Liquidity Shocks and Firm Exports:

Evidence from Cash Shortages during India's Demonetization

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A Data Description

Data Cleaning. We take the following steps to clean the India Customs export database. First, we manually check and clean for misreported and inconsistent variables and duplicated observations in the customs data.[1] Second, we merge each 8-digit HS code and year available in the Customs data with the sector-level export data downloaded from the Trade Map database. We generate the ratio of the aggregated sectoral export value in the Customs data and the export value available in Trade Map by year and drop the sectors in the top and bottom 1% of the distribution. This filtering removes a tiny number of observations with excessively large export values, potentially because of misreporting or data entry errors. Third, after aggregating export information by firm and month and combining the customs data with Prowess data, we trim the top and bottom 1% of observations for each variable and keep firms that export for at least three consecutive months to minimize measurement error. Last, we exclude observations from May and July of 2016 from the event study analyses as the mean and median export values and the number of destinations fall dramatically in these months, inconsistent with official statistics (Trade Map). The main results are generally robust to the inclusion of these months, indicating that removing them is not driving our results in any substantial way.

Combining the Customs and Prowess data. After aggregating export information by firm and month, we combine the Customs data with the Prowess data using the firm name and address available in both data sets. First, we clean the company name in each database.[2] After basic cleaning, we combine the firm names in the Customs data with the

[1] For example, "HSCODE = ########" is recorded instead of the actual HS code, Destination_Country is recorded as "GAUTEMALA" for GUATEMALA, and the same country (South Korea) is recorded as "KOREA,REPUBLIC O", "KOREA,REPUBLIC OF", and "SOUTH KOREA." The duplicated observations arise in the customs data for various reasons. For example, an error is identified by the customs officer after the shipping bill is filed (e.g., wrong export value), and the shipment is not given "LET EXPORT ORDER". The exporter then files another shipping bill with necessary changes until there is no error, leading to duplicates in the raw data.

[2] Specifically, we set space if the company name contains a comma, period, parenthesis, unknown character, the lowercase letter i (all names are in upper case), plus or minus sign, question mark, M/S, semicolon, or [MERGED]. We replace three consecutive quotes with two consecutive quotes, LIMITED to LTD, and PRIVATE to PVT. We eliminate spaces and double spaces at the beginning and end of the firm name.

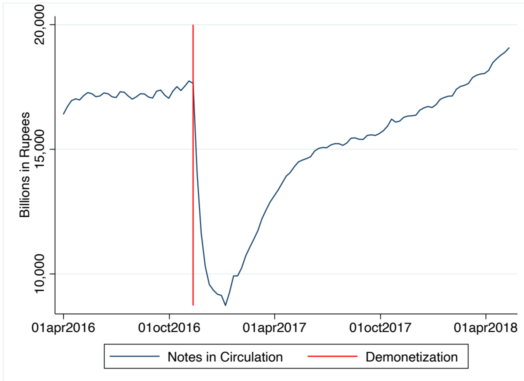
“Listed Status” data downloaded from https://dgft.gov.in/sites/default/files/statusList_0.pdf. Thirty-one official firm names are duplicated within the firm identifier in the customs data (Importer-Exporter Code or IEC). We manually check each name and choose the name that is likely to be the most informative (typically the longest name). We drop a small number of observations that have very different names within the IEC code. For both the Customs and Prowess data, we further clean firm names using the “stnd_compname” STATA command developed by Wasi and Flaaen (2015) and check the names manually. In extracting firm addresses from the Customs data, we only use state names to ease the merging procedure with the Prowess data. For non-missing values in the Customs data, we manually replace misspelled/misreported state names with formal names and double-check these names with the Prowess data. Whenever a state variable is missing, we extract state information from the city, pincode, and long address information.

In matching the two databases with firm names and states, we proceed as follows. First, we identify observations that match the name and state perfectly. Second, among the unmatched observations, we use the STATA “reclink2” command developed by Wasi and Flaaen (2015) to fuzzy match the observations. We only keep observations above the 0.99 threshold and double-check these matches by having two research assistants independently check the matches by searching the company names on Google and Zauba. Note that the firm is identified by the IEC code in the Customs data and by the variable “co_code” in the Prowess data. We define a firm boundary that aggregates both IEC and “co_code” into one unique firm identifier.

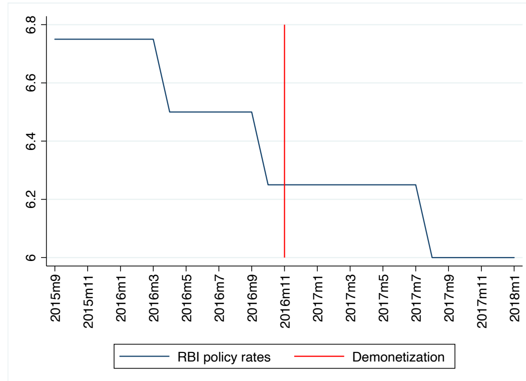
B Illustrations

B.1 Demonetization: Currency Notes, Policy Rates, and Exchange Rates

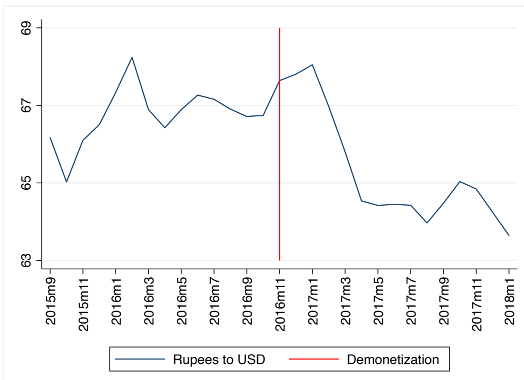
Figure OA.1 shows that the overall money supply, interest rates, and exchange rates did not change due to demonetization. The currency in circulation fell dramatically during



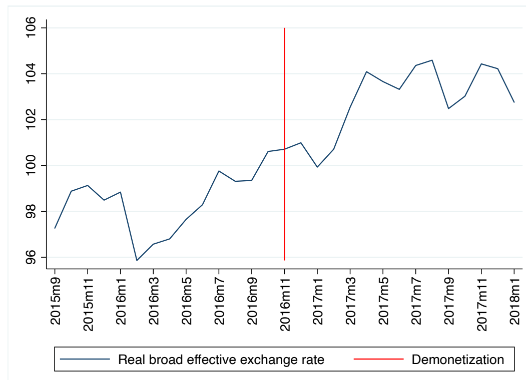
(a) Currency in Circulation



(b) Policy Rate



(c) Rupees to USD



(d) Real Exchange Rate

Figure OA.1: Currency Notes, Policy Rate, and Real Exchange Rates

Note. Source: Reserve Bank of India (currency circulation) and Bank for International Settlements (policy rates and exchange rates). The real exchange rate is the broad effective exchange and is normalized to 100 in 2020.

demonetization, as already documented in previous studies (Figure OA.1a). At the same time, the policy rate was stable (Figure OA.1b), consistent with the notion that demonetization did not lower the overall money supply but only decreased the currency notes in circulation (Crouzet et al. 2023). The stable policy rate has also been documented in Chodorow-Reich et al. (2019), who additionally show the stability of other private rates, such as the rate on deposits, outstanding and new loans, call money, and bank rate. Exchange rates were stable; the nominal (Rupees to USD) and real exchange rates changed little.[3] The stable policy rates and exchange rates help isolate exporters' working capital constraint channel from the other

[3] If anything, the currency in circulation and the exchange rates move in the opposite direction, inconsistent with a standard model of international monetary policy (Gali and Monacelli, 2005).

potential effects of monetary policy.

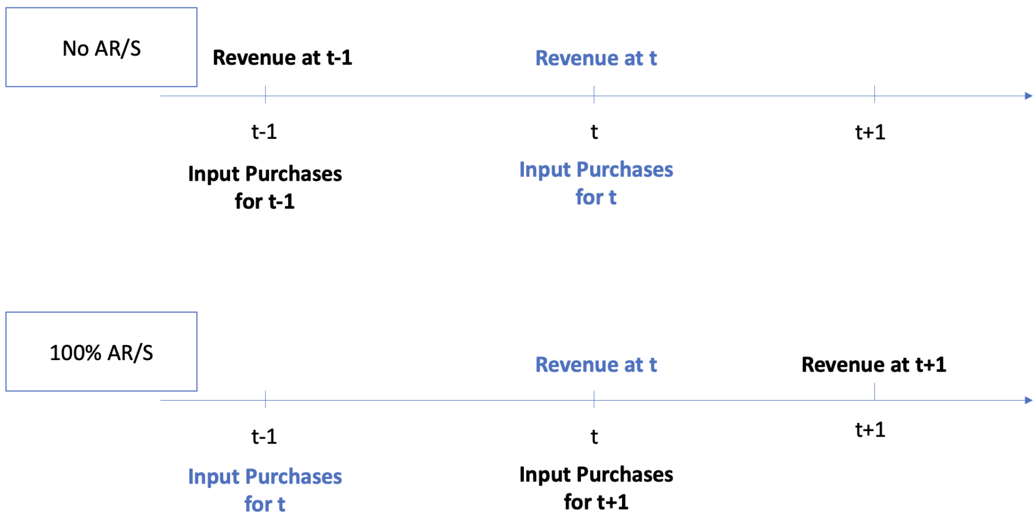
B.2 Accounts Receivable: Exposure to Demonetization

Figure OA.2 illustrates how accounts receivable measure firm-level exposure to demonetization. For simplicity, consider two otherwise identical firms: one with no accounts receivable ("No AR/S") and the other that generates all their revenues in accounts receivable ("100% AR/S"). A firm without receivables creates cash flow and purchases inputs in each period, but a firm with receivables faces a timing difference (Figure OA.2a). These firms must first produce by asking workers or intermediate goods suppliers to provide inputs before receiving revenues (or borrowing from the banks). In this setup, when demonetization affects the economy at a time t, those firms without receivables are negatively affected as they no longer have revenues at time t. However, those firms with receivables are differentially more affected because they cannot finance inputs used in the past (time $t-1$) and concurrently cannot pay for the inputs at time t that they will use to generate revenues in the future $(t+1)$. Thus, the working capital of firms with high receivables is more constrained after demonetization. See, e.g., Altinoglu (2021); Reisher (2020) for how a similar logic is integrated into general equilibrium models to show the importance of trade credit.

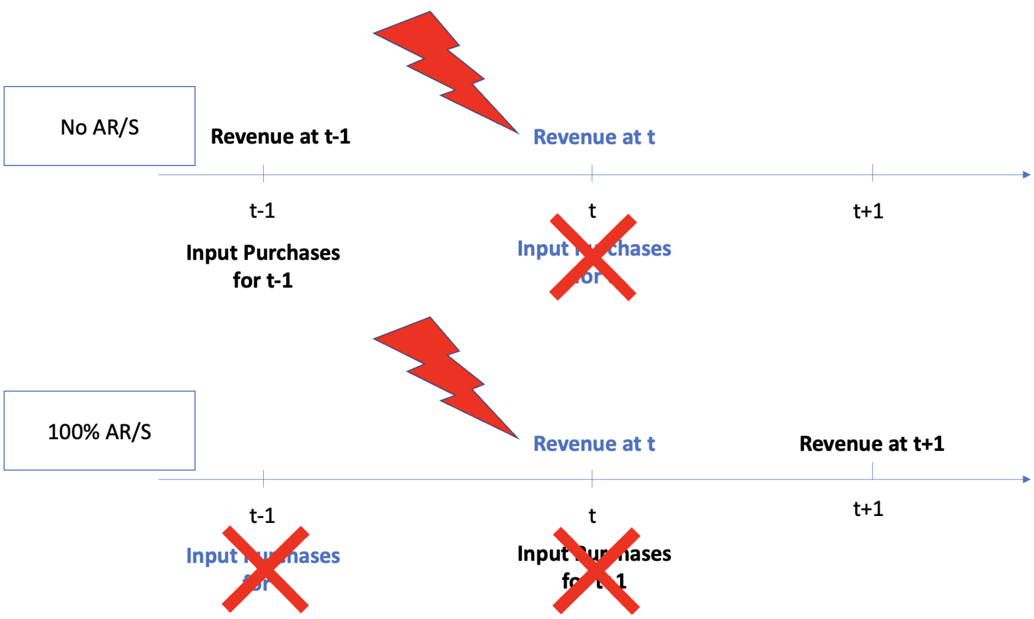
B.3 Cash Reliance in India

Figure OA.3a shows that Indian households and firms heavily relied on cash holdings before demonetization using World Bank Payment Survey data.[4] More than 80% of people did not use a debit or credit card in the last year, and more than 40% of people did not have banking or other financial accounts. Close to 80% of people received wages only in cash and approximately 75% of people received agriculture product payments in cash only. These facts suggest that demonetization likely influences both households who have to rely on cash to purchase goods and services and entrepreneurs who need to pay workers and receive revenues in cash.

[4] See https://www.worldbank.org/en/topic/paymentsystemsremittances.

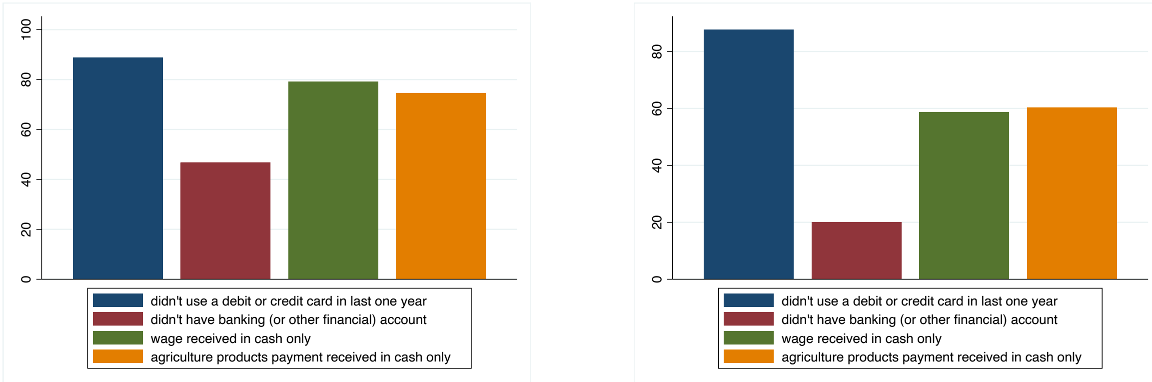


(a) Before Demonetization



(b) After Demonetization

Figure OA.2: 100% AR/S vs. No AR/S



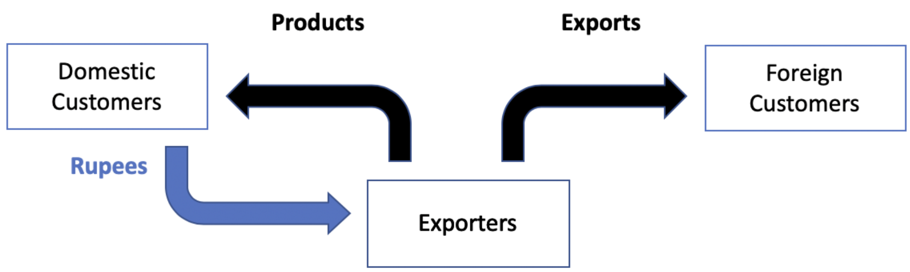
(a) 2014 **(b)** 2017

Figure OA.3: Cash Reliance in India

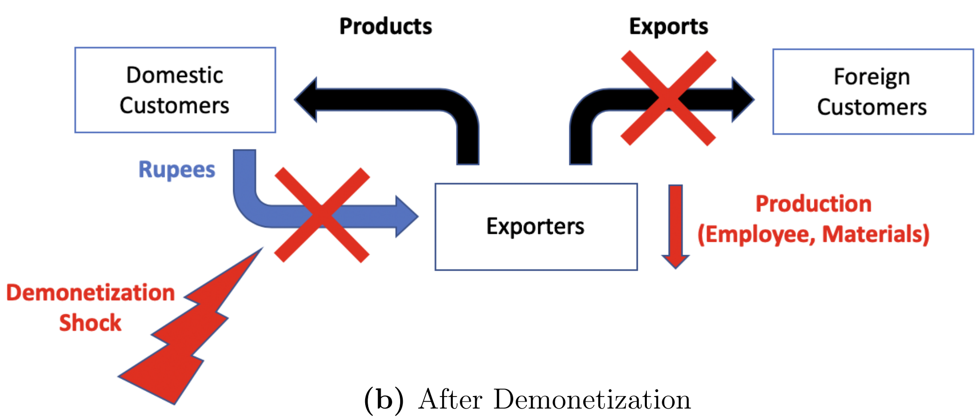
Source: World Bank Payment Survey.

B.4 Mechanism: Exporter Working Capital Constraint

The key transmission mechanism in our paper is the exporter's working capital constraint, which arises from a decrease in cash flow from the domestic market due to demonetization. For simplicity, consider only exporters that sell to both domestic and foreign markets (Figure OA.4a). Since these exporters sell goods and services to foreign counterparts, they are unlikely to use Indian rupees in favor of electronic payment systems or foreign currencies, such as US dollars. However, in general, their domestic counterparts rely heavily on Indian rupees. For example, according to the 2014 World Bank payment survey, approximately 80% and 75% of wages and agriculture products payments in India were received only in cash, respectively (Figure OA.3). In this setup, when domestic customers cannot pay international firms with rupees due to the demonetization policy, exporters decrease their production as they cannot pay their employees and domestic suppliers. As a result, these firms lower their exports (quantity, particularly the number of products and destinations) as illustrated in Figure OA.4b and consistent with the results reported in Figure 1.



(a) Before Demonetization



(b) After Demonetization

Figure OA.4: Mechanism: Illustration

C Export Price and Quantity Index

Following Eslava et al. (2023) and Lenzu et al. (2022), we construct the firm-time-specific chain-weighted export price index, which is defined recursively as follows:

$$P_{ft} = P_{f,B_f} \prod_{\tau=B_f+1}^{t} \Phi_{f\tau} \tag{C.1}$$

where f denotes the firm and t denotes time (month). B_f is the first time when firm f starts to export. P_{ft} is the export price index at the firm-time level, which is the main price index we use in our analyses. P_{f,B_f} is a baseline export price index for firm f and Φ_{ft} is the change in export price index from period $t-1$ and t for firm f. In constructing P_{ft}, we use the custom-firm combined data at the month level from January 2015 to December 2017.

Our main analyses use the conventional Tornqvist price index for simplicity. However, adjusting for variety correction (Feenstra 1994) and taste correction (Redding and Weinstein 2019) does not change the main results. P_{f,B_f} is the same across all indices, but Φ_{ft} changes with different indices. The export-quantity index is defined as the total export value divided by the export price index.

Firm-level Baseline Export Price Index. The baseline export price index at the firm level, P_{fB_f}, is defined as follows:

$$P_{f,B_f} = P_{B_f} \prod_{p \in \Omega_{f,B_f}} \left(\frac{P_{fp,B_f}}{\bar{P}_{p,B_f}} \right)^{s_{fpB}}, \ \bar{P}_{p,B_f} = \prod_{f} P_{fp,B_f} \tag{C.2}$$

where P_{B_f} is a baseline aggregate export price index in time B_f, P_{fp,B_f} is firm-product-level price in time B_f, $\bar{P}_{p,B_f}$ is product-level price index in time B_f (the geometric average of P_{fp,B_f}), and s_{fpt} is the share of product p in firm f's revenue in period t. The set Ω_{f,B_f} is the collection of all products p provided by firm f in its baseline year B_f. The product is defined at the most granular level we observe in the data, which is the 8 digit HS code x unit. The 8-digit HS code reported in the India Customs data is the Indian Tariff Code (ITC) number. The first six digits are identical to the 6-digit HS code used globally, and the last two digits are added to denote more detailed product categories. For example, the 6-digit HS code "84022000 Freezers of the chest type, not exceeding 800 liters capacity" is further subdivided into the "84183010 Freezers, electrical" and "84183090 Freezers, other than electrical".

The aggregate baseline export price index, P_{B_f}, is:

$$P_{B_f} = \begin{cases} 1, & \text{if B is the first month of the sample} \\ \prod_{f'} P_{f',B-1}, & \text{if B is after the first month of the sample.} \end{cases}$$

Intuitively, P_{f,B_f} is the modified version of the weighted geometric average of product-firm-specific export prices across products within the firm at time B_f, where the weight is the sales share of each product within the firm and time B_f. There are two modifications. First, it adjusts for the average product-specific export price index such that the firm-level export price index reflects what is relative to the average export price of the same product sold by other firms. Second, it combines with the aggregate export price index so that the export baseline price index for firms newly entering the market can be adjusted with the aggregate export prices.

Change in Firm-level Export Price Index: Tornqvist. Our main export price index is constructed following the conventional Tornqvist index:

$$\Phi_{ft} = \Phi_{ft}^{T} = \frac{\prod_{p\in\Omega_{ft,t-1}} (P_{fpt})^{s_{ft,t-1}}}{\prod_{p\in\Omega_{ft,t-1}} (P_{fp,t-1})^{s_{ft,t-1}}} \tag{C.3}$$

where $s_{ft,t-1} \equiv \frac{s_{f,t-1}+s_{ft}}{2}$, and $\Omega_{ft,t-1}$ is the set of products p firm f provides in both period t and $t-1$.

Change in Firm-level Export Price Index: Variety and Taste Correction. Following Eslava et al. (2023) and Lenzu et al. (2022), the change in price index at the firm-time level can be written as:

$$\Phi_{ft} = \Phi_{ft}^{J}\Phi_{ft}^{F}\Phi_{ft}^{RW} \tag{C.4}$$

where Φ_{ft}^{J} is an equal-weighted geometric average (a Jevons index) of the prices for all products continuing from period $t-1$ to t, Φ_{ft}^{F} is the Feenstra (1994) variety correction, and Φ_{ft}^{RW} is the Redding and Weinstein (2019) consumer taste-bias correction.

The Jevons index is defined in the following way:

$$\Phi_{ft}^{J} = \frac{\prod_{p\in\Omega_{ft,t-1}} (P_{fpt})^{\frac{1}{|\Omega_{ft,t-1}|}}}{\prod_{p\in\Omega_{ft,t-1}} (P_{fp,t-1})^{\frac{1}{|\Omega_{ft,t-1}|}}} \tag{C.5}$$

where $\Omega_{ft,t-1}$ is the set of products p firm f provides in both period t and $t-1$, and $|\Omega_{ft,t-1}|$

is the number of these continuing products provided by firm f.

The Feenstra (1994) variety correction is as follows:

$$\Phi_{ft}^{F} = \left(\frac{\sum_{p \in \Omega_{ft,t-1}} s_{fpt}}{\sum_{p \in \Omega_{ft,t-1}} s_{fp,t-1}} \right)^{\frac{1}{\sigma-1}} \tag{C.6}$$

where σ is the demand elasticity, and s_{fpt} is the share of product p in firm f's revenue at time t. This term captures the taste for variety. The intuition is that if one more varietal of a product is added to the market, the share of common products must fall, leading to a smaller Φ_{ft}^{F} and price (cost of living) index. If products can be substituted easily (higher σ), this effect is lower; the variety effect is stronger if the products cannot be substituted easily.

The Redding and Weinstein (2019) taste correction is as follows:

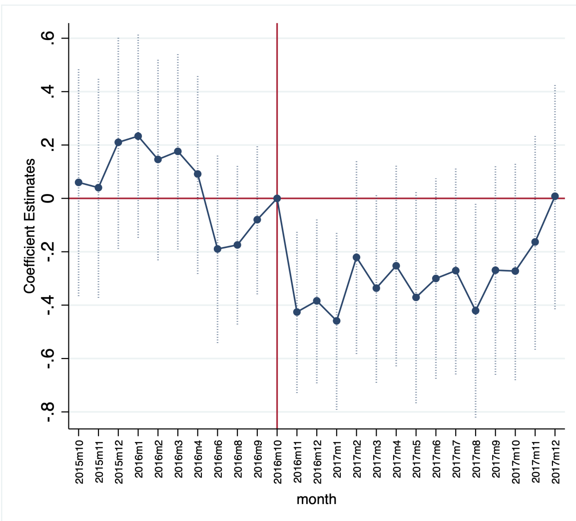
$$\Phi_{ft}^{RW} = \left(\frac{\prod_{p \in \Omega_{ft,t-1}} \left(s_{fpt}^{*} \right)^{\frac{1}{|\Omega_{ft,t-1}|}}}{\prod_{p \in \Omega_{ft,t-1}} \left(s_{fp,t-1}^{*} \right)^{\frac{1}{|\Omega_{ft,t-1}|}}} \right)^{\frac{1}{\sigma-1}} \tag{C.7}$$

where s_{fpt}^{*} is the share of product p in firm f's revenues at time t *among all products continuing from period* $t-1$ *to* t. Thus, $\sum_{p \in \Omega_{ft,t-1}} s_{fpt}^{*} = \sum_{p \in \Omega_{ft,t-1}} s_{fp,t-1}^{*} = 1$. This term captures the utility gains from the taste shift. The intuition is as follows. If the product share is more dispersed across products within firms, Φ_{ft}^{RW} and price (cost-of-living index) fall because the geometric average of shares decreases with a higher dispersion. A more dispersed product share benefits consumers if the dispersion arises from the taste-adjusted prices. As the taste-adjusted prices are more dispersed across products within firms, households facing more dispersed prices can substitute away from high taste-adjusted price products to low taste-adjusted price products. If products can be substituted easily (higher σ), this effect is lower; the taste effect is stronger if the products cannot be substituted easily.

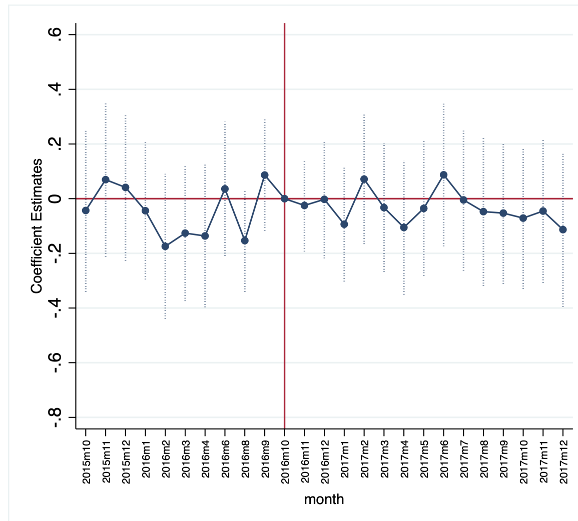
One practical challenge in using the utility-based price index is the unknown measure of the demand elasticity σ. For the baseline analysis, we calibrate $\sigma = 6$ and show that the results are analogous when using $\sigma = 4$ and $\sigma = 8$. These values are used to match the average import demand elasticity the Indian economy faces in exporting products. Specifically, we bring in the import demand elasticity made available by the Economic and Social Commission for Asia and the Pacific (ESCAP). Utoktham et al. (2020) provide these elasticities by applying the estimation method developed by Feenstra (1994) and extended by Broda and Weinstein (2006) and Soderbery (2015) to the UN Commodity Trade Statistics Database (COMTRADE). The elasticities can be downloaded from https://www.unescap.org/resources/new-global-estimates-import-demand-elasticities-technical-note#. We aggregate export values in the customs data by 6-digit HS code and destination country and use this as a weight to calculate the mean and median import demand elasticity. The mean is 5.08 and the median is 6.66.

Figure OA.5 replicates Figure 2 using the utility-based quantity and price indexes. The results reported in Figures OA.5a and OA.5b are similar to the results reported in Figure 2: there is a strong temporary effect on quantity, but the effect on price is muted in the short- and long-run. Since conventional price, variety, and taste effects may move in opposite directions (such that the total price effect is muted), we separately analyze each component (added by $\ln P_{f,B_f}$, the log baseline firm-specific price index): $\ln \Phi^J_{ft}$, $\ln \Phi^F_{ft}$, and $\ln \Phi^{RW}_{ft}$. Figures OA.5c, OA.5d, and OA.5e show that there is no significant effect on price regardless of using the conventional Jevon's price index, variety correction, or taste correction.

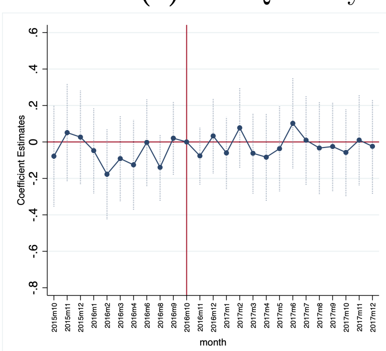
The two results using the utility-based price index are noteworthy. First, despite the fact that affected firms reduced the number of products they export, as shown in Figure 3, the Feenstra variety correction term shows no effect. This result suggests that firms temporarily drop those products that are unimportant to them, but do not drop those that are important, consistent with the idea of core competence. Essentially, firms that are more exposed to demonetization drop non-core products and focus on their most important products. Second, the results on taste correction in Figure OA.5e suggest that the export value effect is unlikely to be driven by differential changes in consumer demand across firms. This result reinforces the idea that firms with higher AR/S did not face differential demand shocks during or after the demonetization.



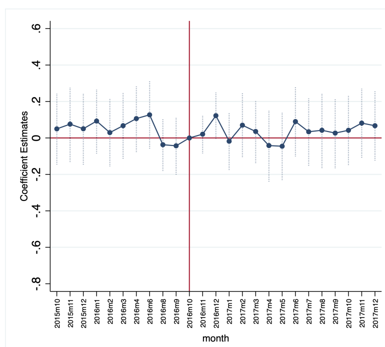
(a) RW Quantity Index



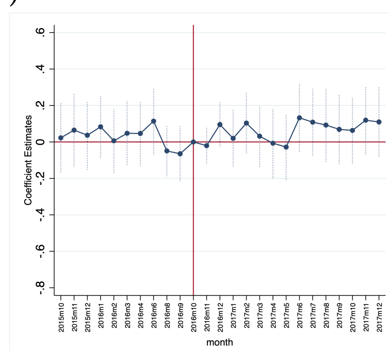
(b) RW Price Index



(c) Price: Jevons Index



(d) Price: Variety Correction



(e) Price: Taste Correction

Figure OA.5: Exports and Demonetization: Price and Quantity, RW Index

Note. Figure OA.5 replicates figure 2 using the Redding and Weinstein (2019) quantity and price indexes with $\sigma = 6$, as discussed in Appendix C. Testing the null hypothesis of all the pre-demonetization coefficients jointly equalling zero leads to p-values of 0.75, 0.47, 0.68, 0.91, and 0.82 for Figures OA.5a-OA.5e, respectively. A 90% confidence interval is reported for each estimated coefficient, and standard errors are clustered by firm.

D Additional Analyses

D.1 Accounts Receivable: Other Measures

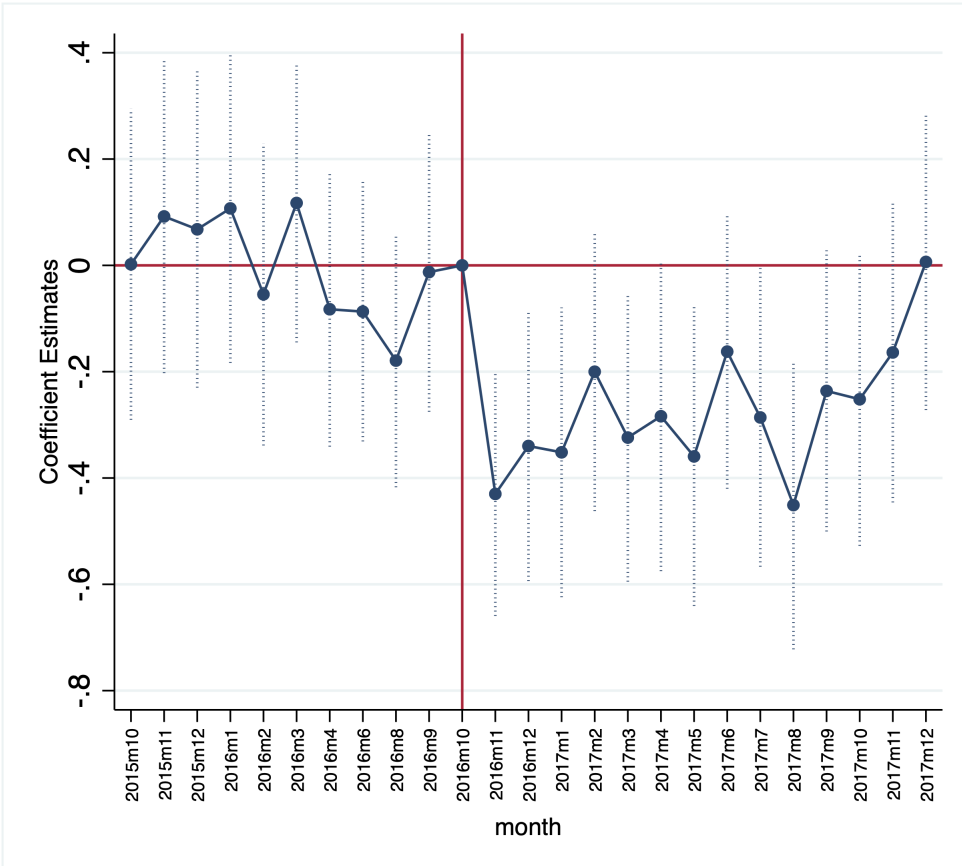


Figure OA.6: Using Short-Term Receivables Only

Note. Figure OA.6 replicates Figure 1 using the short-term accounts receivable (normalized by sales). Testing the null hypothesis of all pre-demonetization coefficients jointly equalling zero leads to a p-value of 0.8. A 90% confidence interval is reported for each estimated coefficient, and standard errors are clustered by firm.

First, in our main analysis, we use the total accounts receivable to maximize the number of non-missing observations (instead of separating them into short-term and long-term receivables). However, since demonetization only lasted approximately a year, only the short-term receivables, which must be paid within 6 months, would be relevant. To reflect this idea, we only use short-term accounts receivable (which must be paid within 6 months or less) instead of total receivables as the exposure measure and still find negative effects of demonetization on exports, as shown in Figure OA.6. Note that the product-specific accounts payable to expenditures of buyers only use short-term payables and address this concern explicitly.

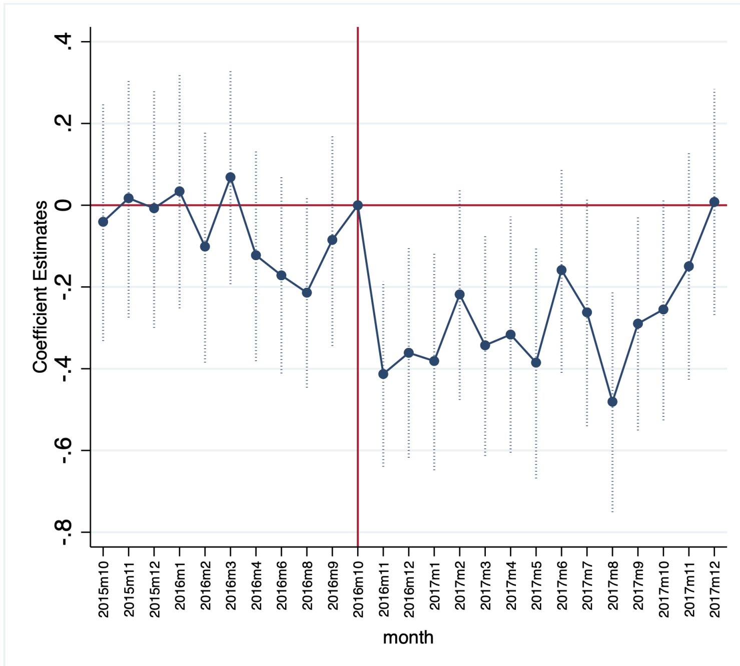


Figure OA.7: Excluding foreign receivables

Note. Figure OA.7 replicates Figure 1 using the accounts receivable (normalized by sales) after excluding firms that have experienced the change in receivables due to the foreign exchange rate fluctuations in 2010-17. Testing the null hypothesis of all pre-demonetization coefficients jointly equalling zero leads to a p-value of 0.79. A 90% confidence interval is reported for each estimated coefficient, and standard errors are clustered by firm.

Second, the main draft do not distinguish between domestic and foreign receivables because the Prowess data do not separately report information about foreign receivables.[5] However, the data report the change in the receivables due to the foreign exchange rate fluctuation. Figure OA.7 shows the results by excluding all firms that have experienced the change in receivables due to the foreign exchange fluctuations in 2010-2017. The effect of cash shortage on exports via initial receivables remains strong. This result is consistent with the view that, in a short time window around demonetization, the effect of the other foreign

[5] A potential concern is that the total receivables may reflect foreign (instead of domestic) receivables, and exports may fall due to foreign-related reasons instead of the domestic cash shortage.

shocks (or a general equilibrium effect of demonetization that affects firms through foreign receivables) did not affect firms differentially based on the foreign receivables, consistent with the small movement in the exchange rates (Appendix B.1) and the fact that the foreign taste changes do not bias the coefficient (Appendix C). Note that we additionally confirm our results using another exposure measure that only captures the domestic receivables: the product-specific accounts payable to expenditures of buyers. This measure only utilizes the domestic buyers' information and does not suffer from concerns related to foreign receivables. As shown in the main draft, the effect is also stronger for firms that rely heavily on the domestic market, consistent with these results.

Lastly, we only use accounts receivable for simplicity, but the same exporters with different levels of payable and borrowings may react differently. For example, firms with high payables may not need to pay for their intermediate goods immediately. While these firms would still be negatively affected because they need to pay for the other inputs, such as labor and capital investment, the high initial payables could partially hedge the shock. A similar idea applies to firms with large initial bank borrowings, assuming that banks can easily lend the currency notes to those firms in need of cash.

Table OA.1 shows the robustness of the main results to explicitly controlling for other types of funding. Column (1) includes payables in addition to receivables of the same firm (interacted with the post dummy). The effect through receivables is still negative and significant, but the effect through payables is negative and insignificant. These results support the view that the account payables play a minor role in hedging the demonetization shock.[6] We also include the profitability of firms but find that this measure plays a minor role. Column (2) includes alternative measures of other funding, such as the interest coverage ratio, borrowing to assets, and cash to assets, and column (3) additionally includes payables and profitability measures. The main results are robust to these alternative controls, suggesting that the other types of funding have a limited role in understanding the demonetization effect on exports through receivables. Specifically, bank borrowing has a minor role, suggesting that firms cannot hedge through borrowing possibly because they could not acquire currency notes from

[6]Depending on the inclusion of outliers, we observe a small positive effect through payables.

	(1)	(2)	(3)	(4)	(5)	(6)
			Exports			
$Post_t$ x $AR/S_{i,t-1}$	-0.296**	-0.274**	-0.294**			
	(0.131)	(0.115)	(0.132)			
$Post_t$ x $AP/E_{p,t-1}$				-0.218**	-0.245**	-0.239**
				(0.104)	(0.114)	(0.114)
$Post_t$ x Age_i	-0.020	-0.066**	-0.022	-0.057*	-0.012	-0.010
	(0.030)	(0.030)	(0.031)	(0.032)	(0.033)	(0.034)
$Post_t$ x Total $Assets_{i,t-1}$	0.034	0.018*	0.006	0.015	0.035	-0.005
	(0.029)	(0.010)	(0.025)	(0.011)	(0.033)	(0.027)
$Post_t$ x Cash $Holding_{i,t-1}$	-0.023**				-0.015	
	(0.011)				(0.012)	
$Post_t$ x Interest $Payment_{i,t-1}$	-0.030				-0.042**	
	(0.019)				(0.020)	
$Post_t$ x Bank $Borrowing_{i,t-1}$	0.028				0.029	
	(0.017)				(0.019)	
$Post_t$ x $AP/S_{i,t-1}$	-0.163		-0.144		-0.230	-0.220
	(0.179)		(0.181)		(0.200)	(0.203)
$Post_t$ x $PBIT_{i,\ t-1}$	0.004		0.009		0.009	0.019
	(0.021)		(0.021)		(0.023)	(0.024)
$Post_t$ x Interest Coverage $Ratio_{i,t-1}$		-0.000	-0.000	-0.000		-0.000
		(0.000)	(0.000)	(0.000)		(0.000)
$Post_t$ x $Borrowings/Assets_{i,t-1}$		-0.080	0.043	-0.132		0.020
		(0.105)	(0.109)	(0.119)		(0.124)
$Post_t$ x $Cash/Assets_{i,t-1}$		-6.332*	-6.351*	-5.843		-5.563
		(3.410)	(3.583)	(4.536)		(4.684)
Firm FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
NIC4 FE x $Post_t$	✓	✓	✓	✓	✓	✓
Number of Firms	3,504	3,926	3,457	3,255	2,907	2,872
R^2	0.769	0.765	0.769	0.769	0.776	0.775
Observations	92135	101371	90847	85192	77604	76581

Table OA.1: Using Additional/Alternative Controls

Note. Table OA.1 replicates Table 4 by using additional and alternative control variables. Interest coverage ratio is defined as the ratio of PBIT to interest payment. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

banks during demonetization. Columns (4)-(6) consider product-specific accounts payable to expenditures of buyers with the same controls and still find the negative demonetization effect on exports through domestic trade credit.

	(1)	(2)	(3)	(4)	(5)	(6)
	$[AR/S]_i$ (total)			$[AR/S]_i$ (short-term)		
$\mathrm{AP/E_{p,t\text{-}1}}$	0.084***	0.099***	0.077***	0.086***	0.097***	0.080***
	(0.029)	(0.035)	(0.028)	(0.029)	(0.034)	(0.028)
ln Age		-0.002	0.014***		-0.003	0.014***
		(0.006)	(0.005)		(0.006)	(0.005)
ln Cash		-0.007***	-0.004*		-0.007***	-0.004**
		(0.002)	(0.002)		(0.002)	(0.002)
ln Interest Payment		-0.000	0.003		-0.000	0.002
		(0.005)	(0.004)		(0.005)	(0.004)
ln Total Assets		0.001	-0.005		-0.000	-0.009
		(0.005)	(0.007)		(0.004)	(0.006)
ln Bank Borrowings		0.003	0.000		0.003	0.002
		(0.004)	(0.004)		(0.004)	(0.004)
$\mathrm{PBIT_{i,\,t\text{-}1}}$			0.001			0.003
			(0.005)			(0.005)
$\mathrm{AP/S_{i,t\text{-}1}}$			0.531***			0.514***
			(0.056)			(0.054)
Firm FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
R^2	0.006	0.013	0.184	0.007	0.014	0.182
Observations	4697	3562	3097	4698	3562	3096

Table OA.2: Using Additional/Alternative Controls

Note. Table OA.2 regresses accounts receivable to sales on accounts payable to expenditures and other control variables. All variables are average across 2013-15. Standard errors are clustered by major product code. * p < 0.10, ** p < 0.05, *** p < 0.01.

D.2 $[AR/S]_i$ and $[AP/E]_p$

Table OA.2 shows a strong, positive relationship between the accounts receivable to sales and product-specific accounts payable to expenditures. The correlation remains strong regardless of including other control variables or using the short-term accounts receivable used in Appendix D.1. These results ensure that the $AP/E_{\mathrm{p,t\text{-}1}}$ is a good measure of exposure to demonetization. When firms mainly sell products paid for with buyers' credit, they hold more receivables and suffer more during demonetization. Cash holding is negatively related to receivables, suggesting that cash and receivables are substitutes but affect exporters independently, as shown in Table 4.

D.3 Using an Indicator Variable

	Exports					
Cutoff:	$AR/S_{i,t-1}$=0.5		p50		p75 and p25	
	(1)	(2)	(3)	(4)	(5)	(6)
$Post_t$ x $D_{i,t-1}$	-0.118***	-0.157**	-0.060***	-0.068**	-0.098***	-0.108**
	(0.039)	(0.077)	(0.022)	(0.029)	(0.031)	(0.050)
Firm FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
NIC4 FE x $Post_t$		✓		✓		✓
Other Firm Controls x $Post_t$		✓		✓		✓
Number of Firms	6,439	4,120	6,439	4,120	3,598	2,156
R^2	0.763	0.764	0.763	0.764	0.753	0.756
Observations	160300	105658	160300	105658	84277	52329

Table OA.3: Exports and Demonetization: Using an Indicator Variable

Note. Table OA.3 considers two different indicator variables defined based on $AR/S_{i,t-1}$. Columns (1)-(3) consider an indicator variable equal to 1 if $AR/S_{i,t-1}$ is larger than 0.5 and 0 otherwise. Columns (4)-(6) consider an indicator variable equal to 1 if $AR/S_{i,t-1}$ is larger than the 75th percentile of the distribution and 0 if $AR/S_{i,t-1}$ is smaller than the 25th percentile of the distribution. All other specifications are identical to table 4 columns (4)-(6). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Our identification strategy relies on the difference-in-differences framework using accounts receivable to sales (AR/S) as exposure to the demonetization episode. One concern in using the AR/S is that it is a continuous variable and requires a stronger assumption to obtain a causal interpretation on the estimated parameter (the "strong parallel trend assumption", as discussed in Callaway et al. (2021)).

As a robustness exercise, we define three different indicator variables based on firms' AR/S. First, we define an indicator variable equal to 1 if the firm's AR/S is larger than 0.5 and 0 otherwise. Second, we use an indicator variable equal to 1 if the firm's AR/S is larger than the median value of AR/S and 0 otherwise. Lastly, we consider an indicator variable equal to 1 if the firm's AR/S is larger than the 75th percentile of the distribution and 0 if the AR/S is smaller than the 25th percentile of the distribution. Table OA.3 reports the results using these three different indicator variables.

The negative demonetization effect on exports remains strong regardless of the choice of indicator variables. Firms with higher accounts receivable to sales decrease their exports more than their counterparts after the demonetization episode. The results are robust to including additional controls or using alternative indicator variables.

D.4 Restricting Sectors

One potential concern is that our sample does not cover total exports by Indian firms. Similarly, the extensive margin results we emphasize in Figure 3 may simply reflect decreased sample coverage after demonetization. To address this concern, we restrict the sample such that we have the same number of sectors in 2015-2017. We also use only those sectors with at least 70%, 75%, 80%, and 85% of total exports reported in official sectoral Trade Map data. As shown in Table OA.4, we still find that the negative effect on exports is robust across different subsectors available in our sample.

	Exports					
	Balance Sectors		>70%	>75%	>80%	>85%
	(1)	(2)	(3)	(4)	(5)	(6)
Post_t x $\text{AR/S}_{\text{i,t-1}}$	-0.311***	-0.310***	-0.317***	-0.367***	-0.376***	-0.321***
	(0.104)	(0.110)	(0.108)	(0.113)	(0.110)	(0.121)
Firm FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
NIC4 FE x Post_t		✓	✓	✓	✓	✓
Other Firm Controls x Post FE		✓	✓	✓	✓	✓
Number of Firms	4,020	4,020	3,929	3,895	3,863	3,808
R^2	0.765	0.767	0.773	0.772	0.772	0.769
Observations	103236	103236	99311	97726	95927	92871

Table OA.4: Exports and Demonetization: Restricting Sectors

Note. The dependent variable is the value of exports at the firm-month level, and AR/S is the 2013-2015 log mean ratio of accounts receivable to deflated sales. Other firm controls are the log firm age and 2013-2015 log mean bank borrowing, cash holdings, interest expenses, and total assets. The sample covers 2015-2017. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Quantity		Price		N. of Products		N. of Destinations	
Post_t x $\text{AR/S}_{\text{i,t-1}}$	-0.444***	-0.380**	0.077	0.017	-0.727**	-0.735**	-0.742***	-0.526**
	(0.144)	(0.153)	(0.104)	(0.112)	(0.310)	(0.328)	(0.240)	(0.252)
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓
Nic4 FE x Post_t		✓		✓		✓		✓
Firm Control x Post_t		✓		✓		✓		✓
Number of Firms	4,043	4,043	4,046	4,046	4,042	4,042	4,045	4,045
R^2	0.734	0.738	0.593	0.599	0.823	0.825	0.891	0.893
Observations	103984	103984	103851	103851	104471	104471	104404	104404

Table OA.5: Price, Quantity (Tornqvist), Extensive Margins

Note. AR/S is 2013-2015 log mean accounts receivable to sales. All variables are deflated. The Tornqvist index is used for the construction of quantity and price indexes. We control for log firm age, 2013-2015 log mean bank borrowing, cash holdings, interest expenses, and total assets. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.5 Price, Quantity, and Extensive Margins

Table OA.5 presents the real effect of demonetization on firm exports using the same specifications used in Table 4. The demonetization effect on export quantity (columns (1) and (2)), export price (columns (3) and (4)), number of products (columns (5) and (6)), and number of destinations (columns (7) and (8)) are presented. Consistent with the event study results in Figure 2, the demonetization effect on firm exports mainly arises from the export quantity rather than export prices. More affected firms decrease the number of exporting products and destinations, similarly to the results in Figure 3. These results reinforce the ones presented in the main body of the paper.

D.6 Extensive vs. Intensive Margins

Our analyses so far emphasize the importance of the extensive margin in part because this margin shows the real effect, consistent with effects on export quantity. This section further investigates the relative importance of the extensive and intensive margins to better understand the effect of demonetization on exports. Specifically, we decompose the value exports as follows:

$$\ln \text{Exports} = \underbrace{\ln\left(\text{Number of X}\right)}_{\text{Extensive Margin}} + \underbrace{\ln\left(\frac{\text{Exports}}{\text{Number of X}}\right)}_{\text{Intensive Margin}}$$

where X is products, destinations, and products X destinations. We regress each margin on the interaction of *Post* X AR/S along with firm and time fixed effects following equation (5.2).

Margins		Product		Destination		Product x Dest.	
	(1) Exports	(2) Ext.	(3) Int.	(4) Ext.	(5) Int.	(6) Ext.	(7) Int.
Post_t x $\text{AR/S}_{\text{i,t-1}}$	-0.323***	-0.143***	-0.181*	-0.115***	-0.208**	-0.197***	-0.126
	(0.111)	(0.046)	(0.098)	(0.043)	(0.088)	(0.055)	(0.084)
Firm FE	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓
Nic4 FE x Post_t	✓	✓	✓	✓	✓	✓	✓
Number of Firms	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Firm Control x Post FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.757	0.784	0.714	0.833	0.667	0.824	0.675
Observations	100021	100021	100021	100021	100021	100021	100021

Table OA.6: Exports and Demonetization: Extensive vs. Intensive Margins

Note. Samples are balanced across specifications such that the total effect is decomposed into extensive and intensive margins. *Ext.* indicates the extensive margin, *Int.* indicates the intensive margin, and *Dest.* indicates product destination. Products are defined using 8-digit HS codes. We control for log firm age, 2013-2015 log mean bank borrowing, cash holdings, interest expenses, and total assets. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The results in table OA.6 suggest that both margins are important. Columns (2) and (3) decompose exports into the number of products and the average exports per product. The effects on the intensive and extensive margins account for approximately 56% (=.181/.323) and 44% (=.143/323), respectively. Decomposing the export values into the destination margins, the effect within each destination is stronger. As shown in columns (4) and (5), the effect on exports per destination is approximately 64% (=.208/323), whereas the effect on the number of destinations is approximately 36% (=.115/323). If we combine both margins, the extensive margin becomes much stronger, as presented in columns (6) and (7). The effect on the number of products and destinations accounts for approximately 61%, and the effect on the average exports per product and destination becomes 39%, and is not statistically significant at conventional levels.

D.7 Aggregate Effect

Our results speak only to the relative change in exports between more and less affected firms based on accounts receivable to sales. The use of micro-level data helps to pin down the exact mechanism through which monetary policy affects exports but does not allow us to quantify the aggregate effect of demonetization.

We conduct a back-of-the-envelope calculation for the aggregate demonetization effect on exports using our reduced form estimates. Table 1 shows that the median exporter has .178 accounts receivable to sales, and the estimated coefficient in Table 4 is approximately 0.3. Considering two economies where one economy only features exporters with 0 receivables and the other with median receivables, an economy with the median receivables experiences an approximately 5.34% (.178 $\times$ 0.3) decrease in exports. Since the aggregate value of exports in 2015 was approximately 264.44 billion USD, the total loss in exports after demonetization is approximately 14.13 billion USD (264.66 $\times$ 0.0534). The effect is likely a lower bound as we have abstracted away from the exit of exporters by focusing on those who survived during demonetization and excluded small exporters not included in the Prowess data (abstracting away from the other general equilibrium effects).

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