

Electronic Payment Technology and Tax Capacity: Evidence from Uruguay's Financial Inclusion Reform

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Motivation

- ▶ **Idea that the digitization of transactions through electronic payment technology can help improve tax compliance**
 - ▶ Influential in academic literature, policy advice (OECD 2017, World Bank 2016) and actual policy (demonetization in India)

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- ▶ **Impact of electronic payment depends on who adopts technology and which transactions are covered by paper trail**

Uruguay's Financial Inclusion Reform

- ▶ **Objective:** increasing financial inclusion for its many benefits, also formalize economy and improve tax compliance

▶ Bank account

▶ Card Circulation

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- ▶ **Multi-dimensional strategy** of financial inclusion
 - ▶ Financial incentives for **consumers** to use cards
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 - ▶ Other: support to POS networks, ceiling to commissions, free accounts for all, mandates for payment of wages/pensions in to bank accounts

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- ▶ **Empirical approach:** Exploit variation in the timing and targeting of incentives

Outline

Context

Results

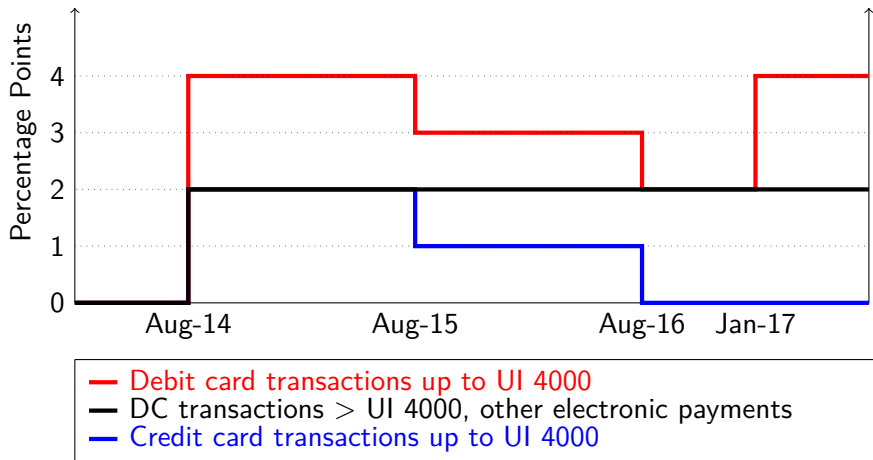
- EPT Adoption

- Tax Compliance

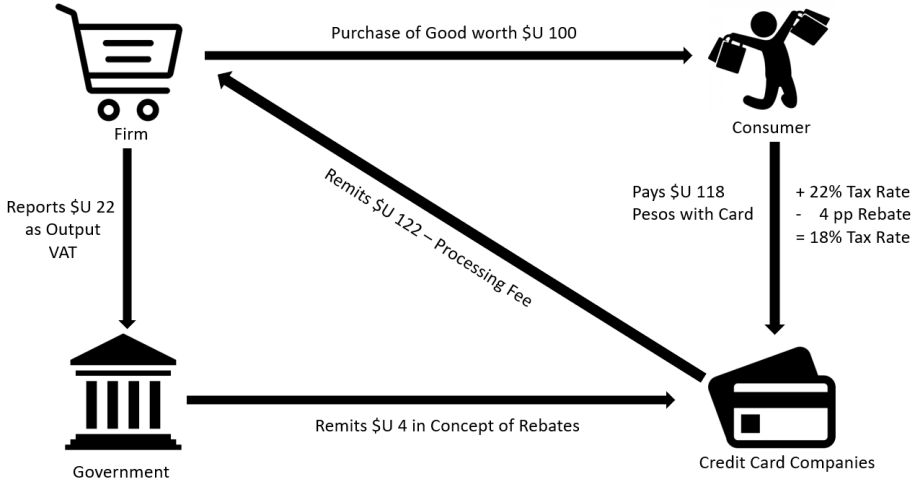
- Interpretation

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Financial Incentives to Adopt EPT: VAT Rebates for Card Purchases



Provision of VAT Rebates



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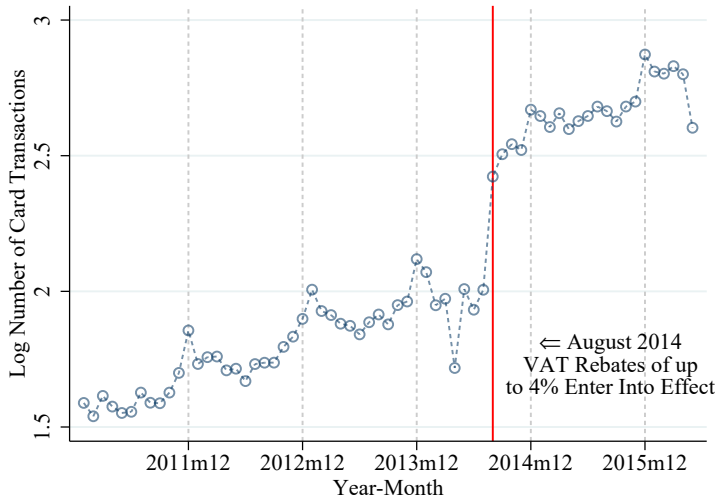
EPT Adoption

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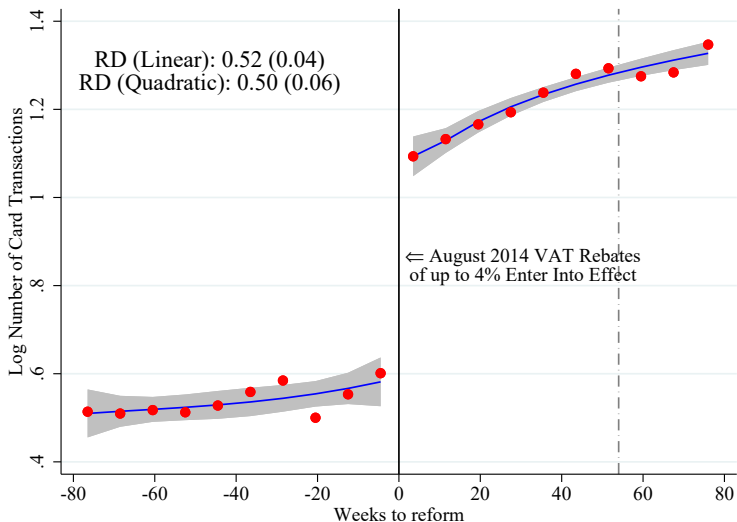
Conclusion

Number of Card Transactions (Raw Data)



▶ De-seasonalized

Large ($\approx 50\%$) Increase in # of Card Transactions

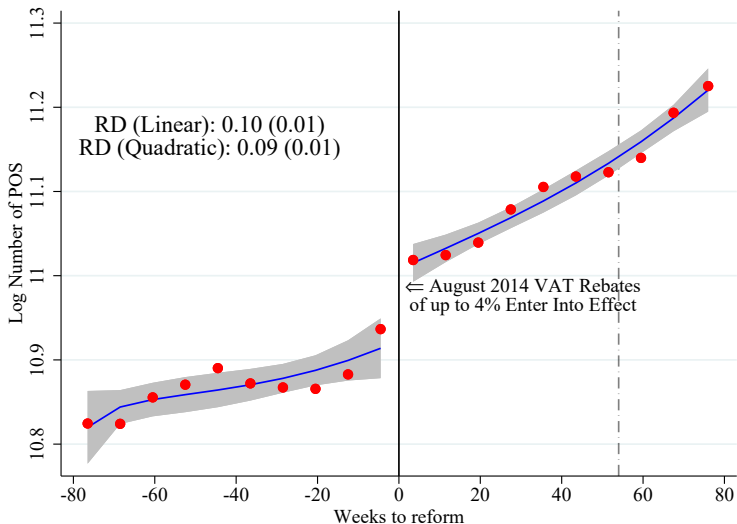


▶ Robustness

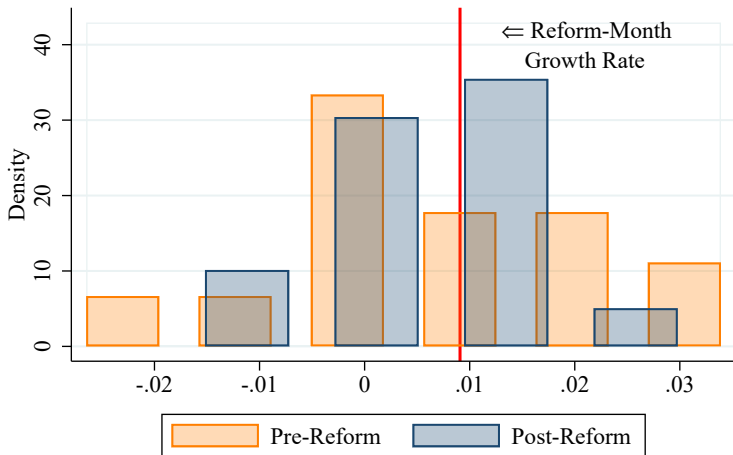
▶ Growth Rate

▶ Placebo

A Small Increase in # of POS



But No Increase in # of Firms with POS



Mean Pre Reform (0.005) vs Mean Post Reform (0.007): ttest p-value (0.667)
Month of Introduction (0.009) vs Mean All Other Months (0.006): ttest p-value (0.086)
Mean Pre Reform (0.005) vs Month of Introduction (0.009): ttest p-value (0.137)

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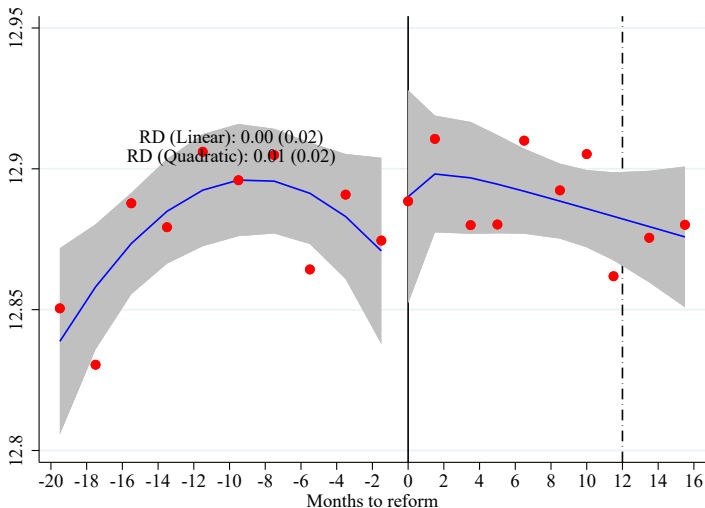
EPT Adoption

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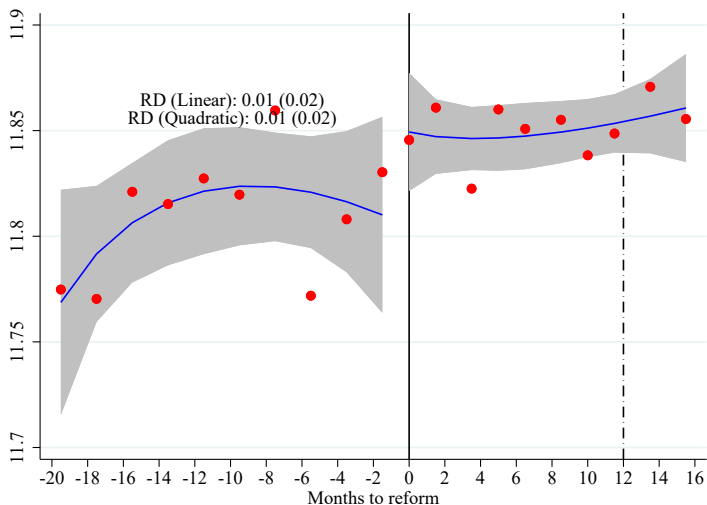
Interpretation

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In Aggregate, No Change in Declared Output VAT



And No Change in Net VAT



Empirical Approach

- ▶ Comparing retailer sector and wholesale sector firms, consider that the latter are not directly treated by reform
- ▶ Use annualized data as non-CEDE firms report retrospectively
- ▶ Results are similar with monthly data

No Detectable Effect on Reported Sales

Figure: (a) Time Trend

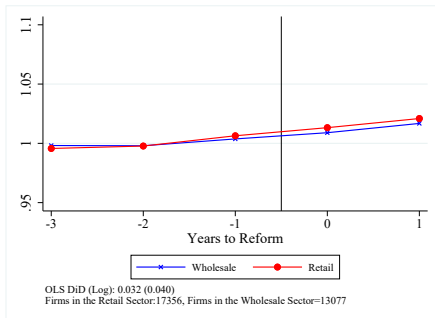
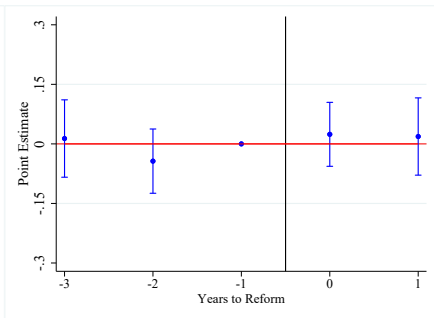


Figure: (b) Treatment Effects



No Effect on Output VAT

Figure: (a) Time Trend

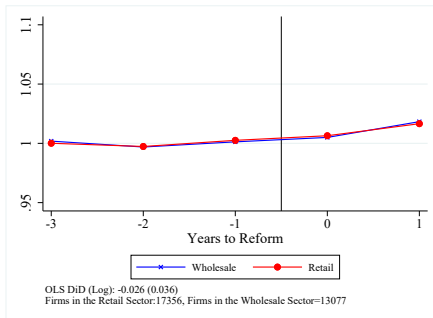
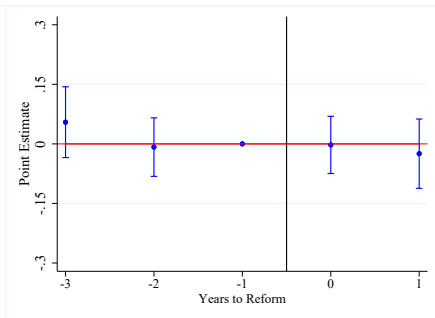


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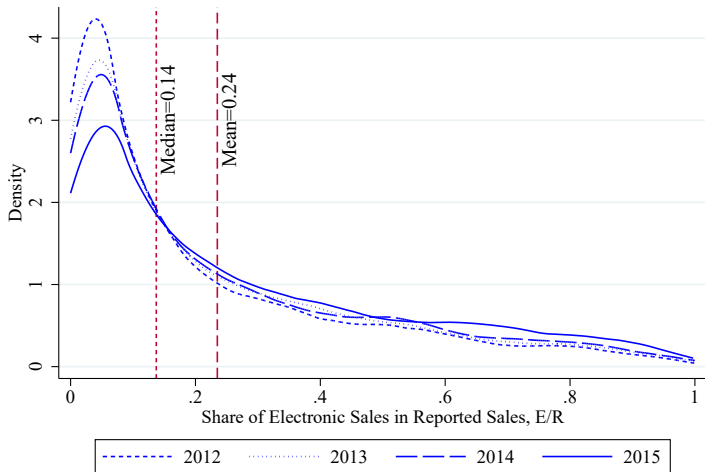
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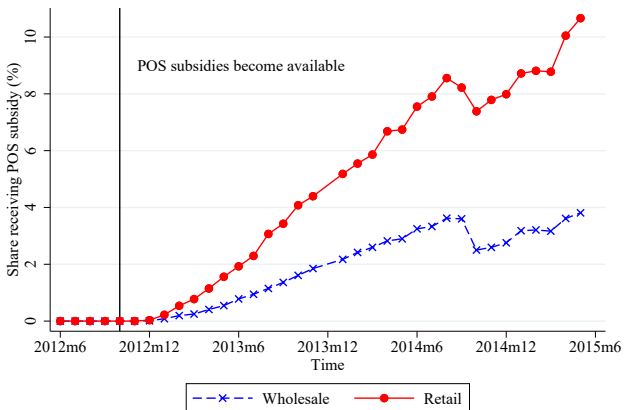
Conclusion

Low Share of Card Sales in Reported Sales



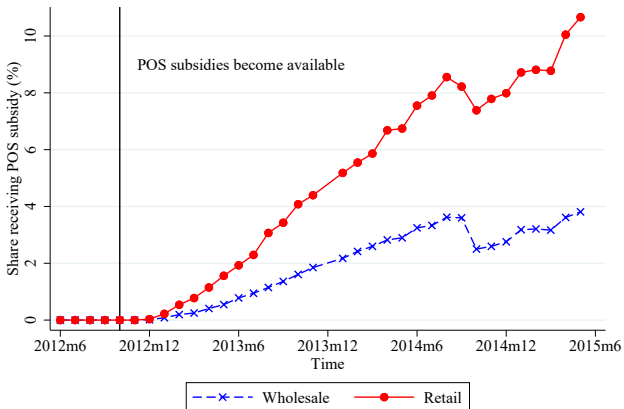
N: 2012=7166, 2013=7471, 2014=7611, 2015=7335

Selective POS Adoption by Firms: Gradual Uptake of POS Subsidy



Unbalanced sample of retail and wholesale firms.

Selective POS Adoption by Firms: Gradual Uptake of POS Subsidy



Unbalanced sample of retail and wholesale firms.

80% of firms taking up subsidy in '13/14 **already had** a card machine

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Financial inclusion measures can accelerate the adoption of electronic payment technology, without boosting tax capacity

Consumers are highly responsive to incentives for EPT adoption

Firms face more complex trade-offs and are less responsive

- ▶ Selective POS adoption
- ▶ Low share of card sales in reported sales

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Mandating card payments overcomes issue of endogenous adoption

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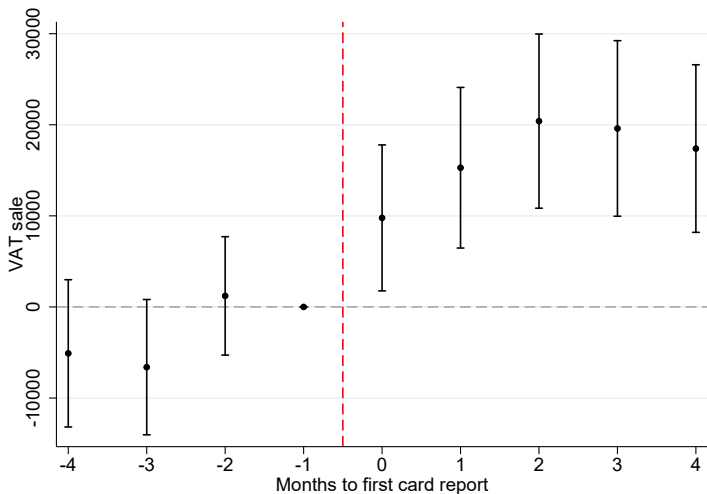
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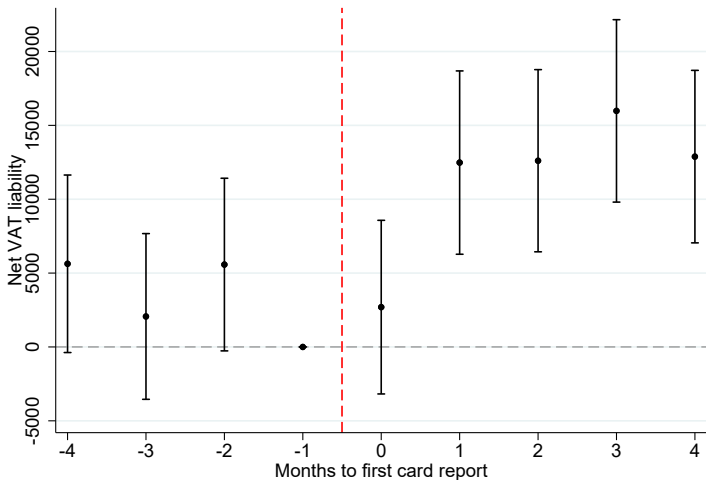
Thank you!

Increase in Output VAT after Card Machine Adoption



Balanced panel of 3694 retailers and wholesalers ever receiving a card report. Mean -1: 257382.54.

Increase in VAT Liability after Card Machine Adoption

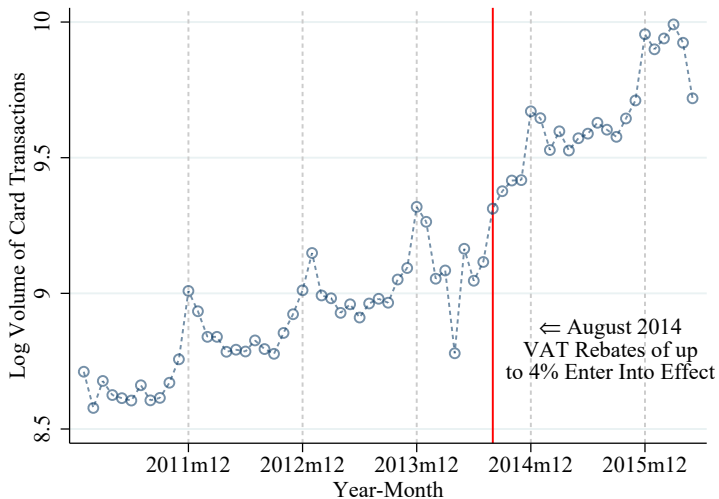


Balanced panel of 3694 retailers and wholesalers ever receiving a card report. Mean -1: 31680.75.

Why is there no tax compliance effect?

- ▶ Firms select into POS adoption
 - ▶ Neither POS subsidy nor consumer response to VAT rebate lead to substantial increase in POS adoption
 - ▶ If anything, response is on the intensive margin
- ▶ Firms with a POS reported a non-trivial share of cash sales

Volume of Card Transactions (Raw Data)

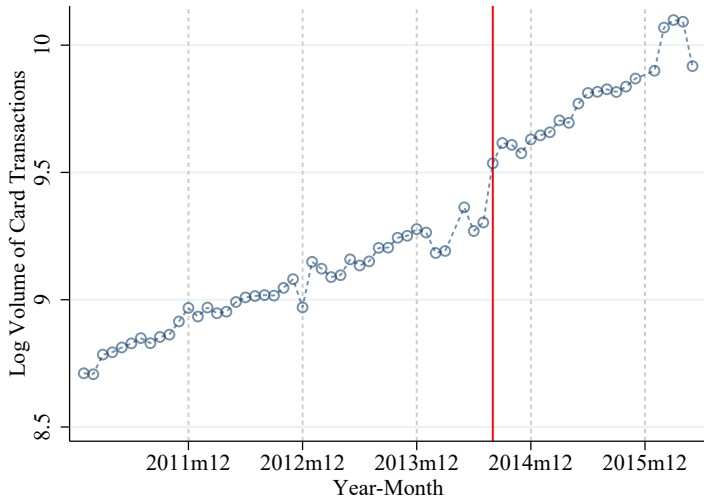


Number of Card Transactions (De-seasonalized)



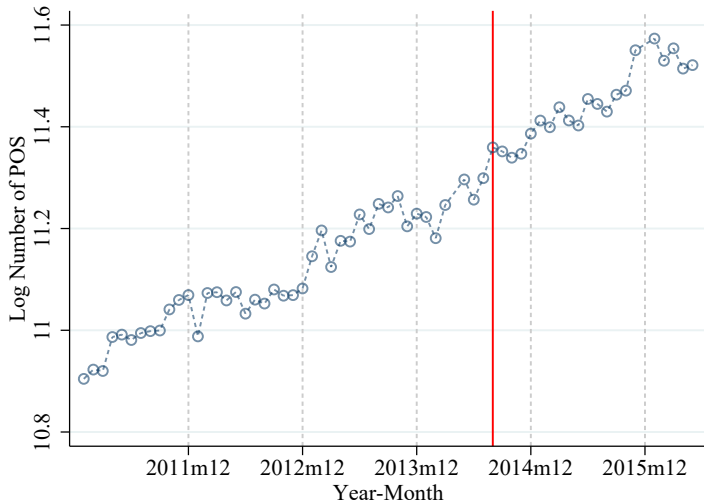
▶ Back

Volume of Card Transactions (De-seasonalized)



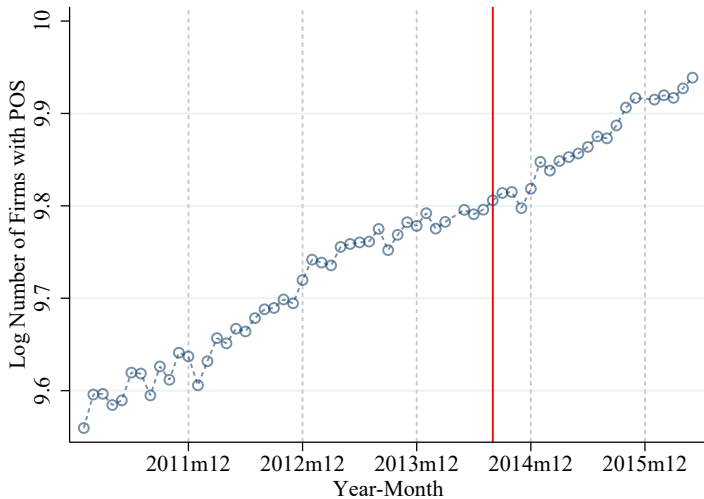
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Number of POS



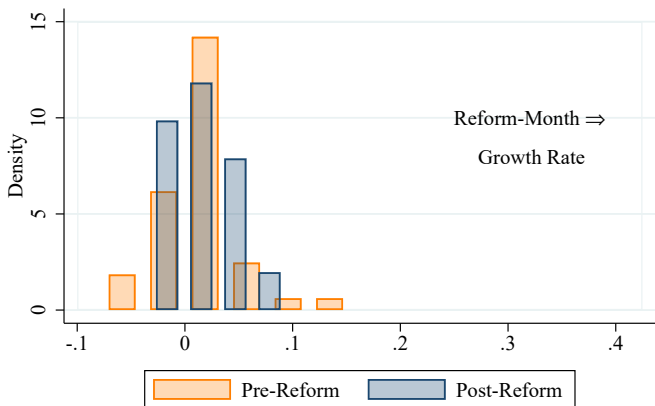
▶ Back

Number of Firms with POS



▶ Back

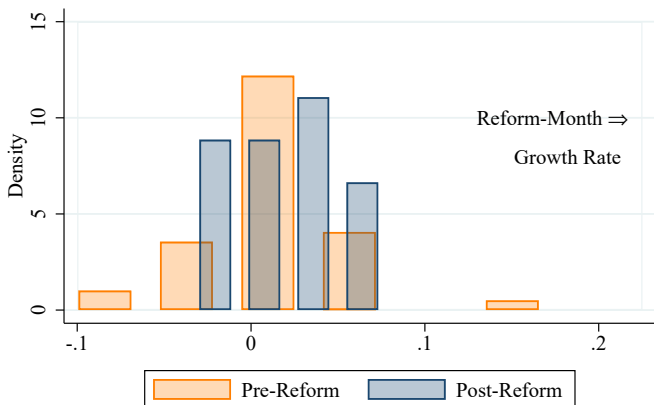
Month-on-Month Growth Rates - Number of Transactions



Mean Pre Reform (0.011) vs Mean Post Reform (0.018): ttest p-value (0.530)
Month of Introduction (0.439) vs Mean All Other Months (0.013): ttest p-value (0.000)
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▶ Back

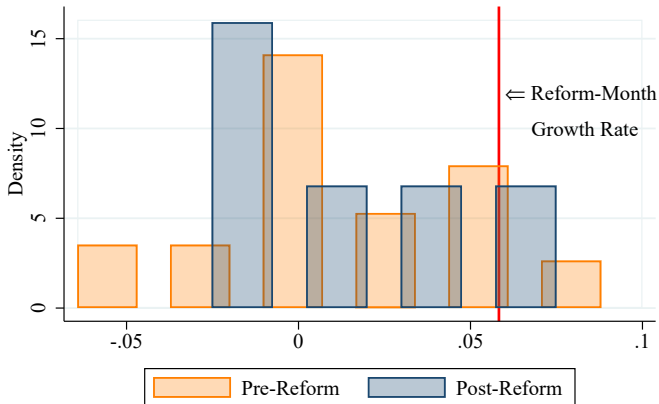
Month-on-Month Growth Rates - Volume of Transactions



Mean Pre Reform (0.012) vs Mean Post Reform (0.024): ttest p-value (0.343)
Month of Introduction (0.233) vs Mean All Other Months (0.015): ttest p-value (0.000)
Mean Pre Reform (0.012) vs Month of Introduction (0.233): ttest p-value (0.000)

[▶ Back](#)

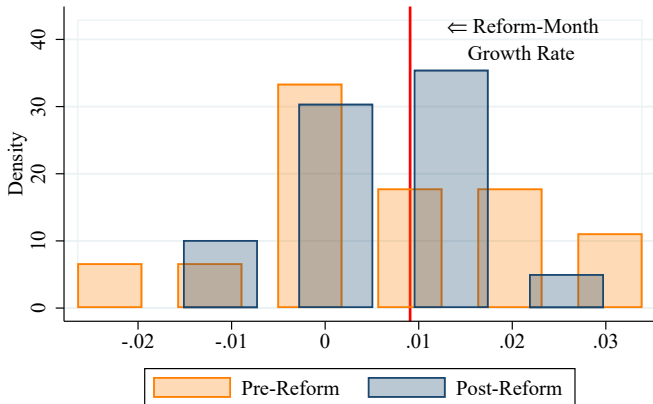
Month-on-Month Growth Rates - Number of POS



Mean Pre Reform (0.011) vs Mean Post Reform (0.014): ttest p-value (0.740)
Month of Introduction (0.058) vs Mean All Other Months (0.012): ttest p-value (0.000)
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▶ Back

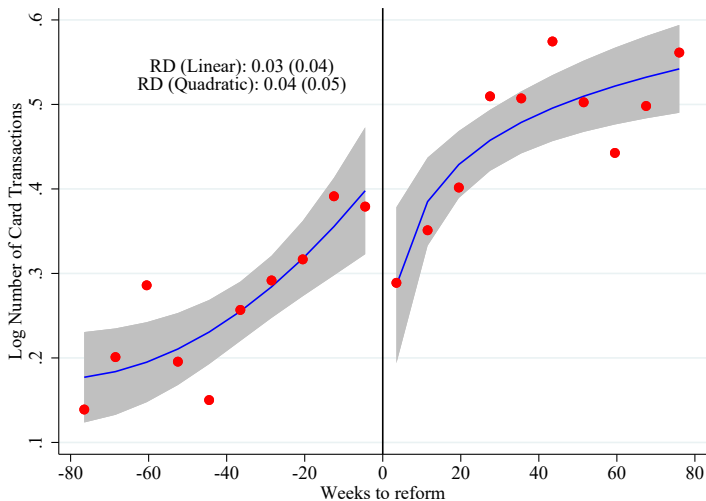
Month-on-Month Growth Rates - # of Firms with a POS



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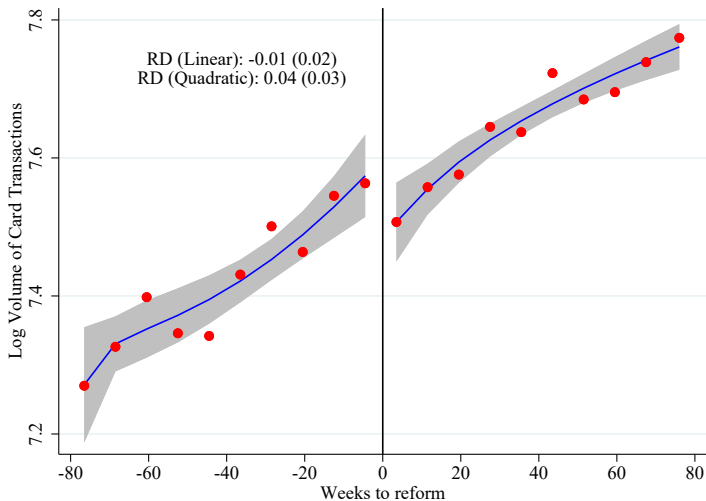
▶ Back

Number of Transactions - Placebo



▶ Back

Volume of Transactions - Placebo



▶ Back

Count of Transactions Robustness Test

Figure: (a) Polynomial Degree 1

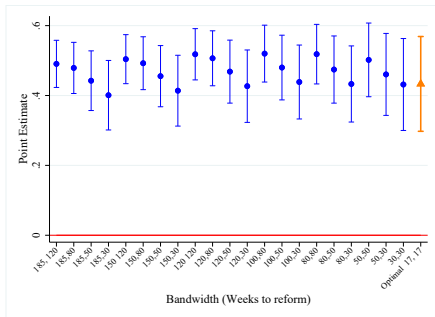
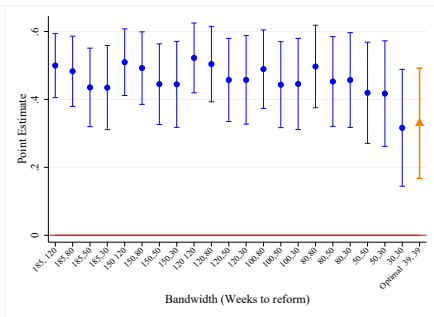


Figure: (b) Polynomial Degree 2



▶ Back

Volume of Transactions Robustness Test

Figure: (a) Polynomial Degree 1

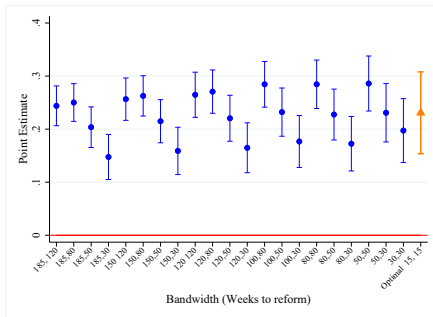
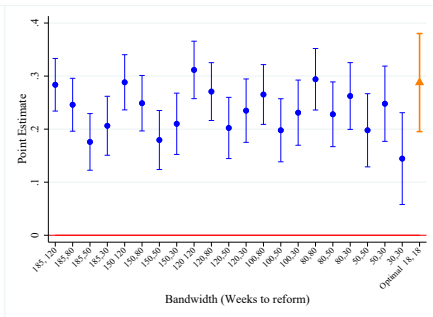


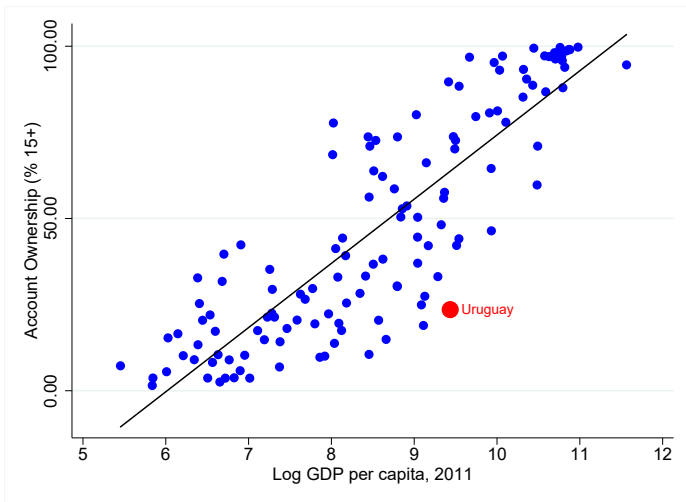
Figure: (b) Polynomial Degree 2



▶ Back

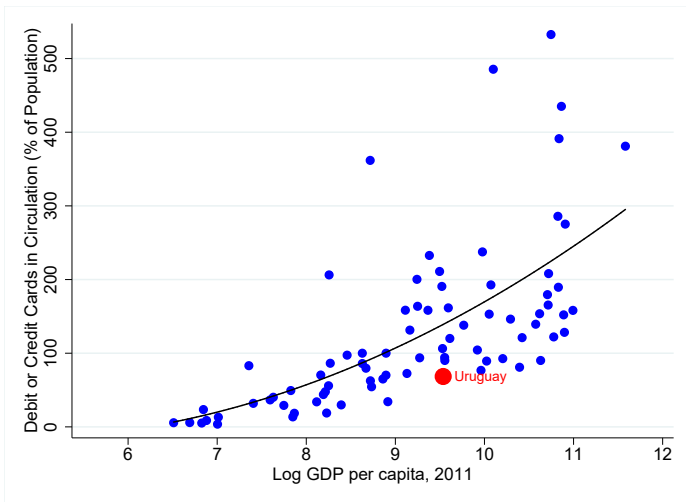
Uruguay Lags in Financial Inclusion

Bank Account Ownership



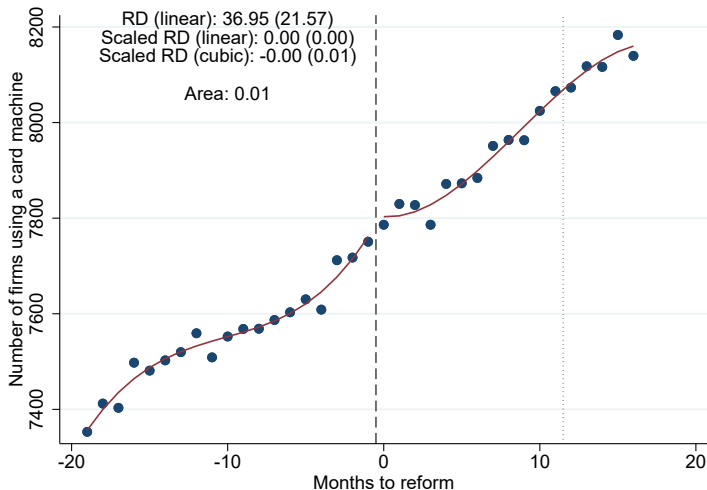
▶ Back

Uruguay Lags in Financial Inclusion Card Circulation



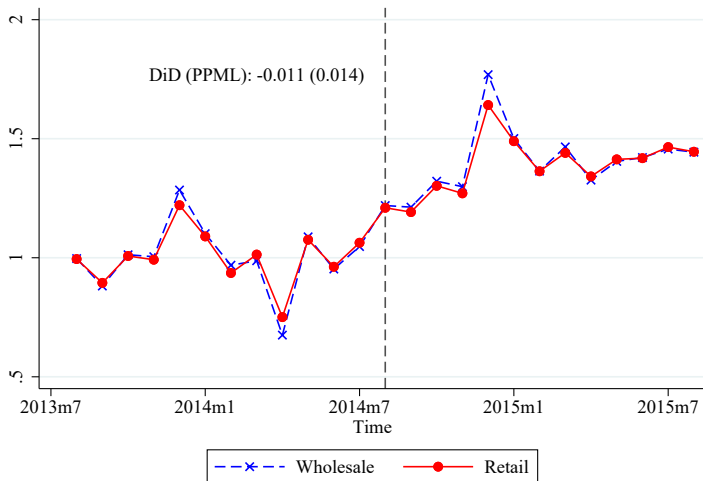
▶ Back

No Change in # of VAT-Registered Firms with POS



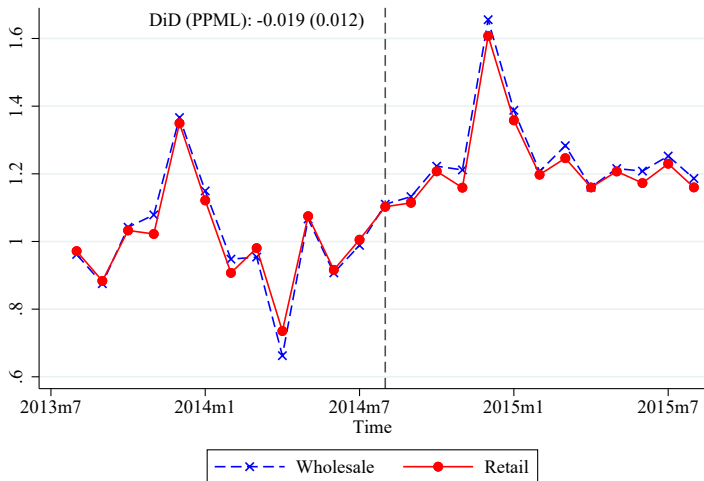
Sample: unbalanced panel of 16271 retail and 12126 wholesale firms.

Number of Card Transactions Increases



Outcomes are scaled by their group-specific pre-reform mean.

And Volume of Card Transactions Increases



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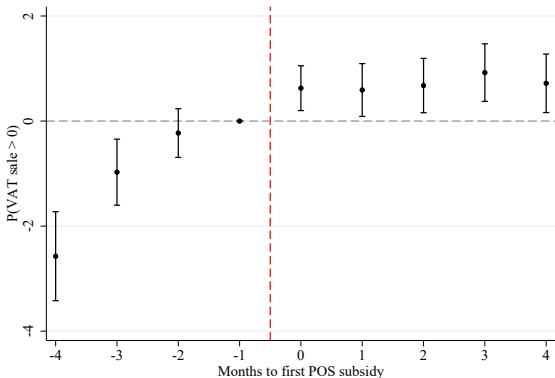
Event Study

- ▶ Examine firm behavior around month of card machine adoption

$$Y_{it} = a_i + g_t + \sum_{k=a}^b \delta_k \cdot D_{it}^k + u_{it} \quad (1)$$

- ▶ Balanced Sample of firms observed before and after the event

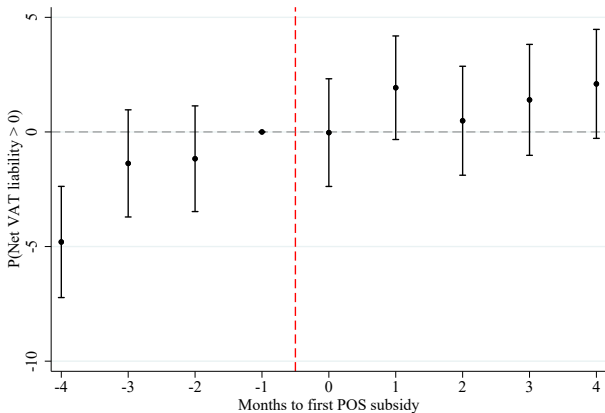
After the subsidy, small increase of VAT on sales for firms with a card machine before the subsidy



Balanced panel of 1800 retailers and wholesalers ever receiving POS subsidy. Mean -1: 98.50.

▶ VAT Liability

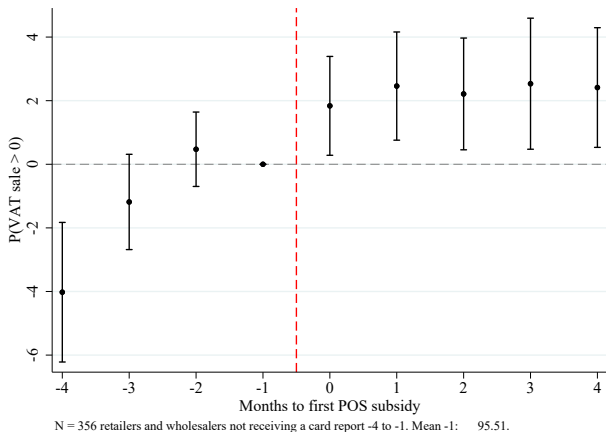
But no significant increase in Tax Liability



Balanced panel of 1800 retailers and wholesalers ever receiving POS subsidy. Mean -1: 77.67.

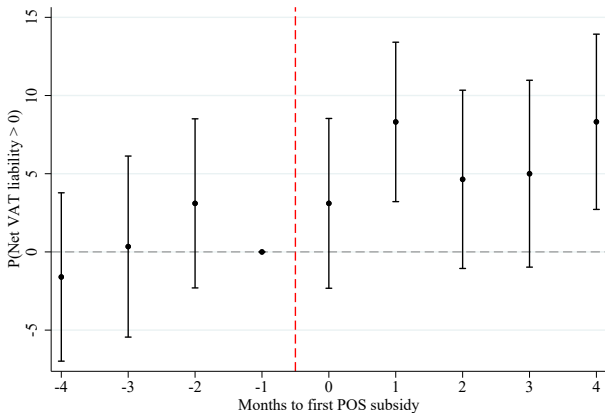
▶ Back

For firms that used a card machine for the first time with the subsidy, there is a larger increase of VAT on sales.



▶ VAT Liability

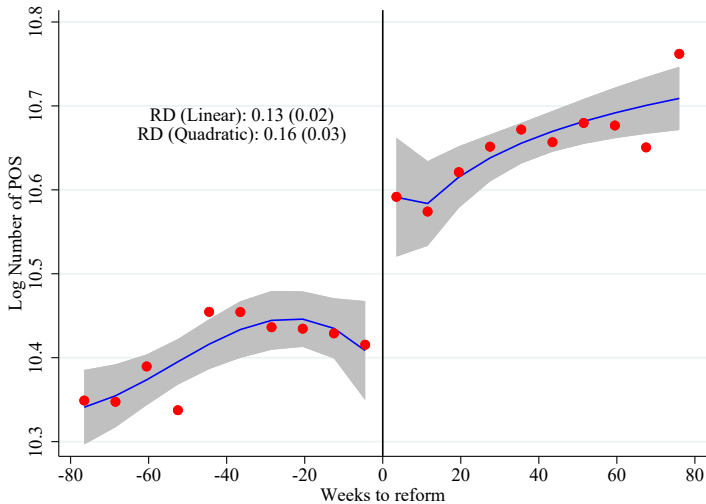
But also, no increase in VAT Liability



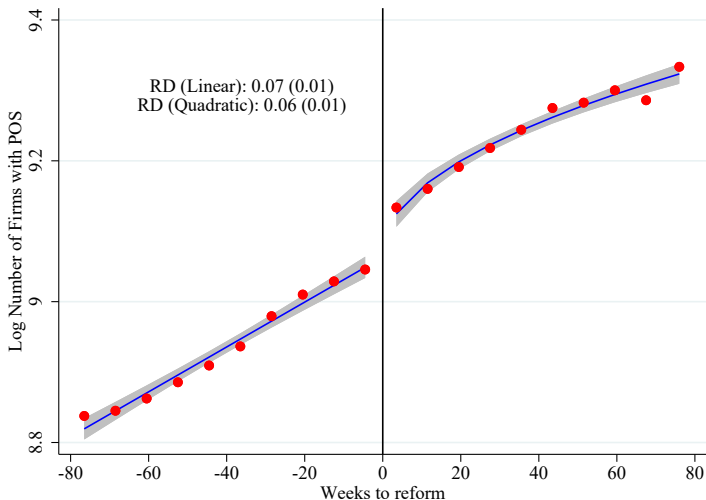
N = 356 retailers and wholesalers not receiving a card report -4 to -1. Mean -1: 69.94.

▶ Back

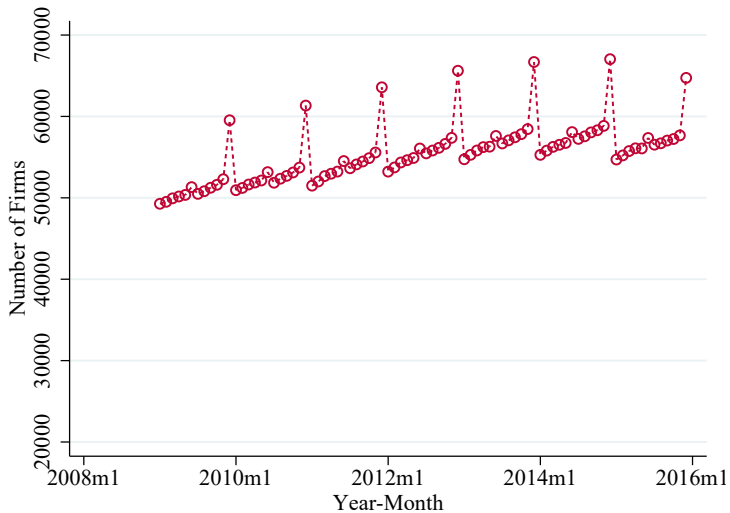
Number of POS - Subsidy Reform



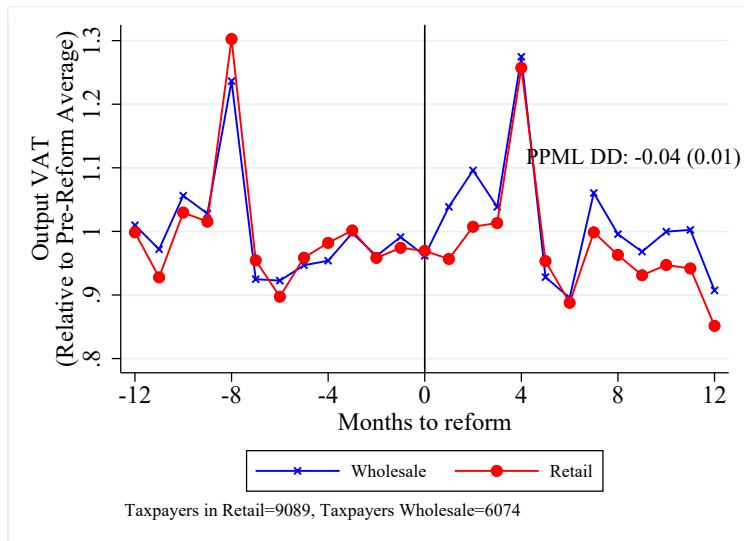
Number of Firms with a POS - Subsidy Reform



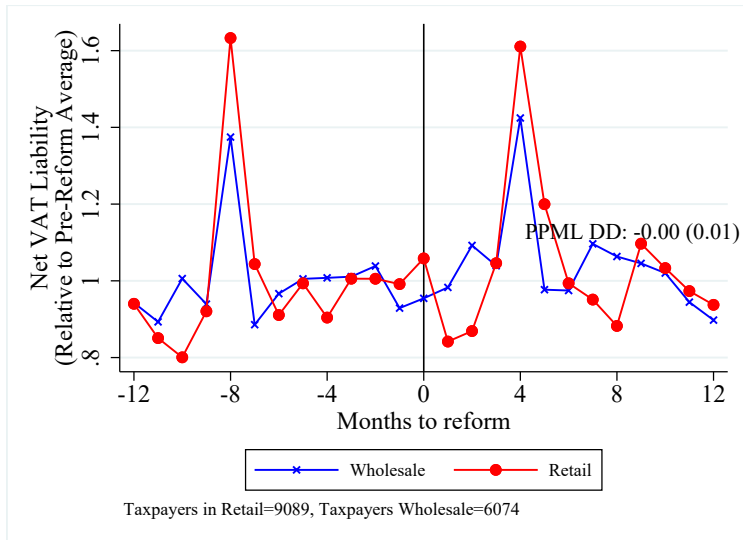
Number of Firms



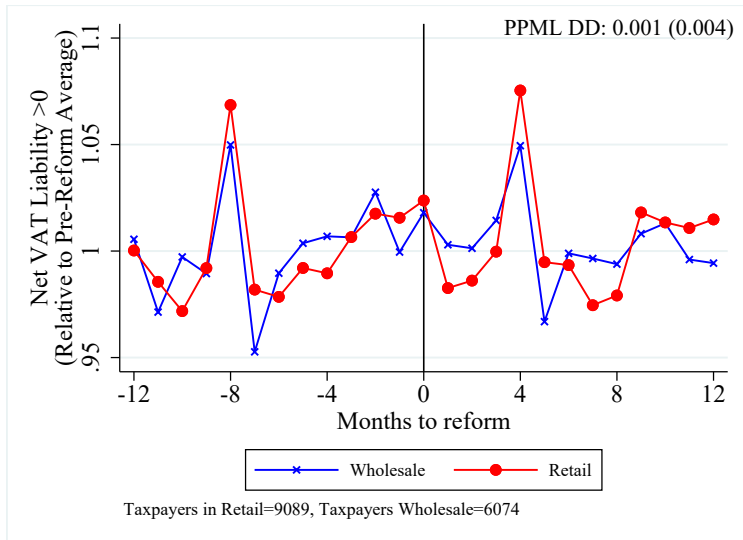
No Positive Effect on Output VAT



No Effect on Net VAT Liability



Nor on Whether the Net VAT Liability > 0



Explaining the Negative Effect on Output VAT Retail Firms without POS pre-reform vs Wholesale

