Analysis of the COVID-19 Shock, Technology and Trade

Regression Results for Mexico, India and Indonesia - Firm-Month Level

Simón Caicedo

May 22, 2023

1. Does Tech Adoption Affect Trade Outcomes?

These regressions aim to analyze the impact of technology adoption on trade outcomes. The regression model used is as follows:

$$y_{it} = \alpha_0 + \alpha_1 tech_{i,t-l} + FE_i + FE_t + \epsilon_{it} \tag{1}$$

Where y_{it} represents the trade outcome for the firm i in the month t. Specifically, the outcomes for the intensive margin regressions can be the logarithm of number of exports/imports of a firm i in the month t, the number of sources or destinations of a firm i in a month t or a dummy indicating whether a firm i in a month t is trading with a new source or a new destination. The variable $tech_{i,t-l}$ is a dummy indicating whether the firm i in month $t-l$ (l is the number of lags taken) used an adopted E-commerce or E-payment technology.

Time fixed-effects control for unobserved variables that are constant at the firm level but vary over time. Firm fixed-effects control for unobserved time-invariant heterogeneities across firms.

1.1 Intensive Margin Analysis

Table 1: India - Regression Results at the Firm-Month level. 2-Lag in technology variable

	Dependent Variables					
	Log. Import	Log. Export	No. Sources	No. Destinations	New Source	New Destination
E-payment or E-commerce (t-2)	-0.009	0.01	0.041*	0.106***	0.012*	0.001
	(0.019)	(0.019)	(0.025)	(0.035)	(0.006)	(0.006)
Num. Obs.	371,467	441,192	371,467	441,192	321,130	376,342
R-squared	0.715	0.759	0.86	0.918	0.373	0.389
Adj.R-squared	0.695	0.745	0.85	0.913	0.341	0.364
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Clustered-standard errors at the firm level.

A new source/new destination is defined with respect to baseline year 2017

The regressions for new source/destinations are estimated using a subset of firms that had transactions in 2017 as well.

Table 2: Mexico - Regression Results at the Firm-Month level. 2-Lag in technology variable

	Dependent Variables					
	Log. Import	Log. Export	No. Sources	No. Destinations	New Source	New Destination
E-payment or E-commerce (t-2)	0.046	-0.104**	0.019	-0.155**	0.01	0.011
	(0.029)	(0.047)	(0.067)	(0.072)	(0.013)	(0.015)
Num. Obs.	80,221	44,054	80,221	44,054	76,625	40,667
R-squared	0.796	0.842	0.912	0.923	0.362	0.439
Adj.R-squared	0.788	0.834	0.909	0.919	0.34	0.418
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Clustered-standard errors at the firm level.

A new source/new destination is defined with respect to baseline year 2017

The regressions for new source/destinations are estimated using a subset of firms that had transactions in 2017 as well.

Table 3: Indonesia - Regression Results at the Firm-Month level. 2-Lag in technology variable

	Dependent Variables			
	Log. Import	Log. Export	No. Sources	No. Destinations
E-payment or E-commerce (t-2)	0.015	-0.079	-0.077	0.001
	(0.04)	(0.07)	(0.054)	(0.098)
Num. Obs.	74,284	41,798	74,284	41,798
R-squared	0.753	0.819	0.873	0.938
Adj.R-squared	0.74	0.81	0.866	0.935
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Clustered-standard errors at the firm level.

2. Does Existing Tech Use Mitigate COVID Impacts?

The aim of these regressions is to investigate whether companies that had adopted E-payment or E-commerce technology before 2019 were better equipped to mitigate the impacts of COVID on their trade outcomes. The regression model is specified as follows:

$$y_{it} = \alpha_0 + \alpha_1 tech_i \cdot covid_t + FE_i + FE_t + \epsilon_{it} \tag{2}$$

Trade outcomes y_{it} are the same as in equation (1). The variable $tech_i$ is a dummy variable indicating whether the company adopted an E-commerce or E-payment technology before 2019. $covid_t$ captures the impact of COVID using the monthly *Stringency Index*.

The interaction term $tech_i \cdot covid_t$ investigates whether the adoption of E-commerce or E-payment technology before 2019 mitigates the impact of COVID on trade outcomes. Finally, fixed-effects are included for firm and month.

2.1 Intensive Margin Analysis

Table 4: India - Regression Results at the firm-month level

	Dependent Variables					
	Log. Import	Log. Export	No. Sources	No. Destinations	New Source	New Destination
E-payment or E-commerce 2019 × Monthly Avg. Stringency Index	-0.000125	0.000268	-0.000411	-0.000274	0.000087	-0.00018**
	(0.00025)	(0.000234)	(0.000325)	(0.000478)	(0.000078)	(0.000077)
Num. Obs.	421,569	496,235	421,569	496,235	364,321	422,572
R-squared	0.718	0.758	0.864	0.918	0.374	0.389
Adj.R-squared	0.698	0.744	0.855	0.913	0.342	0.363
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

E-payment/E-commerce 2019 variable is a dummy indicating pre-2019 adoption of E-payment or E-commerce technology

Clustered-standard errors at the firm level.

A new source/new destination is defined with respect to baseline year 2017

The regressions for new source/destination are estimated using a subset of firms that had transactions in 2017 as well.

Table 5: Mexico - Regression Results at the firm-month level

	Dependent Variables					
	Log. Import	Log. Export	No. Sources	No. Destinations	New Source	New Destination
E-payment or E-commerce 2019 × Monthly Avg. Stringency Index	-0.000623	-0.000097	-0.000581	0.000028	0.000015	0.000107
	(0.000436)	(0.000686)	(0.000833)	(0.001404)	(0.000153)	(0.000222)
Num. Obs.	101,177	54,386	101,177	54,386	96,881	50,273
R-squared	0.803	0.849	0.917	0.916	0.368	0.43
Adj.R-squared	0.796	0.842	0.914	0.912	0.347	0.407
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

E-payment/E-commerce 2019 variable is a dummy indicating pre-2019 adoption of E-payment or E-commerce technology

Clustered-standard errors at the firm level.

A new source/new destination is defined with respect to baseline year 2017

The regressions for new source/destination are estimated using a subset of firms that had transactions in 2017 as well.

Table 6: Indonesia - Regression Results at the firm-month level

	Dependent Variables			
	Log. Import	Log. Export	No. Sources	No. Destinations
E-payment or E-commerce 2019 × Monthly Avg. Stringency Index	0.000014	0.001037	-0.000022	0.000902
	(0.000508)	(0.000733)	(0.000755)	(0.002138)
Num. Obs.	87,739	48,370	87,739	48,370
R-squared	0.761	0.824	0.874	0.94
Adj.R-squared	0.748	0.815	0.868	0.937
Firm FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

E-payment/E-commerce 2019 variable is a dummy indicating pre-2019 adoption of E-payment or E-commerce technology

Clustered-standard errors at the firm level.