TÜRKİYE CUMHURİYET
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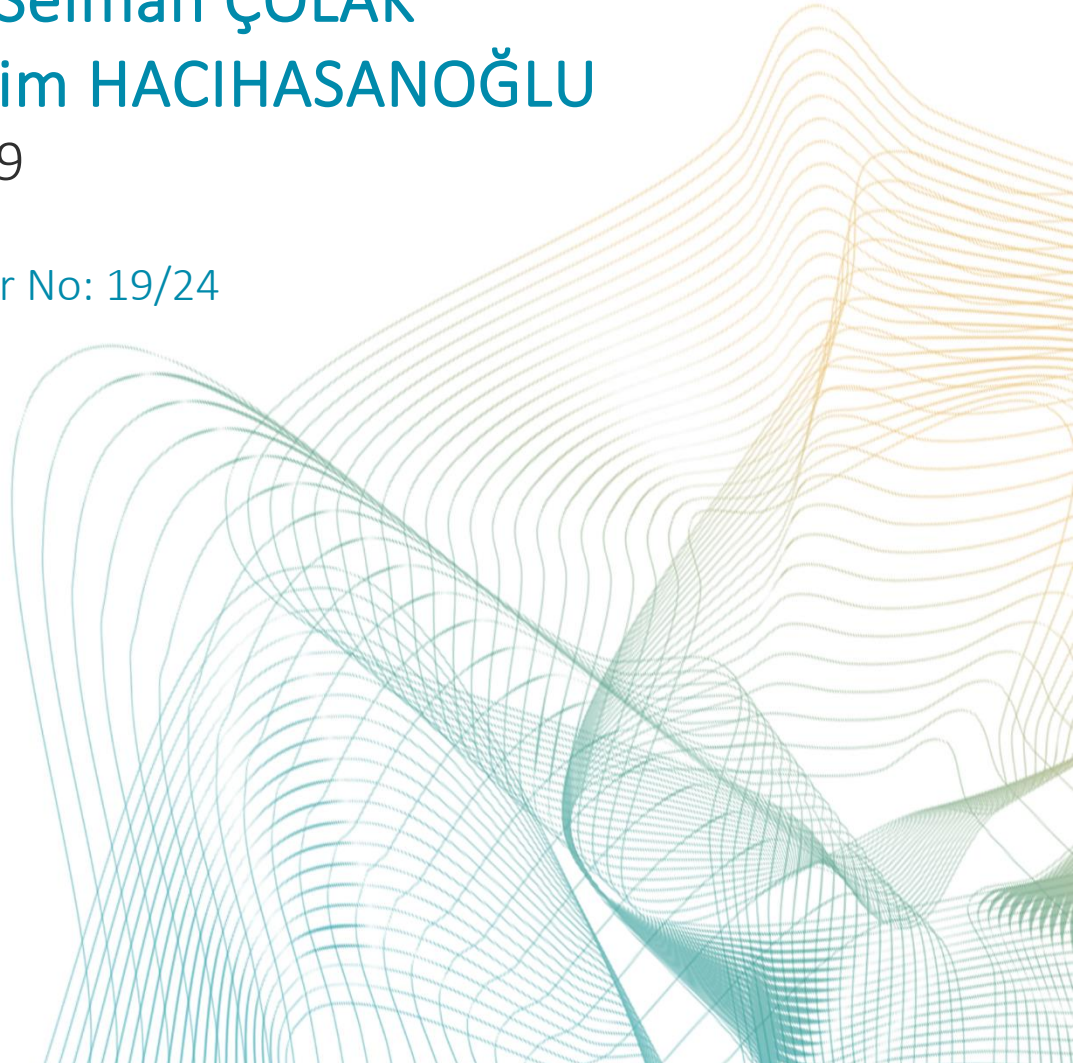# Foreign Currency Debt and the Exchange Rate Pass-Through

Salih FENDOĞLU
Mehmet Selman ÇOLAK
Yavuz Selim HACIHASANOĞLU
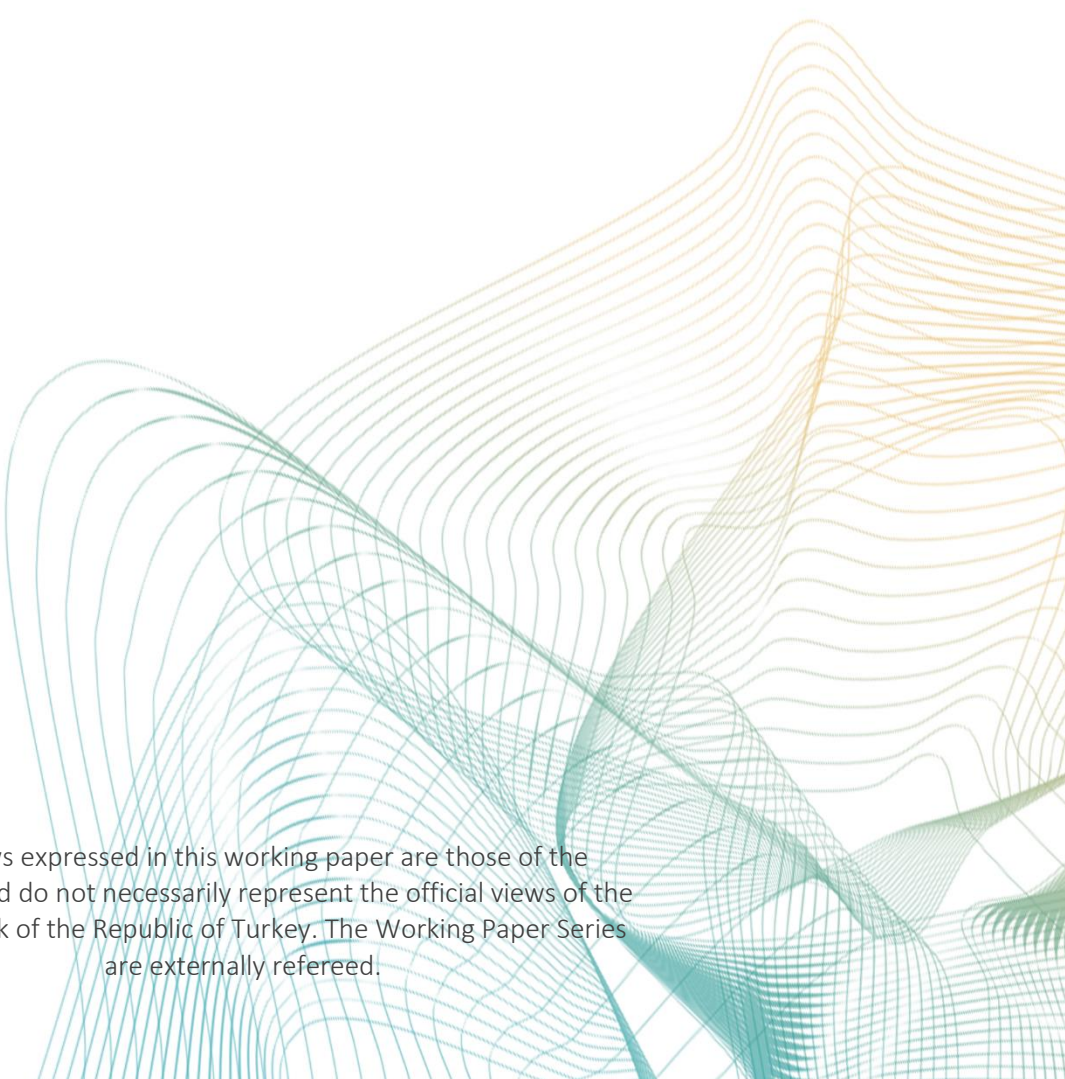
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Foreign Currency Debt and the Exchange Rate Pass-Through

Salih Fendoğlu, Mehmet Selman Çolak, Yavuz Selim Hacıhasanoğlu

Central Bank of the Republic of Turkey

Abstract

We show that higher foreign currency indebtedness raises the degree of exchange rate pass-through to domestic producer prices. For identification, we use micro-level data from Turkey, an emerging market economy that has experienced large exchange rate movements over the last decade. Matching the Credit Register of Turkey with disaggregated manufacturing sector data on domestic prices and foreign currency revenues from international trade, we show that sectors with higher ex-ante net foreign-currency liabilities raise their prices significantly more following domestic currency depreciation. The results are stronger if foreign currency liabilities are short term.

Keywords: Exchange rate pass-through; Producer prices; Foreign currency indebtedness; Emerging market economies.
JEL Codes: E31; F31.

August 27, 2019

Non-Technical Summary

It is well established how foreign currency indebtedness may create financial vulnerabilities for emerging markets, particularly if indebted economic agents hold unhedged positions. Much less is known is whether foreign currency indebtedness is also a concern for price stability. To shed light on this issue, we study the effect of foreign currency indebtedness on exchange rate pass-through to producer prices. We overcome identification challenges by using micro-level data. In particular, for 20 manufacturing sub-sectors, we match (i) the Credit Registry of Turkey aggregated for each sub-sector to obtain outstanding foreign currency liabilities, (ii) foreign currency proceeds from international trade, i.e., exports net of imports, and (iii) producer price indices. We then exploit cross-sectional variation in foreign-currency indebtedness of manufacturing sub-sectors that share a common parent sector (e.g., Foods vs. Beverages, or Textiles vs. Wearing Apparels). By doing so, we absorb economy-wide pricing factors (e.g., changes in aggregate demand) or sectoral pricing factors (e.g., common variation in marginal costs across sub-sectors). We saturate the model further with sub-sector level controls.

We find that sectors with higher ex-ante net foreign-currency liabilities-to-equity ratio raise their prices significantly more following domestic currency depreciations. The results are not only statistically significant but also economically of relevant magnitude, are robust to using alternative measures for the exchange rate (e.g., using realized changes in the value of domestic currency against the USD or a basket of USD and Euro, or using ex-ante expected depreciation of domestic currency against the USD), hold for net rather than gross foreign currency liabilities, and are stronger if foreign currency liabilities are short term.

1. Introduction

Corporate debt in emerging markets has surged to record high levels over the last decade, and of this surge, a significant share has been in foreign currency (IMF, 2015; Brookings, 2015; Feyen et al., 2017; Alfaro et al., 2017). While it is well established how the build-up of foreign currency liabilities create greater financial vulnerabilities following domestic currency depreciations (Krugman, 1999; Cespedes et al., 2004; Aguiar, 2005; Kim et al., 2015), much less is known whether it also creates price stability challenges.

In this paper, we study whether foreign currency indebtedness increases the degree of exchange rate pass-through (ERPT) to domestic producer prices. We match the Credit Registry of Turkey aggregated for 20 manufacturing sub-sectors to obtain their outstanding foreign currency liabilities with sector-level international trade (exports and imports) to eventually reach a measure of net FX liabilities, as well as with their producer prices.[1] Our identification strategy rests on exploiting cross-sectional variation in foreign-currency indebtedness of manufacturing sectors that share a common parent sector (e.g., Foods and Beverages, or Textiles and Wearing Apparels). By doing so, we aim to absorb changes in economy-wide pricing factors (e.g., aggregate demand) as well as changes in pricing factors common within a parent sector. Finally, through our use of a large set of sub-sector level variables, we control for other potential factors that may induce heterogeneity in the ERPT.

We find that following a 10% depreciation in the domestic currency, sectors with a one-standard-deviation higher net foreign currency liability-to-equity ratio raise their producer prices by about 2% points more. We generally find more robust and higher degree of ERPT for sectors with short-term FX liabilities, and it is mainly the net rather than gross foreign currency position that matters for whether FX indebtedness affects the degree of ERPT.

Our paper contributes to the literature on how FX indebtedness, or balance sheet conditions in this regard, affect firms' real economic performances following sharp exchange rate depreciations (Kim et al., 2015; Kim, 2016; Alfaro et al., 2017; Bruno and Shin, 2018), a topic that also received increasing attention within policy circles (see, e.g., IMF, 2015; Brookings, 2015). Our paper also contributes in this vein to the strand of cross-country literature on "fear of floating" (Calvo and Reinhart, 2002; Reinhart et al., 2003; see also Carranza et al. (2009)) and the pass-through literature in general (Bussière et al., 2014; Ogunc et al., 2018; Ertug et al., 2019). Our key contribution is to uncover in a well-identified way that foreign currency indebtedness is also a price stability concern, that it raises the degree of ERPT significantly.

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[1] As an emerging market economy, Turkey serves as an ideal laboratory to address this question. Its non-financial corporate debt-to-GDP ratio has raised over 30% after 2008 (Figure 1). The share of foreign currency denominated debt in total debt has also been high compared to other emerging markets, reaching as high as nearly 60% in 2016 (Figure 2). Its foreign currency debt-to-GDP ratio has increased by 20% points after 2008 (Figure 3). Finally, there exists cross-sectional heterogeneity among manufacturing sub-sectors in their foreign currency indebtedness (Figure 4). We also would like to note that bank loans, rather than trade credit or bond issuance, are the primary source of foreign currency funding for firms in Turkey, which also makes Turkey a convenient environment to study this question.

2. Empirical Strategy and Data

Our key estimation equation is as follows:

$$\pi_{i,t} = \beta \, \Delta ER_{t,t-3} \left(\frac{\text{Net FX Liability}}{\text{Equity}} \right)_{i,t-3} + \text{Controls}_{i,t-3} + \varphi_{s,t} + \varphi_i + \epsilon_{i,t} \qquad (1)$$

where $\pi_{i,t}$ denote quarterly percentage change in sector i producer prices (from month $t-3$ to t), s is the parent sector of sub-sector i, e.g., Foods (i) vs. Foods and Beverages (s). Net FX Liability/Equity$_{i,t-3}$ is our baseline measure of FX indebtedness, and is the ratio of net foreign currency liabilities to total equity for sector i, measured ex-ante (at month $t-3$).[2] $\Delta ER_{t,t-3}$ denotes the quarterly log change in the exchange rate, using an equal basket of US dollars-to-Turkish liras (USD/TRY) and Euros-to-Turkish liras (EUR/TRY), the two major currencies for which foreign currency loans are denominated (a positive value means a depreciation of TRY). Later, we use solely the USD/TRY exchange rate, and further, given the fact that pricing is a forward-looking behavior, expected depreciation of TRY against USD. Moreover, we also explore robustness of our results to using alternative definitions for FX indebtedness.

Our identification strategy rests on exploiting ex-ante cross-sectional variation in net FX liabilities of sectors that share a common parent sector (by including parent sector×time fixed effects, $\varphi_{s,t}$). By doing so, we absorb economy-wide pricing factors, e.g., changes in monetary policy stance or overall demand conditions, and parent sector-specific pricing factors, e.g., any common variation in markups or marginal costs within the parent sector, following a domestic currency depreciation. Moreover, we include sector fixed effects, φ_i, to control for time-invariant pricing factors for sector i.

Moreover, we control for sector-specific financial ratios, such as liquidity (acid-test) ratio, inventory turnover rate, accounts receivable turnover rate, profitability, and leverage ratio, each measured ex-ante; and the increase in production costs due to reliance on imports (namely, the change in import expenditures from $t-3$ to t, divided by total assets at $t-3$). These sectoral controls are included in levels –as given by equation (1), and in most saturated specifications, in interaction with the change in the exchange rate as well. We estimate equation (1) with weighted least squares, where each sector i receives a weight proportional to its share in the producer price index.[3]

Data. We match the following databases: (i) 3-digit sector-level producer price indices and total value of exports and imports, compiled by the Turkish Statistical Agency (TUIK); (ii) 3-digit sector-level balance sheet and income statements, compiled by the Central Bank of the Republic of Turkey (CBRT); (iii) outstanding FX loans (including FX-indexed domestic currency credit) provided by banks operating in Turkey

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[2] Net FX liability is defined as total outstanding foreign currency loans (including foreign-currency indexed domestic currency loans) of firms within sector i minus net revenues from international trade (exports minus imports over the last 12 months); which in turn, is divided by total equity of firms in sector i. We use CBRT Sectoral Accounts database that covers balance sheet and income statement details for over 15000 firms over our sample period. See Table 1 for average number of firms covered by this dataset for each sector.

[3] Sectoral shares within the producer price index change mildly over the sample period. We take the time-average of each of these shares. See Table 1 for the sub-sector weights. The results are strongly robust to using unweighted (ordinary) least squares.

or from abroad, obtained from the Credit Registry of Turkey –which, for conformability, we aggregate at the 3-digit sector level–;[4] and lastly, (iv) exchange rate expectations provided by the CBRT's Survey of Expectations.[5] Our sample period is from January 2007 to December 2016.

Table 1 provides the list of manufacturing sectors used in the estimations. We have 20 3-digit sub-sectors and 9 corresponding 2-digit parent sectors. Our set of manufacturing sub-sectors on average covers 60% of the whole manufacturing sector in terms of gross sales.[6] Table 2 presents the summary statistics and definitions of variables. Table 3 further provides cross-correlation between variables used in the estimations. It shows that our measures of FX indebtedness are on average mildly correlated with changes in the exchange rate.[7] Finally, Figure 4 shows that there exists cross-sectional variation in foreign-currency indebtedness among sub-sectors that share a common parent sector, an essential ingredient for our identification.

3. Empirical Results

Table 4 presents our baseline results. FX indebtedness, particularly of short maturity, has a significant and positive estimated effect on the ERPT. Numerically, a sector with a 1-standard-deviation higher net FX liability-to-equity ratio raises its prices by 2.2% points more following a 10% depreciation in the domestic currency (column 1).[8] In column (2), we include the interaction of sectoral controls with the change in the exchange rate. The estimated effect becomes milder (the degree of estimated ERPT drops to 1.3%). We find stronger results when we measure FX indebtedness using short-term FX liabilities (columns 3 and 4). Numerically, the estimated pass-through due to FX indebtedness attain 2.2% for the simple specification and 2% for the extended specification that includes interaction of sectoral controls with changes in the exchange rate.

Some of the sectoral controls appear to matter for the ERPT as well. Sectors that have lower inventory turnover rate –those that operate with higher average duration of stocks– raise their prices more following

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[4] The Credit Register provides bank-firm-loan level details on outstanding credit balance, currency of denomination, maturity (short-term (<1 year) or >1 year), together with for which sector the loan is used. We aggregate outstanding foreign-currency credit balance at a 3-digit sector level for short-term and short-and-long term maturity loans.

[5] The Central Bank of Turkey conducts a monthly survey on US dollar/Turkish lira (USD/TRY) exchange rate expectations. Survey results are publicly available at http://www.tcmb.gov.tr/wps/wcm/connect/en/tcmb+en/main+menu/statistics/tendency+surveys/survey+of+expectations

[6] In particular, we had to leave aside sectors such as Leather and Leather Products (DC), Wood and Wood Products (DD), Coke, Refined petroleum products and nuclear fuel (DF), Electrical and Optical Equipment (DL), since the Credit Register does not provide further disaggregation regarding these sectors. Unless these sectors do not behave systematically differently in their within-sector pricing, e.g. "Wood" compared to "Wood and Wood Products" behaves systematically differently than, e.g., "Textiles" compared to "Textiles and Wearing Apparels", our results would continue to hold. Our sectoral coverage is 58% for 2007, and 68% for 2016.

[7] If FX indebtedness were very strongly correlated with changes in the exchange rate, that would render our estimates hard to interpret. In this vein, we also find that our results are strongly robust to using *average* sectoral FX indebtedness, $\left(\overline{\frac{\text{Net FX Liability}}{\text{Equity}}}\right)_i$, (not reported for brevity).

[8] Throughout the text, we calculate the economic impacts by multiplying the estimated coefficient with the respective variable's standard deviation. For instance, to reach the estimate of 2.2%, we multiply 0.017, the estimated coefficient, with the standard deviation of net foreign liabilities-to-equity ratio (which is 12.92 as given in Table 2) and by 10 (corresponding to the 10% increase in the exchange rate).

a domestic currency depreciation. Moreover, we find a positive impact of higher import reliance on prices, mainly for the specification that includes overall rather than short-term FX liabilities. Higher profitability –potentially suggesting lower competition– appear to have a positive effect on the ERPT, as one may expect, yet turns out to be insignificant (it becomes significant in a few cases that we report below).

Further Discussions. In Table 5, we normalize net FX liabilities with total assets. The key result remains intact. FX indebted sectors have higher degree of ERPT, and this is strongly the case for short-term FX indebtedness. For the most saturated specification, the estimated degree of ERPT is nearly 1.8% points higher following a 10% domestic currency depreciation for sectors with higher short-term FX liabilities-to-assets ratio.

In Table 6, we provide further evidence that our results above are robust to using alternative definitions for the exchange rate. Namely, we now use quarterly log change in the USD/TRY exchange rate, or expected depreciation in the USD/TRY exchange rate over the next 12-month horizon (measured at $t-3$). Two results emerge: First, we find consistently stronger and more precise estimates for the effect of short-term FX indebtedness on the ERPT. Second, exchange rate expectations matter as well. Following a 10% expected TRY depreciation against USD, higher FX indebted sectors raise their prices by about 3% more.

In Tables 7 and 8, we study alternative measures for FX liabilities to reflect further on how FX indebtedness affects pricing dynamics. We start with using gross FX liabilities, i.e., outstanding FX loans divided by total equity or total assets (Table 7). The estimated effects become essentially nil for almost all the specifications, suggesting that it is mainly the net rather than gross FX liabilities that matters for pricing following domestic currency depreciations. In Table 8, we calculate net FX liabilities in an alternative way. We use FX revenues due to exports (rather than using net FX revenues due to international trade –exports minus imports– as in the baseline) in calculating net FX liabilities. This alternative definition, in essence, assumes all imports are financed by FX loans. We continue to find that higher FX indebted sectors pass domestic currency depreciations more strongly onto their prices, with short-term rather than overall FX indebtedness appearing a robust and stronger factor for the ERPT. The estimated degrees of ERPT under this definition appear numerically close to our baseline estimates.

4. Conclusion

Foreign currency indebtedness has generally been put forward as a potential source of financial vulnerability for emerging markets, particularly at the onset of domestic currency depreciations. In this paper, we show in a well-identified way that foreign currency indebtedness is also a concern for price stability. Controlling for economy-wide or sectoral pricing factors and exploiting within parent-sector variations, we find that foreign currency indebted sectors raise their prices significantly more following domestic currency depreciations. The estimated pass-through is economically stronger and more robust if foreign currency liabilities are short term.

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Figures

FIGURE 1: CHANGE IN THE NON-FINANCIAL CORPORATE SECTOR TOTAL DEBT TO GDP RATIO
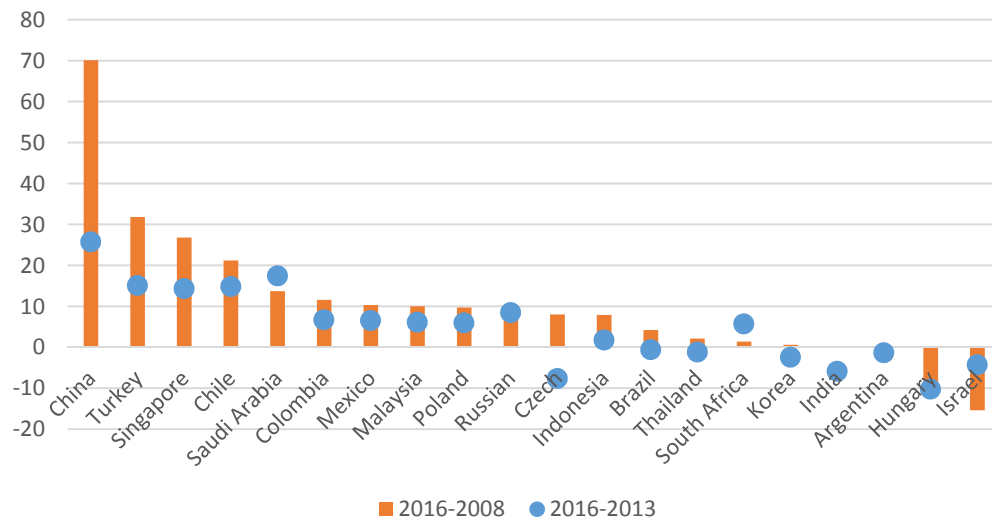
Source: Authors' calculations, Institute of International Finance (IIF).

FIGURE 2: NON-FINANCIAL CORPORATE SECTOR FX DEBT TO TOTAL DEBT RATIO

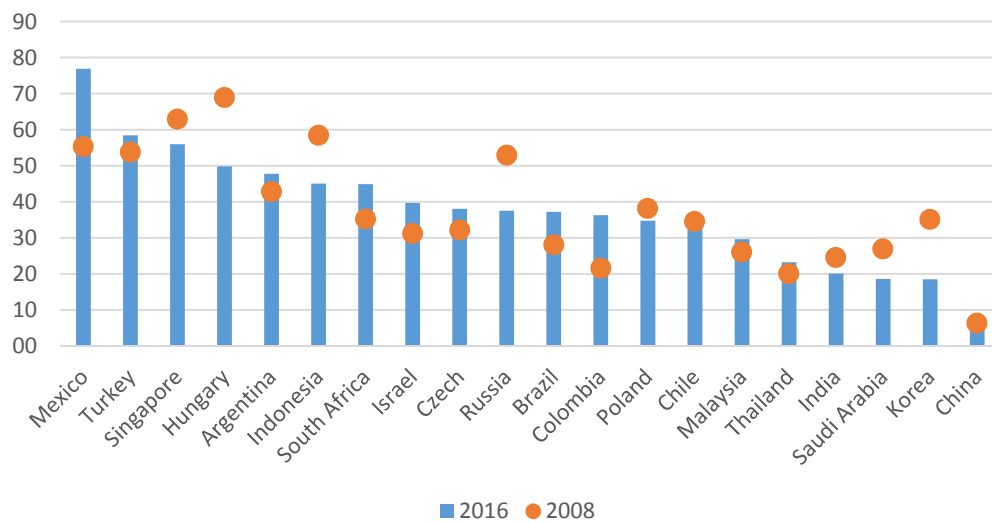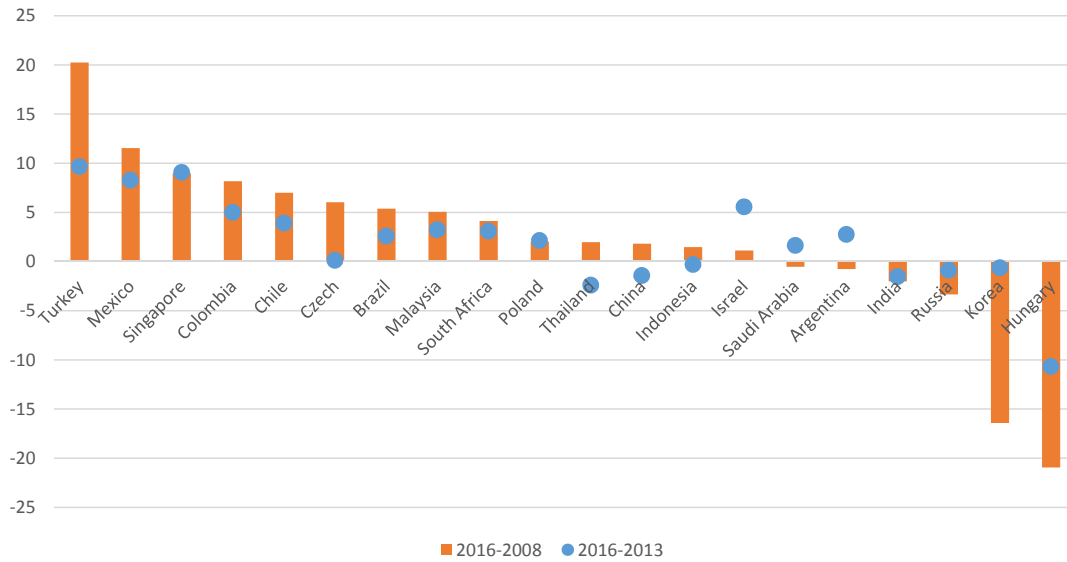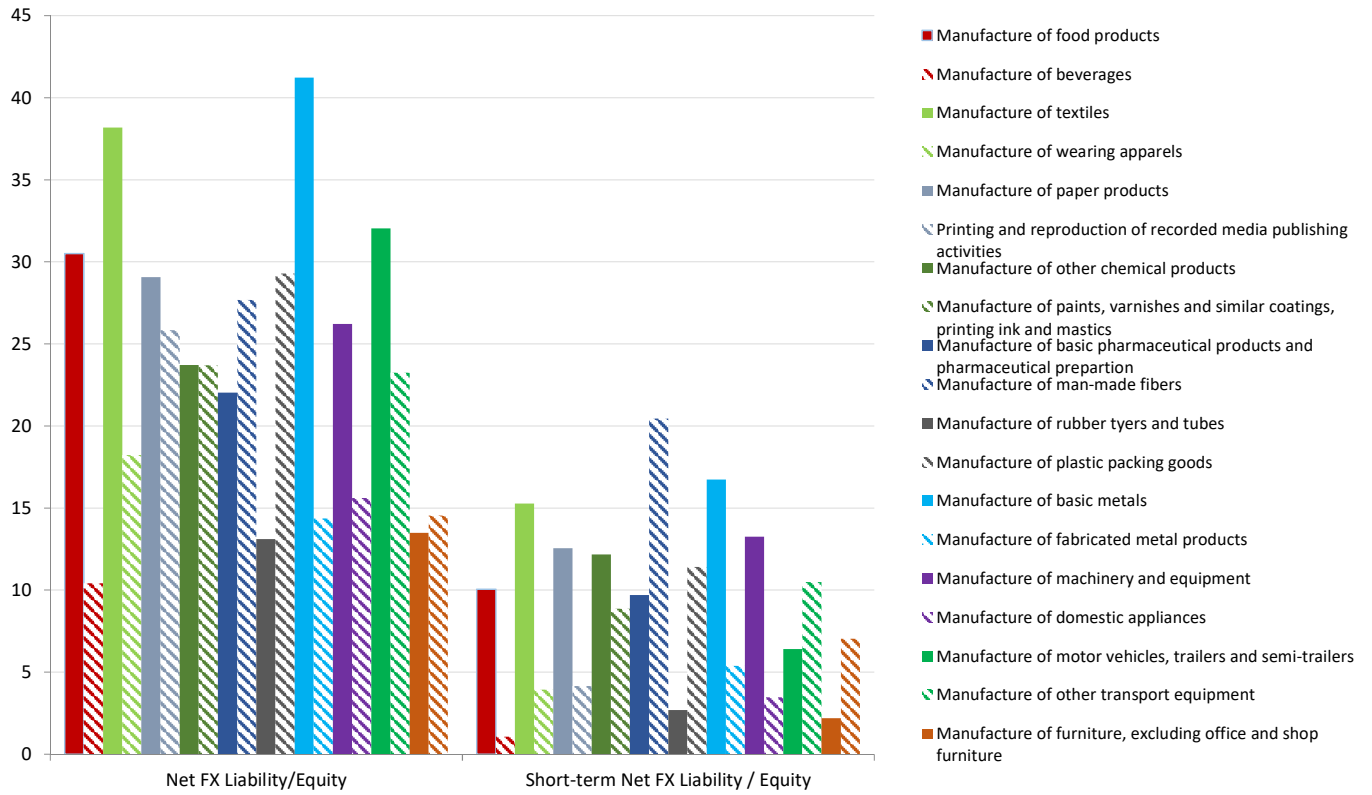Source: Authors' calculations, Institute of International Finance (IIF).

FIGURE 3: CHANGE IN THE RATIO OF NON-FINANCIAL CORPORATE SECTOR FX DEBT-TO-GDP

Source: Authors' calculations, Institute of International Finance (IIF).

FIGURE 4: NET FX LIABILITY / EQUITY ACROSS SECTORS

Tables

TABLE 1: MANUFACTURING SUB-SECTORS USED IN THE ESTIMATIONS

Parent Sector (s)*	Sub-Sector Codes (i)*	Nace Rev 2	Name	Average number of firms**	Average weight in the PPI***
DA	DAA	10	Manufacture of food products	2194	15.72%
	DAB	11	Manufacture of beverages	76	1.12%
DB	DBA	13	Manufacture of textiles	2276	5.14%
	DBB	14	Manufacture of wearing apparels	1095	3.35%
DE	DEA	17	Manufacture of paper products	413	1.71%
	DEB	18	Printing and reproduction of recorded media publishing activities	238	0.85%
DG	DGA	20.5	Manufacture of other chemical products	885	2.19%[a]
	DGB	20.3	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	318	2.19%[a]
	DGC	21	Manufacture of basic pharmaceutical products and pharmaceutical prepartion	222	1.05%
	DGD	20.6	Manufacture of man-made fibers	38	2.19%[a]
DH	DHA	22.1	Manufacture of rubber tyers and tubes	304	3.39%[b]
	DHB	22.2	Manufacture of plastic packing goods	1203	3.39%[b]
DJ	DJA	24	Manufacture of basic metals	1527	6.60%
	DJB	25	Manufacture of fabricated metal products	1379	3.24%
DK	DKA	28	Manufacture of machinery and equipment	1346	4.37%
	DKB	27.5	Manufacture of domestic appliances	398	1.22%
DM	DMB	29	Manufacture of motor vehicles, trailers and semi-trailers	305	4.63%
	DMD	30	Manufacture of other transport equipment	136	0.60%
DN	DNA	31	Manufacture of furniture, excluding office and shop furniture	389	2.01%
	DNB	32	Other manufacturing, excl. manufacturing of coins and medical supplies	1437	1.29%
			TOTAL	**16178**	**58%**

* Parent and sub-sector codes provided by the Credit Register.
** Average number of firms covered by the CBRT Sectoral Accounts database (2007-2016).
*** Average weight in the PPI over 2007-2016.
[a][b] Since not publicly available, the sums of (a)s or (b)s are provided.

TABLE 2: SUMMARY STATISTICS

Variable	Definition	Mean	Std. Dev	Obs.
Inflation	Percentage change in producer price index for sector i from month t-3 to t; annualized	5.85	13.99	2199
Net FX Liability/Equity	Total FX revenues due to international trade activity (export proceeds-import expenses over the last 12 months) is substracted from the gross FX liability, to reach net FX liabilities. Net FX Liability is then divided by total equity of firms within that sector.	23.48	12.92	2199
Short-term Net FX Liability/Equity	Calculated similarly as above, except that we use short-term (<12 months) foreign-currency liabilities.	8.24	5.76	2199
Net FX Liability/Assets	Calculated similar as above, except that we now divide Net FX Liability with total assets of firms within that sector.	8.73	4.20	2199
Short-term Net FX Liability/Assets	Calculated similar as above, except that we use short-term (<12 months) foreign-currency loans.	3.06	2.03	2199
Gross FX Liability/Equity	The total amount of outstanding foreign currency loans (including foreign currency-indexed domestic currency loans) divided by total equity, aggregated over firms within that sector.	23.40	12.80	2199
Short-term Gross FX Liability/Equity	Calculated similar as above, except that we use short-term (<12 months) foreign-currency loans.	8.16	5.46	2199
Gross FX Liability/Assets	Calculated similar as above, except that we divide Gross FX Liability with total assets of firms within that sector.	8.67	4.13	2199
Short-term Gross FX Liability/Assets	Calculated similar as above, except that we use short-term (<12 months) foreign-currency loans.	3.01	1.89	2199
Liquidity Ratio	Acid-test ratio: (Current Assets - Inventory - Prepaid Expenses) / Current Liabilities	100.32	22.88	2199
Inventory Turnover Rate	Cost of sales/ ((Inventories + Previous Year's Inventories) / 2)	6.00	1.90	2199
Acc. Receivable Turnover Rate	Net Sales / Total Trade Credit	5.73	2.44	2199
Profitability	Net Profits / Net Sales	2.48	2.41	2199
Leverage	Total Debt / Total Assets	61.09	6.39	2199
Imports	Change in Import Expenditures (t-3 to t) / Total Assets (t-3)	0.07	0.21	2199
ΔER	Log change in equal basket of USD/TRY and EUR/TRY (from month t-3 to t), multiplied by 100.	1.98	5.67	2199
ΔER^{USD}	Log change in USD/TRY (from month t-3 to t), multiplied by 100.	2.22	6.44	2199
$\Delta ER^{e,USD}$	Log difference between 12-month ahead USD/TRY expectations and the current USD/TRY, multiplied by 100.	4.10	3.99	2199

TABLE 3: CROSS-CORRELATIONS

	ΔER	ΔER^{USD}	ΔER^{e,USD}	Net FX Liabilities/Equity	Short-term Net FX Liabilities/Equity	Net FX Liabilities/Assets	Short-term Net FX Liabilities/Assets
ΔER	1						
ΔER^{USD}	0.86***	1					
ΔER^{e,USD}	0.05**	0.01	1				
Net FX Liabilities/Equity	0.07***	0.11***	-0.14***	1			
Short-term Net FX Liabilities/Equity	0.05**	0.07***	-0.07***	0.73***	1		
Net FX Liabilities/Assets	0.02	0.05**	-0.13***	0.93***	0.71***	1	
Short-term Net FX Liabilities/Assets	0.008	0.01	-0.03*	0.61***	0.96***	0.68***	1

	Net FX Liabilities/Equity	Liquidity Ratio	Inventory Turnover Rate	Acc. Receivable Turnover Rate	Profitability	Leverage	Imports
Net FX Liabilities/Equity	1						
Liquidity Ratio	-0.04*	1					
Inventory Turnover Rate	0.07***	0.09***	1				
Acc. Receivable Turnover Rate	-0.13***	-0.37***	0.02	1			
Profitability	0.02	0.40***	-0.11***	-0.14***	1		
Leverage	0.33***	-0.38***	0.07***	-0.07***	-0.29***	1	
Imports	0.04*	-0.06***	0.005	0.21***	-0.07***	0.09***	1

Notes. Each entry corresponds to pairwise correlations. ***, **, * denote significance at 0.01, 0.05, and 0.10 levels, respectively.

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Maturity of FX Liability:	All		Short-term (<1 year)	
	(1)	(2)	(3)	(4)
ΔER x Net FX Liability/Equity	0.017***	0.010*	0.038***	0.035***
	(0.005)	(0.005)	(0.010)	(0.010)
ΔER x Liquidity Ratio		0.006*		0.001
		(0.003)		(0.007)
ΔER x Inventory Turnover Rate		-0.070***		-0.195***
		(0.023)		(0.063)
ΔER x Acc. Receivable Turnover Rate		0.027		-0.012
		(0.027)		(0.055)
ΔER x Profitability		0.010		0.032
		(0.023)		(0.035)
ΔER x Leverage		0.023***		0.015
		(0.009)		(0.014)
ΔER x Imports		0.747***		0.125
		(0.215)		(0.339)
Parent Sector x Time FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Observations	2,199	2,199	2,199	2,199
R-squared	0.762	0.769	0.765	0.768
Change in the inflation rate (percentage points) by a sector with 1 std. higher net FX Liability/Equity ratio following 10% domestic currency depreciation	**2.20**	**1.29**	**2.19**	**2.01**

Notes: Dependent variable is the percentage change in producer price index of sector i (from month t-3 to t, annualized). ΔER is the quarterly log change in the level of (equal-weighted) basket of USD/TRY and EUR/TRY. A positive ΔER means a depreciation of TRY. "Yes" indicates that the corresponding fixed effects are included. Net FX Liability is defined as total outstanding FX loans (including FX-indexed domestic currency loans) minus net FX revenues from international trade over the last 12 months (exports minus imports). Robust standard errors are given in parentheses. Estimates are based on weighted least squares (where each sector receives a weight proportional to its share in the overall producer price index). All control variables are included in levels as well, and not reported for brevity. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

Maturity of FX Liability:	All		Short-term (<1 year)	
	(1)	(2)	(3)	(4)
ΔER x Net FX Liability/Assets	**0.042*****	**0.028***	**0.080*****	**0.087*****
	(0.014)	(0.015)	(0.026)	(0.027)
ΔER x Liquidity Ratio		**0.013**		**0.001**
		(0.009)		(0.018)
ΔER x Inventory Turnover Rate		**-0.209*****		**-0.435****
		(0.064)		(0.176)
ΔER x Acc. Receivable Turnover Rate		**0.070**		**-0.008**
		(0.075)		(0.149)
ΔER x Profitability		**-0.001**		**0.168***
		(0.071)		(0.099)
ΔER x Leverage		**0.025**		**-0.013**
		(0.020)		(0.034)
ΔER x Imports		**2.203*****		**0.807**
		(0.638)		(0.910)
Parent Sector x Time FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Observations	2,199	2,199	2,199	2,199
R-squared	0.762	0.769	0.765	0.768
Change in the inflation rate (percentage points) by a sector with 1 std. higher net FX Liability/Assets ratio following 10% domestic currency depreciation	**1.77**	**1.18**	**1.63**	**1.77**

Notes: Dependent variable is the percentage change in producer price index of sector i (from month t-3 to t, annualized). ΔER is the quarterly log change in the level of (equal-weighted) basket of USD/TRY and EUR/TRY. A positive ΔER means a depreciation of TRY. "Yes" indicates that the corresponding fixed effects are included. Robust standard errors are given in parentheses. Estimates are based on weighted least squares (where each sector receives a weight proportional to its share in the overall producer price index). All control variables are included in levels as well, and not reported for brevity. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

TABLE 6: FURTHER DISCUSSIONS II: ALTERNATIVE DEFINITIONS FOR EXCHANGE RATES

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Net FX Liability/Equity	**0.010***	**0.035***
	(0.005)	(0.010)
ΔER^{USD} x Net FX Liability/Equity	**0.004**	**0.027***
	(0.005)	(0.010)
ΔER^{e,USD} x Net FX Liability/Equity	**0.013***	**0.051***
	(0.008)	(0.016)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Net FX Liability/Equity, following		
10% depreciation in TRY (against the basket of USD and EUR)	**1.29**	**2.01**
10% depreciation in TRY against the USD	**0.52**	**1.55**
10% expected depreciation of TRY against the USD	**1.68**	**2.94**

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Net FX Liability/Assets	**0.028***	**0.087***
	(0.015)	(0.027)
ΔER^{USD} x Net FX Liability/Assets	**0.011**	**0.061****
	(0.014)	(0.025)
ΔER^{e,USD} x Net FX Liability/Assets	**0.036***	**0.148***
	(0.021)	(0.042)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Net FX Liability/Assets, following		
10% depreciation in TRY (against the basket of USD and EUR)	**1.18**	**1.77**
10% depreciation in TRY against the USD	**0.46**	**1.24**
10% expected depreciation of TRY against the USD	**1.51**	**3.01**

Notes: Each estimate is based on the most saturated regression specification (as in columns 2 and 4 of Table 4 or Table 5). Robust standard errors are given in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

TABLE 7: FURTHER DISCUSSIONS III: USING GROSS FX LIABILITIES

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Gross FX Liability/Equity	**0.004**	**0.004**
	(0.006)	(0.016)
ΔER^{USD} x Gross FX Liability/Equity	**-0.003**	**-0.006**
	(0.006)	(0.015)
ΔER^{e,USD} x Gross FX Liability/Equity	**0.012**	**0.048****
	(0.009)	(0.023)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Gross FX Liability/Equity, following		
10% depreciation in TRY (against the basket of USD and EUR)	**0.51**	**0.22**
10% depreciation in TRY against the USD	**-0.38**	**-0.33**
10% expected depreciation of TRY against the USD	**1.54**	**2.62**

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Gross FX Liability/Assets	**0.012**	**0.007**
	(0.018)	(0.043)
ΔER^{USD} x Gross FX Liability/Assets	**-0.009**	**-0.031**
	(0.017)	(0.041)
ΔER^{e,USD} x Gross FX Liability/Assets	**0.037**	**0.159****
	(0.025)	(0.065)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Gross FX Liability/Assets, following		
10% depreciation in TRY (against the basket of USD and EUR)	**0.50**	**0.13**
10% depreciation in TRY against the USD	**-0.37**	**-0.58**
10% expected depreciation of TRY against the USD	**1.53**	**3.00**

Notes: Each estimate is based on the most saturated regression specification (as in columns 2 and 4 of Table 4 or Table 5). Robust standard errors are given in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

TABLE 8: FURTHER DISCUSSIONS IV: ALTERNATIVE DEFINITION FOR NET FX LIABILITIES

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Net FX Liability/Equity	**0.010***	**0.032****
	(0.006)	(0.012)
ΔER^{USD} x Net FX Liability/Equity	**0.006**	**0.030****
	(0.006)	(0.011)
ΔER^{e,USD} x Net FX Liability/Equity	**0.009**	**0.029**
	(0.009)	(0.020)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Net FX Liability/Equity, following		
10% depreciation in TRY (against the basket of USD and EUR)	**1.23**	**2.10**
10% depreciation in TRY against the USD	**0.74**	**1.96**
10% expected depreciation of TRY against the USD	**1.11**	**1.90**

Maturity of FX Liability:	All	Short-term (<1 year)
	(1)	(2)
ΔER x Net FX Liability/Assets	**0.029***	**0.075****
	(0.016)	(0.033)
ΔER^{USD} x Net FX Liability/Assets	**0.016**	**0.067****
	(0.015)	(0.030)
ΔER^{e,USD} x Net FX Liability/Assets	**0.026**	**0.086***
	(0.023)	(0.052)
Change in the inflation rate (percentage points) by a sector with 1 std. higher Net FX Liability/Assets, following		
10% depreciation in TRY (against the basket of USD and EUR)	**1.23**	**1.72**
10% depreciation in TRY against the USD	**0.68**	**1.54**
10% expected depreciation of TRY against the USD	**1.10**	**1.98**

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Notes: Net FX Liability is now defined as total outstanding FX loans minus export revenues over the last 12 months. Each estimate is based on the most saturated regression specification (as in columns 2 and 4 of Table 4 or Table 5). Robust standard errors are given in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

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