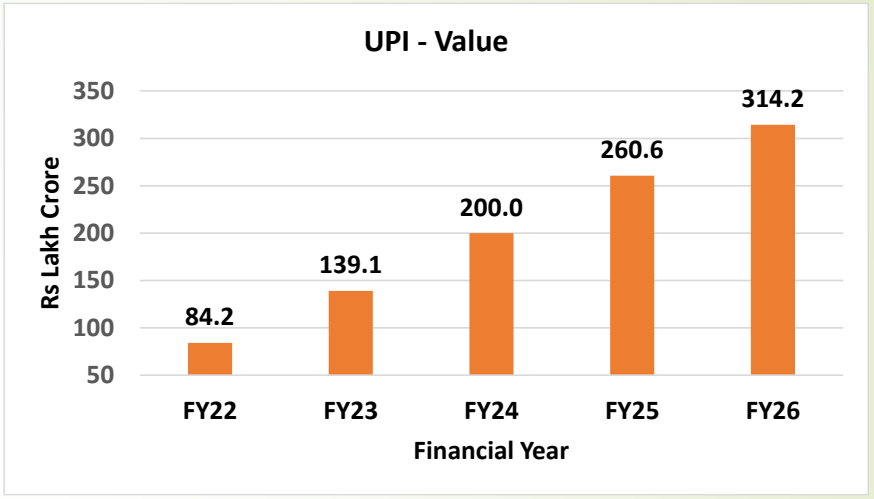
- **Card networks** mastercard/ VISA/ Amex are pioneers of credit card business. They set the business model for P2M digital transactions in the absence of other cashless retail payments.
- The basis of their business model hinged on the merchant discount rate (MDR), i.e., a percentage of credit card transaction value that the merchant's bank takes from the merchant.
- Present era has brought several alternative and efficient digital means of payment– (Impact of their co-existence?)

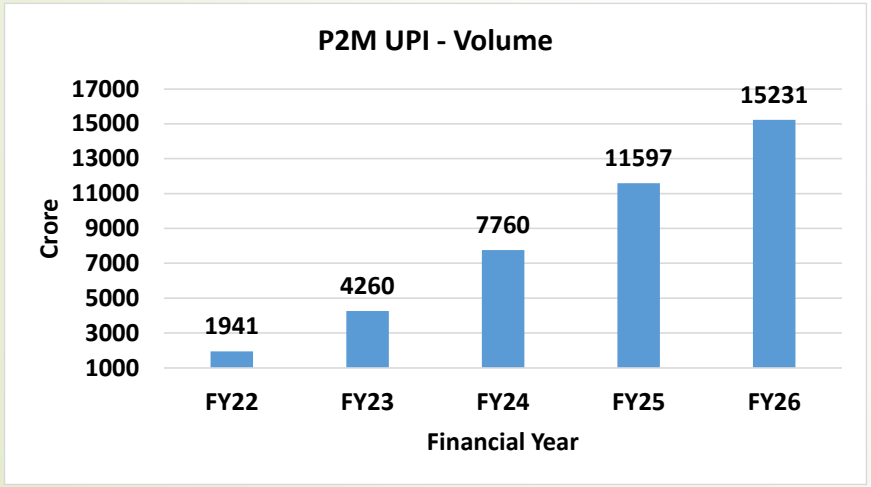
UPI – An alternative to pay digitally

- UPI is a digital revolution that has swept India's retail payment means. It has become a convenient alternative to cash.
- Unlike credit cards, UPI caters to both P2P and P2M transactions.
- In FY26, the average ticket size of credit card had been Rs 4000 and that of P2M UPI Rs 600.

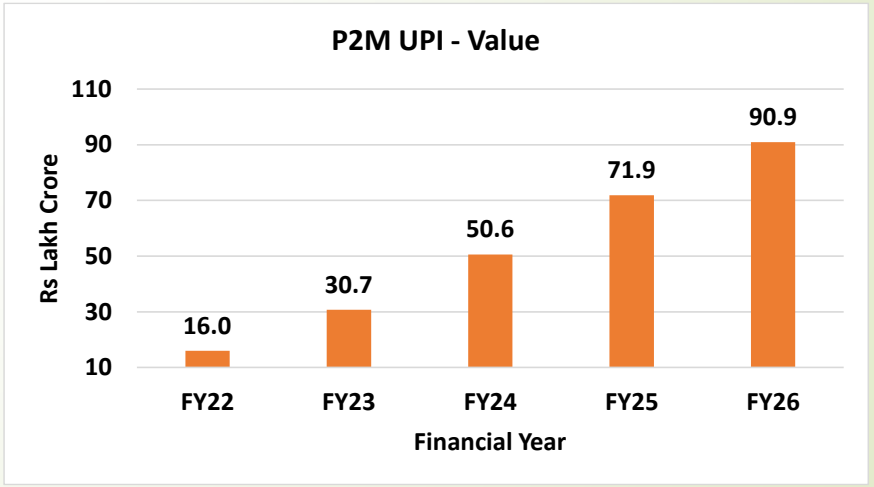
The growth of UPI transactions





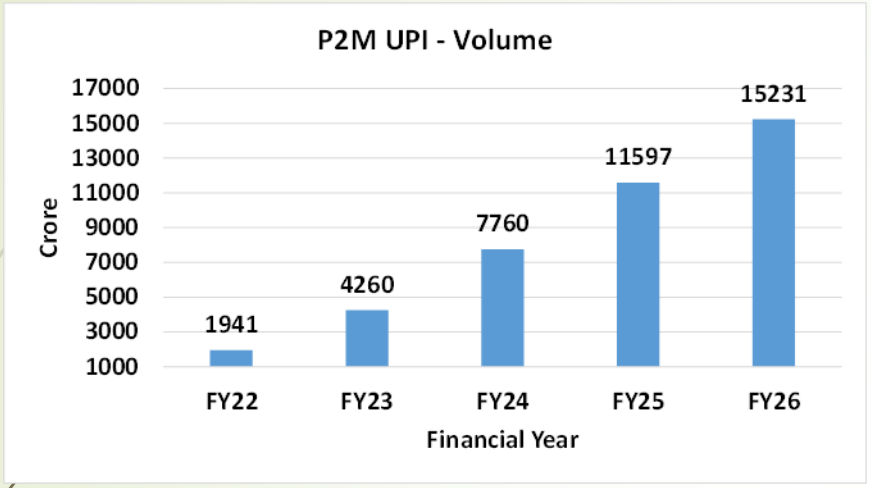


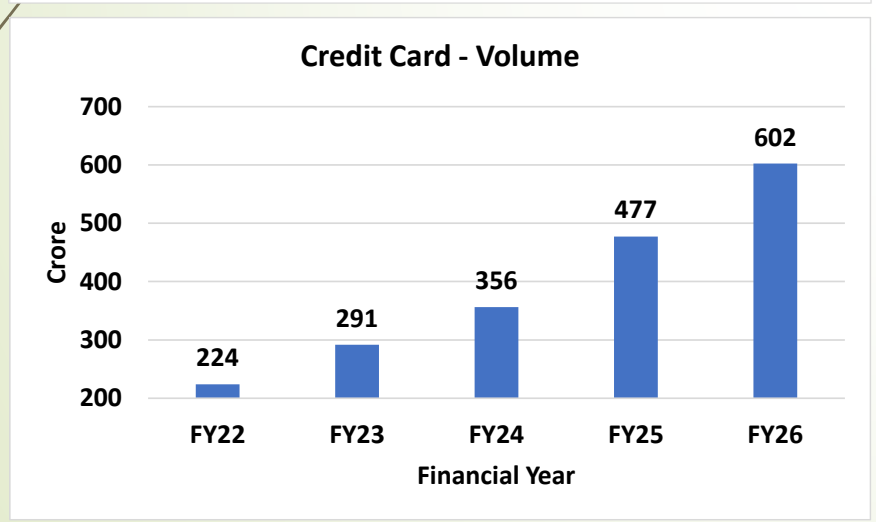
63% of UPI Vol.



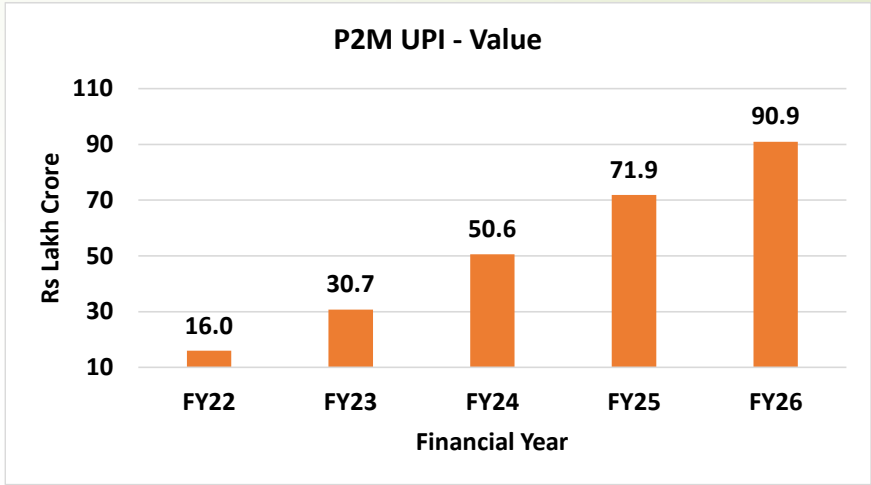
29% of UPI Val.

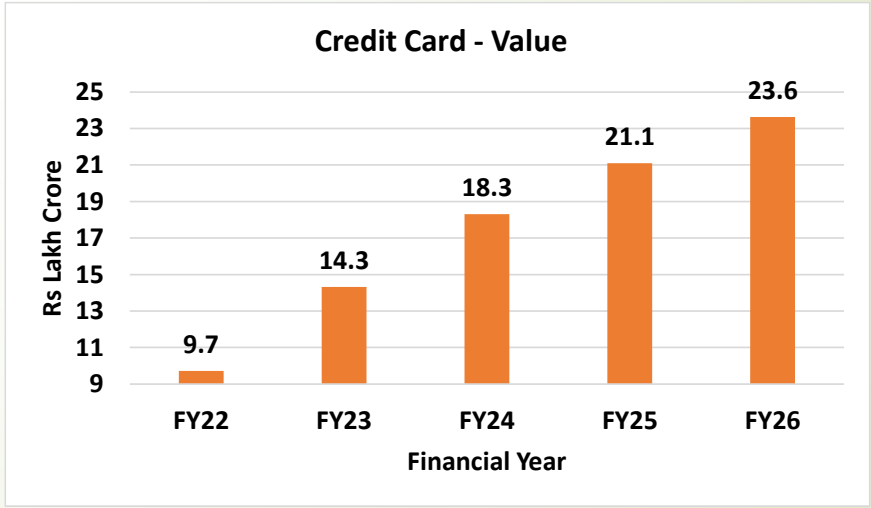
UPI vs. Credit Card – P2M transactions





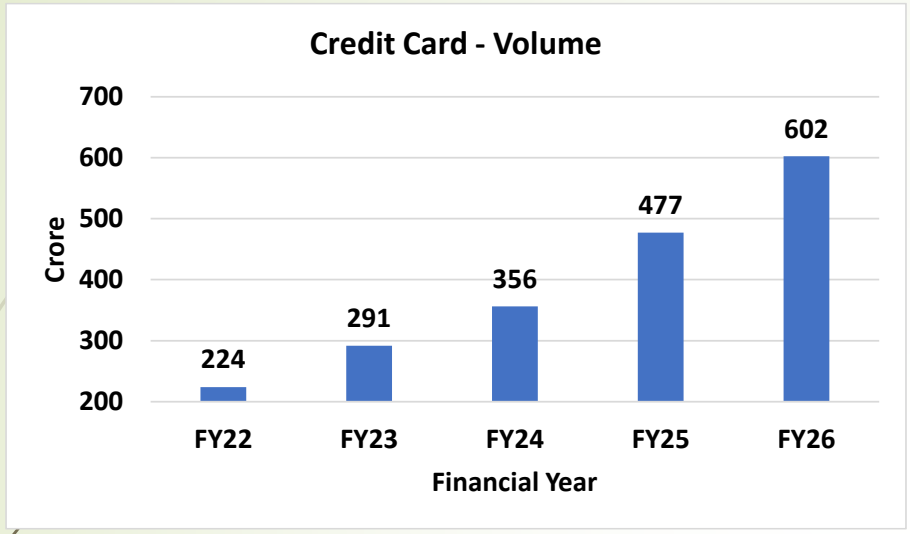
4% of P2M UPI Vol.

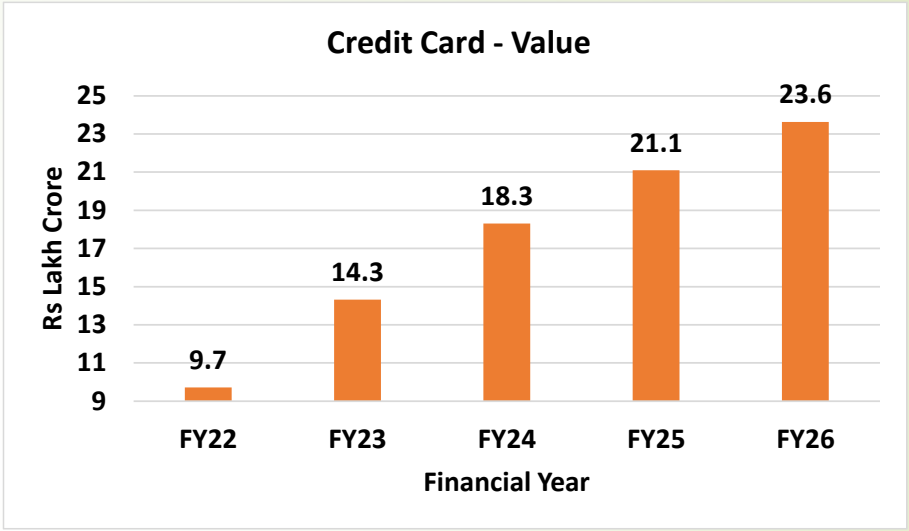


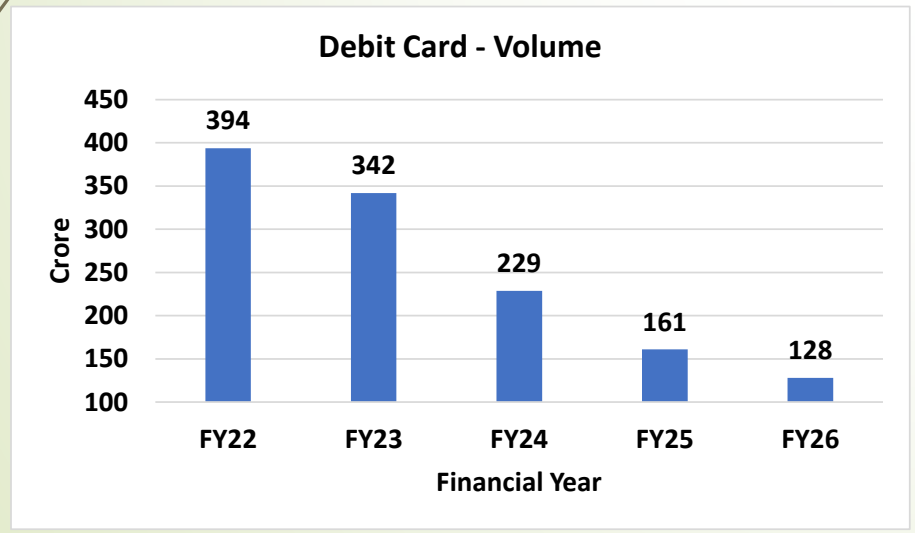


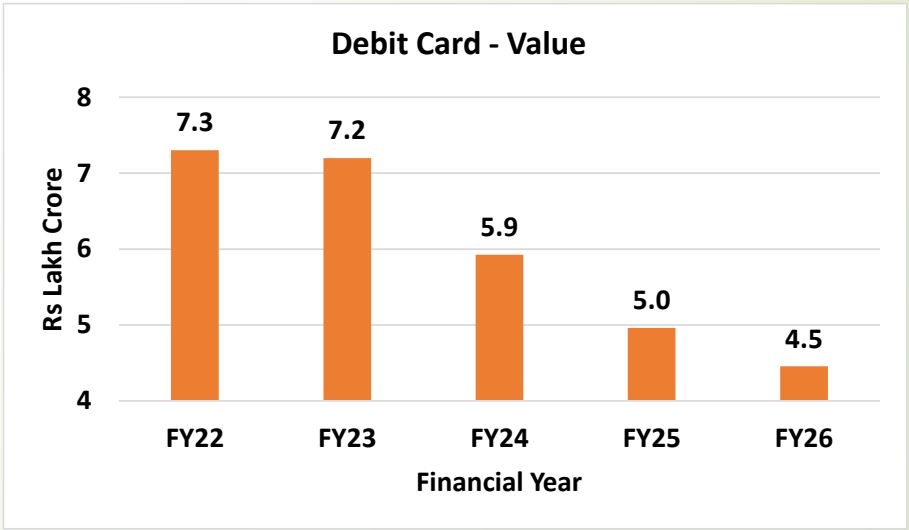
26% of P2M UPI Val.

Credit Card vs. Debit Card – P2M

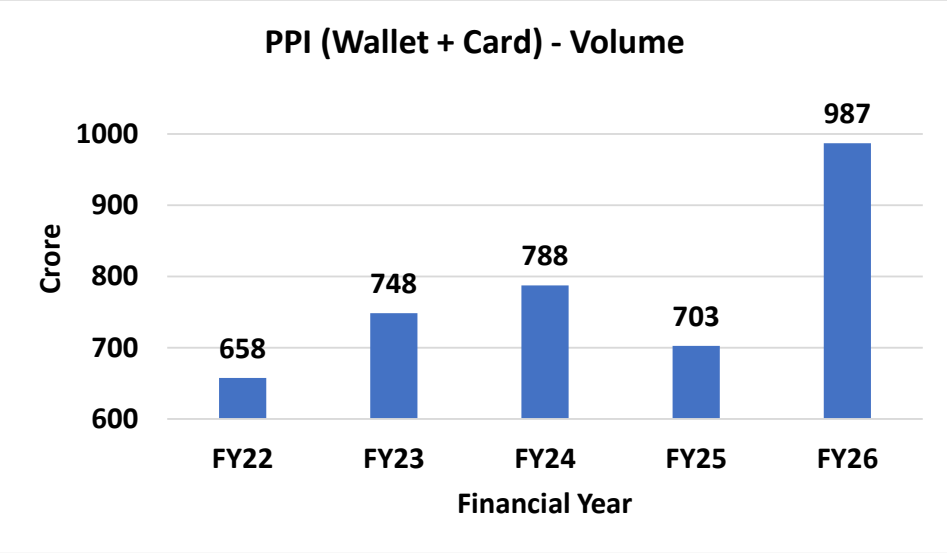


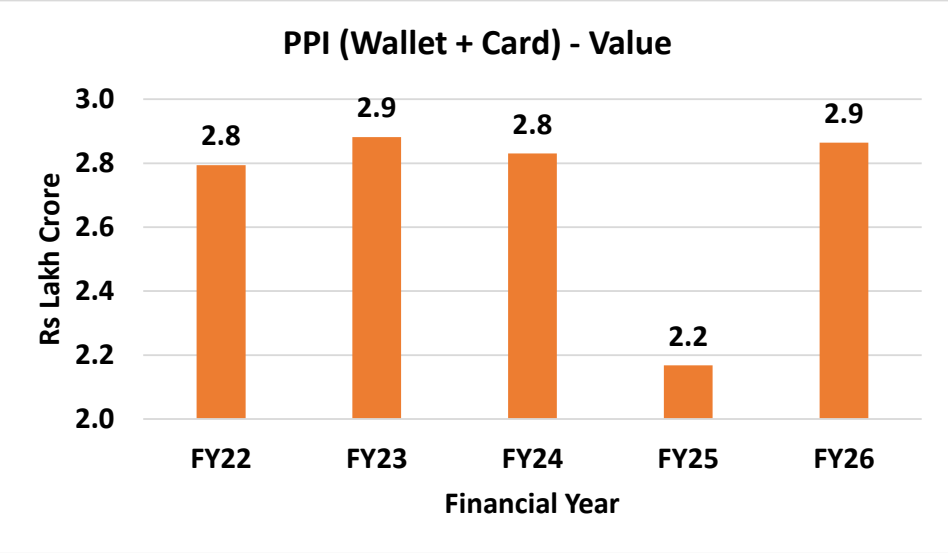




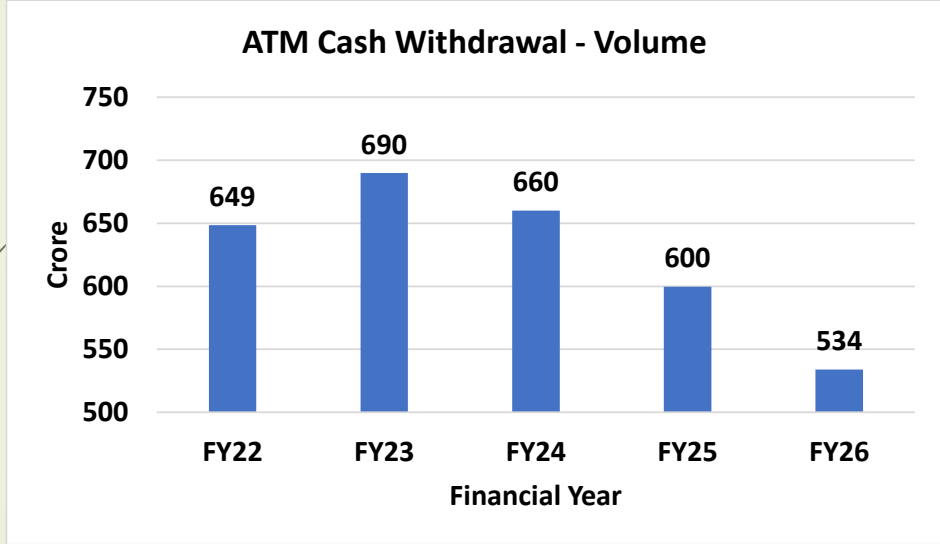


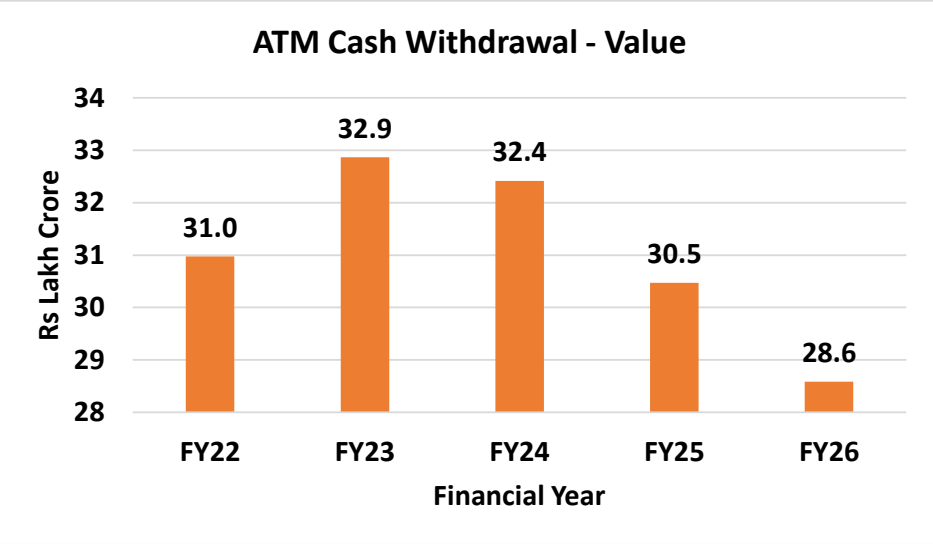
PPI Wallet and Card





ATM Cash Withdrawal (using debit card)





The business model

- The credit card payment system is not exclusively a payment system - it is an embedded loan (credit) product, for which merchants pay (MDR) to their bank.
- The money received by the bank, from the merchant, towards MDR, includes the **interest cost for such a credit.**
- Other major costs built onto the MDR are reward/loyalty points, free airport lounge access, insurance, etc.
- All these make credit card an expensive payment product as against UPI/Cash/Debit Card/PPI.
- The **credit card cost add-up to the overall cost price for the merchant that gets *universally* reflected (or adjusted) in the selling price**.

Credit card Interchange

- MDR is primarily shared between issuer bank, acquirer bank and the card scheme (e.g., mastercard, *VISA*, NPCI)
- Major share of MDR goes to the issuer bank
- **Interchange**: A component of the MDR that the card-issuing bank receives.
- An interchange of 1-2% usually translates into an MDR (inclusive of GST) of **1.5-3%**
- As an illustration, a 1.5% interchange means MDR (inclusive of GST) = {1.5+(**0.3**×1.5)}×1.18 = 2.3%

IRCTC vs Other merchants

- IRCTC iPay New – PG Charges (Upto) [Exclusive of GST@18%]:-
  - UPI & Rupay(Debit Card): Nil
  - Debit Card: 0.4% ≤ ₹2,000 & 0.9% > ₹2,000
  - **Credit Card: 1.8%**
  - Net Banking: ₹10
  - Autopay: 1.8% (Including UPI)
  - UPI-Credit Card & UPI-Credit Line: 1%
- Credit Card industry has allowed IRCTC to surcharge – **Consumers** pay directly towards the MDR (net price increases only for the credit card users)
- Credit Card industry has **dis**allowed other merchants to surcharge – **All consumers** pay indirectly towards MDR through a marginal (about 1% - 2%) increase in the price.

Merchant-acceptability and Burden?

- Majority of the UPI acceptance points (~ 80 crore) do not accept card payments, while all card acceptance points (~ 1.2 crore) take UPI.
- The imposition of the MDR for receiving credit card payments becomes part of the overall cost of business that inherently gets reflected in a higher price charged by merchants for the merchandise/ service from **all** customers.
- Who loses from credit card payments – how, why and **to what extent**?
- Credit card MDR generates the financial pool that is primarily used for funding the benefits enjoyed by credit card users.
- This financial pool leads to an implicit monetary transfer by the non-credit card (i.e., UPI/Cash/DC/PPI) users because merchants generally do not set differentiated prices for credit card users to recoup the high MDR costs.
- Credit card spending is expected to be positively correlated with household income – thus such transfers induce a regressive money transmission from low-income to high-income households in general.
- We build and calibrate a Burden-model to compute the monetary-burden of credit card MDR onto non-credit card users.

Burden - Theory and Calibrations

A Simple Scenario for a merchant:

- Total monthly retail sales = Rs 50,000.
- Rs 2,500 sales by accepting credit cards; Rs 47,500 sales are through UPI/Cash/DC/PPI payments. This means 5% of sales is through accepting credit card, while 95% through non-credit card payment modes (i.e., UPI/Cash/DC/PPI)

Merchant's cost:

- Total credit card sales: Rs 2,500
- MDR: 2.5% of Rs 2,500 = **Rs 62**

Redistribution of Costs and Prices:

- Merchant beforehand factors the transaction costs into the price of their products
- Merchant's credit card acceptance cost of Rs 62 is inbuilt in the sale-amount of Rs 50,000.
- In the absence of credit card system, all customers pay via UPI/Cash/DC/PPI, and the overall sale price amount gets reduced by Rs 62.
- Of the Rs 62, 95% burden gets transferred onto non-credit card users— $62 \times 0.95 \sim$ Rs 59.
- Thus, non-credit card users collectively have a **burden** of Rs 59— cross-subsidizing credit cards.

A Holistic Model –
Accounts for the minimal cost of handling UPI/Cash/DC/PPI

- Let, **S** = Rs 50,000 be the total retail sales in the economy
- Let, **d** = 0.05 represent the *d×100 (= 5%)* sales through credit card
- The credit card transactions equal *d S = 0.05 × 50,000 (= Rs 2,500)*
- Let, **μ** = 0.025 represent the credit card MDR (μ×100 = 2.5%)
- The total fee incurred by the merchant is μ d S = 0.025 × Rs 2,500 = Rs 62.50
- Let, **ϵ** = 0.001 denote the merchant's cost (rate) for accepting UPI/Cash/DC/PPI (ϵ×100=0.1%)
- Thus, the total fee incurred by the merchant is (μ d S) + (ϵ (1-d) S)= 62.50 + (0.001 x 47,500) = 62.50 + 47.50 = Rs 110
- A component of the merchant's cost is transferred to the UPI/Cash/DC/PPI users. This component is (1-d)100%. Thus, the transferred amount is (1-d) {μ d S+ϵ (1-d) S} = (1-0.05)×110 = Rs 104.50
- Of this, the cost incurred because of handling UPI/Cash/DC/PPI is something to be borne by the UPI/Cash/DC/PPI users themselves. So we deduct ϵ (1-d) S = Rs 47.50 from the above calculated Rs 104.50 (i.e., 104.50 – 47.50 = Rs 57).
- This means that UPI/Cash/DC/PPI users collectively bear a burden from the credit card system of

$$\mathbf{X_{nc} = (1-d)\{(\mu dS) + (\epsilon(1-d)S)\} - \epsilon(1-d)S} = \text{Rs } 57$$

Burden Simplified

- On simplifying $X_{nc} = (1-d) \{(\mu\ d\ S) + (\epsilon\ (1-d)\ S)\} - \epsilon\ (1-d)\ S$

$$X_{nc} = S\ d\ (1-d)\ (\mu-\epsilon)$$

Calculating ϵ and d

- Total purchases using CC, UPI, Cash, DC/PPI is denoted resply by ***Cr, Up, Ca, De***
- Merchant's cost (rate) for UPI, Cash, DC/PPI transactions donated resply by $\epsilon_1, \epsilon_2, \epsilon_3$
- ***Total sales: S = Cr + Up + Ca + De.***
- UPI Usage Share among non-credit: $W_{\mathbf{Up}} = \frac{Up}{S-Cr}$
- Cash Usage Share among non-credit: $W_{\mathbf{Ca}} = \frac{Ca}{S-Cr}$
- DC/PPI Usage Share among non-credit: $W_{\mathbf{De}} = \frac{De}{S-Cr}$
- The overall non-credit card transaction cost (rate) is $\epsilon = W_{\mathbf{Up}}\epsilon_1 + W_{\mathbf{Ca}}\epsilon_2 + W_{\mathbf{De}}\epsilon_3$
- Portion of sales made by credit card is ***d = Cr/S***.

NOTE:

Cr, Up, Ca and De data are sourced from RBI.

Ca is **certain times (t) of ATM cash withdrawal**. ***t is taken as 3***.

The benchmark values for μ, ϵ_1, ϵ_2 and ϵ_3

- We take μ = 0.025, ϵ_1 = 0.0005, ϵ_2 = 0.002 and ϵ_3 = 0.008.
- These are average rates (cost to merchant) for the four payment modes
- Translates to a charge of

  Rs 25 for every Rs 1,000 credit card sales

  Rs 0.50 for every Rs 1,000 UPI sales

  Re 2 for every Rs 1,000 Cash sales

  Rs 8 for every Rs 1,000 DC/PPI sales

These values have been chosen based on perceived/current trends, and can be revised as situation demands.

Burden in November 2024

- ***Cr* = Rs 1,69,298 crore**
- ***Up* = Rs 5,99,177 crore**
- ***Ca* = 3 × 2,40,471 = Rs 7,21,412 crore** (t=3. Twice of Debit Card based ATM cash withdrawal)
- ***De* = 39,010 + 19,214 = Rs 58,224 crore**

S = Cr + Up + Ca + De = 169298 + 599177 + 721412 + 58224 = Rs 15,48,110 crore (Rs 15 Tr)

d = 169298/1548110 = 0.1094

ϵ = (0.435×0.0005)+(0.523×0.002)+(0.042×0.008) = 0.0016

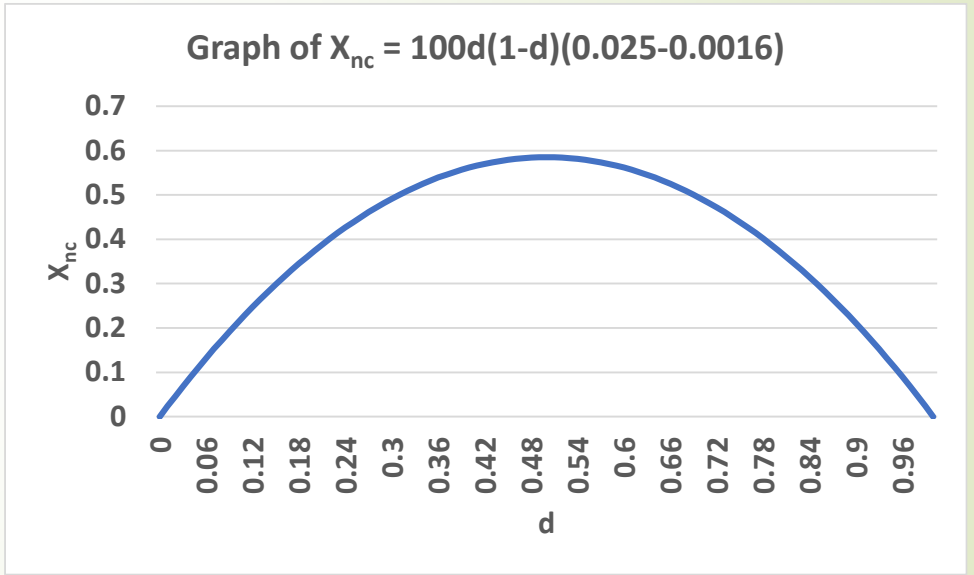
μ = 0.025

X_{nc} = 1548110×0.1094×(1-0.1094)×(0.025-0.0016) = **Rs 3,528 crore**

The role and impact of *d*

Burden: $X_{nc} = S\ d\ (1-d)\ (\mu-\epsilon)$

- *For fixed S, μ, and ϵ, it is easy to see that X_{nc} attains a maximum value at d=0.5.*
- *$X_{nc} = 0$ for d=0 or 1.*



- *With d = Cr/S,* **$X_{nc} = Cr\ (1-d)\ (\mu-\epsilon)$.**
- ***Thus, for Cr, μ and ϵ fixed, if d decreases, X_{nc} increases.***

Distribution of Merchant Categories

- While the Holistic Model appears complete, our example assumes the same value of *d* across all merchant categories.
- The reality is much more complex. Varied customer/merchant behavior towards payment modes and differing transaction fees make the redistribution effect more significant.
- To accurately quantify this impact, a more nuanced model is required.
- **Refining the Sales Model: Accounting for Sector-Wise Variations**
- In the Proper Model, we assumed a uniform percentage of credit card usage across all sale-transactions.
- In reality, different sectors of society and types of merchants experience varying proportions of credit card transactions.
- If we fail to account for these differences, our model may overestimate the burden of credit card transactions onto the non-credit card users.
- To address this situation, we refine our model by segmenting sales sectors based on their actual percentage of credit card usage.

Three Sector Model (November 2024)

- We categorize the transacting economy into three sectors, each with distinct transaction behavior
- **1) Small/'no credit'/'surcharge' Merchants (Low to Nil credit card usage) –** e.g., Canteens, Vegetable Vendors, Kirana shops, Securities brokers and dealers, Debt collection agencies, Government Services, Railways-IRCTC, etc.
- a_1 = proportion of sales at small/'no credit'/'surcharge' merchants. Consider $a_1 = 0.6$; d_1 = 0.0002, meaning 99.98% of transactions are non-credit. $a_1 \times S$ = 0.6 × 15,48,110 = 9,28,866
- **2) Large retail chains (Moderate credit card usage)** – e.g., DMart, Malls, etc.
- a_2 = proportion of sales at large retail chains. Consider $a_2 = 0.3769$; d_2 = 0.25, meaning 75% of transactions are non-credit. $a_2 \times S$ = 0.3769 × 15,48,110 = 5,83,491
- **3) High-end retails (High credit card usage) –** e.g., Tanishq (Jewelry Stores), Airlines, Hotels, etc.
- a_3 = proportion of sales at high-end retails. Consider $a_3 = 0.0231$; d_3 = 0.65, meaning 35% of transactions are non-credit. $a_3 \times S$ = 0.0231 × 15,48,110 = 35,753
- **From small/'no credit'/'surcharge' merchants, Burden** is $X_{nc1} = a_1 \times S \times d_1 \times (1-d_1) \times (\mu-\epsilon)$ = Rs 4 crore
- **From large retail chains, Burden is** $X_{nc2} = a_2 \times S \times d_2 \times (1-d_2) \times (\mu-\epsilon)$ = Rs 2,560 crore
- **From high-end retails, Burden is** $X_{nc3} = a_3 \times S \times d_3 \times (1-d_3) \times (\mu-\epsilon)$ = Rs 190 crore

Consistency

- Summing up the weighted sales through credit card across all sectors:
- $a_1 S d_1 + a_2 S d_2 + a_3 S d_3 = 186 + 145872 + 23240 = 1,69,298$

- This matches our earlier $Sd = 1,69,298$, confirming consistency in our approach.

- Summing up the sector-wise burdens:

$$X_{ncCorrected} = X_{nc_1} + X_{nc_2} + X_{nc_3} = 4 + 2,560 + 190 = \textbf{Rs 2,755 crore}$$

- This sector-wise segmented burden of Rs 2,755 crore is more realistic and corrects for the overestimated value of Rs 3,528 crore.
- For November 2024, if $a_1 = 0.60$, then $X_{ncCorrected}$ = Rs 2,755 crore
- The payment system's burden on non-credit card users for the month of November 2024 had been Rs 2,755 crore.

Calculus of Three-Sector Burden Distribution

- We fix a_1, d_1, d_2 and d_3. Now, since $a_1 + a_2 + a_3 = 1$ and $Sa_1d_1 + Sa_2d_2 + Sa_3d_3 = Sd$, where $d = Cr/S$, we solve for a_2 and a_3, giving

$$a_2 = \frac{d_1a_1+d_3(1-a_1)-d}{d_3-d_2} \text{ and } a_3 = 1 - a_1 - a_2.$$

- It is noted that the choice of a_1, d_1, d_2 and d_3 should be such that a_2 and a_3 are positive.
- Recall, $W_{\text{Up}} = \frac{Up}{S-Cr}, W_{\text{Ca}} = \frac{Ca}{S-Cr}, W_{\text{De}} = \frac{De}{S-Cr}, \text{and } \epsilon = W_{\text{Up}}\epsilon_1 + W_{\text{Ca}}\epsilon_2 + W_{\text{De}}\epsilon_3$
- $X_{ncCorrected} = X_{nc_1} + X_{nc_2} + X_{nc_3}$
- $= Sa_1d_1(1-d_1)(\mu-\epsilon) + Sa_2d_2(1-d_2)(\mu-\epsilon) + Sa_3d_3(1-d_3)(\mu-\epsilon)$
- $= S(\mu-\epsilon) \sum_{i=1}^{3} a_id_i(1-d_i)$

The choice of a_1

- a_1 = proportion of sales at small/'no credit'/'surcharge' merchants, plays a crucial role in arriving at the burden amount.
- For example, in November 2024, when we consider t=3 and ***a_1 = 0.6, the total value of transactions for such small/'no credit'/'surcharge' merchants is*** $a_1 \times S$ = 0.6 × 15,48,110 = Rs. 9,28,866 crore.
- In November 2024, the total value of P2M (Rs. 0-2000) and P2M (> Rs. 2000) transactions had been $Up_{(Sub2k)}$ = Rs. 1,97,728 crore and Rs. 4,01,448 crore, respectively. That means $Up_{(Sub2k)}$ is just about 33% of the Up. It is noted that of the P2M (> Rs. 2000), nearly Rs. 1,20,911 crore is attributed to the Securities brokers and dealers, and the Debt collection agencies. Furthermore, Government Services and Railways-IRCTC attribute to another Rs. 9,967 crore. These specific merchants (say, 'Others') need not be small but may not be accepting credit cards or be surcharging credit cards.
- Now, 60% of P2M UPI value leads to Rs. 3,59,506 and attributing all of this to small/'no credit'/'surcharge' merchants would imply that we are accounting for a little more than Rs. 3,28,605 (i.e., the combine of $Up_{(Sub2k)}$ = Rs. 1,97,728 crore and 'Others' = Rs. 1,30,877 crore).
- Thus, it is reasonably justified in assuming ***$a_1 \approx 0.6$ as it would tally closely to a realistic value. In fact, a_1 is such that*** $a_1 \times Up \approx (Up_{(Sub2k)} + Others)$. That is, $a_1 \approx (Up_{(Sub2k)} + Others)/Up$.
- Thus, from the monthly UPI data on *Up*, $Up_{(Sub2k)}$, Securities brokers and dealers, the Debt collection agencies, Government Services and the Railways-IRCTC, it shows that the value a_1 should realistically be closer to 0.6 than to 0.7.
- Instead of a point estimate for computing the burden that is based on just one assumed value of ***a_1, we consider a conservative range of a_1 in the range 0.6 to 0.7.***

The burden as computed

- On considering, μ = 0.025, ϵ_1 = 0.0005, ϵ_2 = 0.002, ϵ_3 = 0.008, t=3, d_1 = 0.0002, d_2 = 0.25 and d_3 = 0.65

- For FY24,
  with a_1 = 0.7, $X_{ncCorrected}$ = Rs 24,026 crore
  with a_1 = 0.6, $X_{ncCorrected}$ = Rs 30,597 crore

- For FY25,
  with a_1 = 0.7, $X_{ncCorrected}$ = Rs 26,816 crore
  with a_1 = 0.6, $X_{ncCorrected}$ = Rs 34,084 crore

- For FY26,
  with a_1 = 0.7, $X_{ncCorrected}$ = Rs 29,403 crore
  with a_1 = 0.6, $X_{ncCorrected}$ = Rs 37,325 crore

Transaction data and Burden FY24-26 (Rs crore)

μ	ε1	ε2	ε3
0.025	0.0005	0.002	0.008

d1	d2	d3
0.0002	0.25	0.65

t = 3

FY	Credit Card	P2M UPI	ATM Cash	Debit Card	PPI (Wallet+Card)	$X_{ncCorrected}$ (a_1 =0.7)	$X_{ncCorrected}$ (a_1 =0.6)
24	18,31,134	50,56,990	32,41,538	5,92,429	2,83,048	24,026	30,597
25	21,09,197	71,87,096	30,46,987	4,95,914	2,16,751	26,816	34,084
26	23,62,471	90,93,029	28,58,626	4,45,475	2,86,429	29,403	37,325

Month	Credit Card	P2M UPI	ATM Cash	Debit Card	PPI (Wallet+Card)	$X_{ncCorrected}$ (a_1 =0.7)	$X_{ncCorrected}$ (a_1 =0.6)
Jul-26	2,08,186	9,06,613	2,19,308	37,932	28,607	2,612	3,316

NOTE: **1. Cash withdrawal at Micro ATMs is one-tenth of the withdrawals at ATMs (Source: RBI)**
2. Cash withdrawal at Bank Branches is about twice of the withdrawals at ATMs (Source: SBI)

The burden in FY26

In FY26, the burden on non-credit card users due to presence of the credit card system in the country had been in the range of

Rupees **29.4 – 37.3 thousand crore (μ = 0.025)**

Rupees **23.1 – 29.4 thousand crore (μ = 0.02)**

RBI and the Government- The analogy

- RBI Governor Sanjay Malhotra has echoed the sentiment, saying UPI cannot stay free forever: "It is not free even now, someone is paying for it. The government is subsidizing it, but somewhere the costs are being paid.". That 'somewhere' the costs are being paid is exactly the point he stresses indicating that though government is subsidizing, still it is the public money and thus the people (poor and rich) of the country are bearing the cost uniformly. This may not be fair unless (i) the government alongside subsidizing the UPI ensures that it recovers the subsidy amount from the rich in form of direct taxes, or (ii) the government without subsidizing, brings in a way to charge merchants, mostly those catering the rich, while accepting UPI transactions.
- In our analogy with respect to the credit card system, we show that this 'somewhere' is the UPI users themselves who are cross subsidizing the credit card costs by taking the burden of the credit card system of the country. The 'someone' is the merchant who pays the credit card MDR, but the 'somewhere' from where this MDR expenditure of the merchant gets actually paid is the UPI users who take the significant burden of the costs of credit card MDR.

The deceptive discrimination towards UPI users

- Within the "no payment-surcharge" rule (as per merchant agreements), merchants have no option but to discriminate between two consumers, one paying through credit card and another paying through UPI. The discrimination is in the sense that merchants make more profit from those consumers who pay through UPI than from those who pay through credit card where a high MDR bites into their margins.
- Earlier days when such a comparison between cash and credit card was valid, the argument put forth was that currency handling is no less expensive than the MDR associated to credit cards, and so the discrimination did not really hold between the consumers using cash and credit cards. However, now with the advent of UPI, there is no good justification to retain the discrimination between UPI and credit card.
- The potential of all those who continue to pay through UPI, cross-subsidizing credit card payments, would lead to credit card promoting such discrimination under the credit card interchange and MDR structure.
- The imposition of MDR for receiving credit card payments becomes part of the overall cost of business that inherently gets reflected in a higher price charged from all customers by the merchant for providing merchandise/ service. As a result, UPI payers are subsidizing credit card payers, where the two co-exist.
- The players in the payment system are exploiting the merchants and all consumers by integrating an avoidable layer of cost to the pure payment system that exists in UPI. The thrust of credit card MDR onto the merchants is so strong that it has become much easier for the merchants to succumb to the same and continue with their focused business prospects by considering such costs as overheads (thus building the same into the selling price). This inherently raises the purchase price for all consumers and thus hurts the consumers more as they ultimately bear the convoluted cost of such payment system extravaganza.

Passive smokers: An analogy for cross-subsidization

- We present an analogy between passive smokers and UPI users. Let smokers be equated to credit card users enjoying the same, while non-smokers be equated to the UPI users. Non-smokers are analogous to those who do not use credit card, or associate with negatives to the same.

- To mitigate the risk of passive smoking, it is prohibited to smoke at public places. The same analogy is not applied for usage of credit card.

- Merchants are required to accept credit card at par with the UPI. This makes UPI user analogues to a passive smoker because of the cross-subsidization. Thus, the credit card induces negatives that is analogous to passive smoking.

- The payment system needs to keep UPI as a pure digital alternative to currency devoid of any systemic burden due to co-existence of the credit card payment system.

Repulsion to high MDR (but adjusts as system prevails)

- Interchange is just one component of the credit card MDR. The MDR, @2-3% of the transaction amount, is paid by merchants, i.e., for a Rs 3,000 transaction, MDR would amount to Rs 60-90.
- The imposition of MDR for receiving credit card payments becomes part of the overall cost of business that inherently gets reflected in a higher price charged by merchants for the merchandise/ service from **all** customers.
- Non-credit card payers cross-**subsidize** credit card payers where the two co-exist.
- Low-income households cross-**subsidize** high-income households where non-credit card and credit card acceptance co-exist.
- Moreover, small- and medium-merchants are usually repulsive in accepting credit card because of high MDR.

Thoughts for pondering…

- **The merchants can be allowed to impose a credit card payment-surcharge onto credit card users. This has been realized by many countries including the United States, Australia, and Canada to '***curtail cost to businesses of card acceptance and the pass-on of such costs to all consumers***'.**
- Alternatively, as also echoed in RBI's discussion paper on charges in payment systems, instead of this burden of adjusting the price being the responsibility of the merchant, the issuing banks can take the responsibility to charge directly the credit card users for the cost of the credit enjoyed.
- However, such a practice is currently non-existent in this world, possibly because it goes against the business interests of mastercard and VISA.
- Regulators worldwide need to meticulously measure aspects that relates more to the end-stakeholders and consider retaining the excellent payment-cum-credit product, but tweaking it structurally.

The concluding takeaway…

- The thrust of credit card MDR onto the merchants is so strong that it has become much easier for the merchants to succumb to the same and continue with their focused business prospects by considering such costs as overheads (thus adding the same into the selling price). This inherently raises the purchase price for all consumers, even for those who have not enjoyed any credit.

- To make the 'credit card' payment space a viable banking business, a logical and objective solution is **not the credit-cost-embedded-MDR**, but rather, the **daily interest earned from the true credit takers** who want to buy now but pay later.

- As also echoed in RBI's discussion paper on charges in payment systems, the issuing bank should charge for the credit enjoyed by the credit takers in a credit card transaction rather than the acquirer banks charging, the high credit-component in the MDR, from the merchants.

Thank you all…