Macroprudential FX Regulations: Shifting the Snowbanks of FX Vulnerability?*

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ONLINE APPENDIX

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Appendix A: Derivations of Equilibrium and Proofs

This appendix characterizes the equilibrium of the model in Section II of the impact of macroprudential FX regulations on different forms of lending in domestic or foreign currency. It describes demand for funding by different types of firms, solves for the equilibrium lending rates and threshold exchange rate above which firms default, and describes the lending patterns from banks and market investors in the unregulated equilibrium and after macroprudential FX regulations.

A. Funding choice of productive, non-exporting firms

Given the lending rates (R_D, R_F), consider the funding and investment decisions for the productive, non-exporting firms. Firm profits expressed in the domestic good for a given funding profile (d, f) and realized exchange rate e at $t = 1$ are: $\pi(d, f; e) \equiv (d + f)^{\alpha} - d\, R_D - e\, f R_F$. Thus, the firm defaults whenever the exchange rate depreciates such that it exceeds a threshold, $e > e^*$:

$$e^*(d, f) \equiv \frac{(d+f)^{\alpha} - d\, R_D}{f\, R_F}. \tag{3}$$

We use $g(e)$ and $G(e)$ to denote the probability density and cumulative distribution functions of the exchange rate. The firm chooses its funding mix to maximize expected profits, taking the exchange rate threshold e^* into account and lending rates as given:

$$\max_{d,f} \Pi \equiv \int_0^{e^*} \pi(d, f; e) dG(e) \quad s.t. \;\; e^* = e^*(d, f). \tag{4}$$

The solution to this problem provides the amount of foreign funding, domestic funding, and investment for non-exporting firms:

$$f^* = (1 - \alpha)\left(\frac{\alpha^{\alpha}}{R_D}\right)^{\frac{1}{1-\alpha}}, \;\; d^* = (2\alpha - 1)\left(\frac{\alpha^{\alpha}}{R_D}\right)^{\frac{1}{1-\alpha}}, \;\; I^* = \left(\frac{\alpha}{R_D}\right)^{\frac{1}{1-\alpha}}. \tag{5}$$

The threshold exchange rate for firm default is $e^* = 2\frac{R_D}{R_F}$. We henceforth impose the bound $\alpha \geq \frac{1}{2}$ to ensure that all non-zero constraints are satisfied.

PROOF. The first-order conditions for this problem are $\frac{d\,\Pi}{d\,d} = G(e^*)\left(\frac{\alpha}{I^{1-\alpha}} - R_D\right) = 0$, which yields the stated expression for I^*, and $\frac{d\,\Pi}{d\,f} = \int_0^{e^*}\left(\frac{\alpha}{I^{1-\alpha}} - eR_F\right) dG(e) = 0$. Using the distribution, $g(e) = \frac{1}{b}$

and $G(e) = \frac{e}{b}$, we obtain $\int_0^{e^*} e\, dG(e) = \frac{(e^*)^2}{2b}$ and the stated default threshold of the exchange rate e^*. Using the balance-sheet identity, $I = d + f$, the definition of the threshold e^*, and combining it with the first-order condition yields the stated expressions for d^* and f^*. ■

B. Funding choice of exporters

The funding and investment choice for exporters is simpler. Since funding in F is cheaper than funding in D, $R_D > R_F$ (as verified below). The natural hedge of exporters implies that they are not exposed to any FX risk when they fund themselves exclusively in F, $d_E^* = 0$. Taking R_F as given, exporters maximize their expected profits, which simplifies to:

$$\max_{f_E} \Pi_E = \int_0^{e^*} e\, (f_E^{\alpha} - f_E\, R_F)\, dG(e). \tag{6}$$

The solution to this problem implies that exporters raise only foreign funding to invest:

$$f_E^* = \left(\frac{\alpha}{R_F}\right)^{\frac{1}{1-\alpha}} = I_E^*. \tag{7}$$

This solution agrees with the analysis in Salomao and Varela (2018), which uses Hungarian data to show that exporters are more likely to raise funding in FX because it is cheaper than local currency funding and exporters are hedged against currency risks.

PROOF of Exporter problem. The first-order condition of the problem is: $\frac{b}{2}(\alpha f^{\alpha-1} - R_F) = 0$ and yields the stated solution for f_E^*. ■

C. General equilibrium

Next, we turn to the equilibrium lending rates and lending patterns for banks and market investors, as well as the impact of macroprudential FX regulations (set at the level t).

Observed exporters (of fraction O) receive cheaper funding from market investors than from banks, $r_F \leq r_F + t$, so they borrow from the market in F.

If banks (labelled as B) lend in foreign currency to unobserved exporters (of fraction $1-O$), the competitive lending rate covers the costs of funding and screening and the macroprudential FX tax (with no default risk because exporters do not default):

$$R_E^B = r_F + c + t. \tag{8}$$

If banks lend to productive firms (in either currency), they require a premium for firm default that occurs for $e > e^*$. The competitive lending rates of banks therefore jointly solve $R_D^B G(e^*) = r_D + c$ and $R_F^B G(e^*) = r_F + c + t$, which results in the following rates:

$$R_D^B = \frac{b(r_F+c+t)}{2}, \quad R_F^B = \frac{b(r_F+c+t)^2}{2(r_D+c)} > R_E^B, \tag{9}$$

which verifies the previously supposed ranking $R_D > R_F$.[1]

Next, consider the competitive lending rates offered by market investors (labelled M). When lending in D, investors lend to unproductive firms and receive 0 with probability $1-p$ and to productive non-exporters and receive R_D^M with probability $p(1-q)G(e^*)$, which incorporates default risk after depreciation. Thus, the lending rate is

$$R_D^M = \frac{1-pq}{p(1-q)G(e^*)} r_D. \tag{10}$$

The lending rate of investors is above that of banks, $R_D^M > R_D^B$, whenever the consequences of adverse selection are more severe than the cost of screening, which we assume henceforth:

$$c < \overline{c} \equiv \frac{1-p}{p(1-q)} r_D. \tag{11}$$

Turning to the competitive lending rates offered by investors in foreign currency, suppose that market investors attract non-exporters but not exporters, $R_E^B < R_F^M \leq R_F^B$. Our objective is to establish when this ranking holds in equilibrium. Investors lend to unproductive firms and receive 0 with probability $1-p$, and to productive non-exporters and receive R_F^M with probability $p(1-q)G(e^*)$ because of default risk. The firm obtains funding in D from the bank, $R_D^B G(e^*) = r_D + c$, and funding in F from the market, $R_F^M = \frac{1-pq}{p(1-q)G(e^*)} r_F$. Solving this system of equations – where the exchange rate threshold also depends on the lending rates – yields:

[1] This captures the key trade-off in Salomao and Varela (2018), that firms chose their level of foreign-currency borrowing to balance the trade-off between the lower cost of FX borrowing with higher default risk from FX exposure.

$$R_F^M = \frac{b\, r_F^2}{2(r_D+c)}\left(\frac{1-pq}{p(1-q)}\right)^2. \tag{12}$$

The lending rate of investors is above that of banks, $R_F^M > R_F^B$, whenever the consequences of adverse selection are more severe than the cost of screening and the macroprudential tax, $c < \frac{1-p}{p(1-q)} r_F - t$. This bound holds in the unregulated economy, $t = 0$, whenever

$$c < \underline{c} \equiv \frac{1-p}{p(1-q)} r_F < \overline{c}. \tag{13}$$

This series of results immediately yields the Unregulated Equilibrium stated in the main text.

The lending pattern described above, however, shows that banks are exposed to default after a depreciation of the local currency D, which is socially costly.

The expected exposure of banks can be measured as:

$$EE \equiv \big(1 - G(e^*)\big) f^*. \tag{14}$$

This expected social cost of bank default due to FX exposure could provide the incentive to adopt macroprudential FX regulations. Implementing macroprudential FX regulations, however, generates a number of changes from the Unregulated Equilibrium, which are shown in the main text. Its proof is given below.

PROOF. First, using the equilibrium allocation, we can express the expected exposure as $EE = (1-\alpha)\left(\frac{2\,\alpha^\alpha}{b}\right)^{\frac{1}{1-\alpha}}\left(1 - \frac{2(r_D+c)}{b(r_F+c+t)}\right)\left(\frac{1}{r_F+c+t}\right)^{\frac{1}{1-\alpha}}$. Thus, the derivative, $\frac{d\,EE}{d\,t}$, is proportional to $\frac{2}{b}(2-\alpha)\frac{r_D+c}{r_F+c+t} - 1$, which is negative if and only if the stated condition holds. Second, firms borrow from banks if $t < t^*$. Marginal increases in the tax rate affect the allocations via changes in the equilibrium interest rates, $R_D(t)$ and $R_F(t)$. According, a marginally higher tax, $d\,t > 0$, depresses funding in F and total investment for both productive non-exporters and exporters. Third, higher macroprudential taxes make market funding more attractive relative to bank funding. At $t = t^*$, we have $R_F^B = R_F^M$ and firms switch from banks to investors. At this point, the remaining FX lending of banks is to exporters. Since these are riskless because of their hedge, there is no point for the regulator to increase the tax above t^*. ■

Appendix B: Data Sources, Definitions, and Summary Statistics

We use two databases on international capital flows in order to measure debt and bank capital flows into FX and non-FX denominated flows: the BIS International Banking Statistics (IBS) data for cross-border bank loans provided by international banks[2] and the BIS International Debt Statistics (IDS) for the issuance of debt securities of domestic banks and corporates on international debt markets (and hence potentially bought by all types of creditors, i.e., banks and non-banks).

For the IBS (international loan) data, the currency denomination of cross-border bank loan liabilities needs to be estimated using information on cross-border bank loan assets from all BIS-reporting countries to a large set of countries. This is because only a fraction of the countries in our sample are BIS reporters and even for BIS reporters we only have information on the FX-loan liabilities of the banking system and no information on the balance sheet of non-banks. Consequently, we match information on the currency denomination of loans by international banks with the currency in use in the receiving country to determine whether a specific currency-lending pair can be classified as FX or non-FX from the perspective of the receiving country.

For the IDS (international debt) data, data on residency basis include information on the currency denomination of debt issuance. The data refer to debt securities issued by domestic headquartered entities on international markets. This is a key component of the portfolio debt category in the balance of payments.

We combine this data with our dataset on macroprudential FX regulations (discussed in Section III.A). Then we exclude the countries that issue the main safe-haven currencies (the United States, Japan, Switzerland and long-standing members of the Euro Area) and exclude small off-shore financial centers (according to BIS definitions), but include Hong Kong and Singapore.[3] These safe-haven issuing countries do not have any changes in macroprudential FX regulations in our underlying dataset, except for Austria, which we therefore include in our sample for the main analysis.[4]

Our final dataset has information on 48 countries: Argentina, Australia, Austria, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Korea, Kuwait, Latvia, Lithuania, Malaysia, Mexico, Mongolia, New Zealand, Norway, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Sweden, Thailand, Turkey, Ukraine, United Kingdom, Uruguay, and Vietnam. Detailed information on the sample and changes in FX regulation by country are available in Appendix Table A1 at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3139618##

Additional information on control variables is below in Appendix Table B1 and summary statistics are in Table 1.

[2] The IBS data contain only a long enough time series for loans to banks and non-banks respectively. They also include data for disaggregating loans to non-banks into loans to non-bank financials, households and corporates, but this time series is too short for our empirical analysis (starting in 2014 Q1). For information on the BIS adjustments to the stock data to remove exchange rate valuation effects, see: https://www.bis.org/publ/qtrpdf/r_qt1509e.htm.

[3] The countries excluded as safe-haven issuing countries are: Belgium, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Malta, Netherlands, Portugal, Spain, Switzerland, and US. The countries that are excluded as small off-shore financial centers are: Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Curacao, Gibraltar, Guernsey, Isle of Man, Jersey, Lebanon, Macao, Mauritius, Netherlands Antilles, Panama, Samoa, St. Maarten, Vanuatu.

[4] Sensitivity tests which exclude Austria, or exclude Hong Kong and Singapore, have no meaningful impact on the key results.

Appendix Table B: Data Sources for the Empirical Analysis

Variable	Description	Source
Domestic Credit Growth	Quarterly growth in credit by domestic banks to private non-financial sector to GDP (PBM770A, %) taken from the BIS or if not available quarterly growth in claims by other depository corporations on private sector (scaled by GDP, %) from IMF IFS.	BIS and International Financial Statistics (IFS), IMF
Exchange rate depreciation (FW)	Financially-weighted exchange rate depreciation, defined as $= mean\left(\sum w_{n,t}^{F} \cdot \Delta er_{n,t}\right)$, where $\Delta er_{n,t}$ is the log change in the spot exchange rate in quarter *t* vis-à-vis country *n* based on weekly data; $w_{n,t}^{F}$ is the (annual) financial weight of foreign (*F*) country *n* in quarter *t*. *n* captures the major currencies/currency areas: USD, GBP, EUR, YEN, CHF. Financial weights are based on all foreign assets and liabilities (to capture the financial links for the entire economy), taken from Bénétrix *et al.* (2015), and are extrapolated for 2013/2014 based on 2012 values. An increase is a depreciation.	Data Stream; Bénétrix *et al.* (2015)
Exchange rate volatility (FW)	Financially-weighted exchange rate volatility, defined as $= std.dev\left(\sum w_{n,t}^{F} \cdot \Delta er_{n,t}\right)$, where $\Delta er_{n,t}$ is the log change in the spot exchange rate in quarter *t* vis-à-vis country *n* based on weekly data; $w_{n,t}^{F}$ is the (annual) financial weight of foreign (*F*) country *n* in quarter *t*. The standard deviation of the measure is calculated on a quarterly level. *n* captures the major currencies/currency areas: USD, GBP, EUR, YEN, CHF. Financial weights are based on foreign debt liabilities, taken from Bénétrix *et al.* (2015), and are extrapolated for 2013/2014 based on 2012 values.	Data Stream; Bénétrix *et al.* (2015)
Fed funds rate/Shadow rate (Changes)	Quarterly change in the effective federal funds rate prior to Q4 2008 and Wu-Xia estimates of the shadow rate from Q1 2009.	Wu and Xia (2016)
Financial Openness (Changes)	The annual index of capital account openness (KAOPEN) from Chinn and Ito (2008). The index runs from 0 to 1, where higher values imply fewer restrictions on the capital account or fewer financial restrictions on the current account.	Chinn and Ito (2006, extended to 2013)
FX Regulation (*fxm*)	Equal to +1 for any new or tightening of macroprudential FX regulations, and -1 for any removal or reduction in these measures. See the online appendix corresponding to this article or Appendix A of Ahnert *et al.* (2018) for details. Calculated on a quarterly basis for the analysis in Section IV, with the contemporaneous value and three lags included separately in estimates of equation (15). In Section V, the FX measure is calculated as the cumulated value over the current and previous three quarters (still only allowed to equal -1, 0, or +1) in order to estimate the interaction term in equation (16).	Calculated. See Appendix A of Ahnert *et al.* (2018) for more information
Global Growth	Real Quarterly GDP Growth (%)	IFS, IMF
Global Volatility	Volatility of MSCI World Index. Realized volatility calculated as square root of the average of the sum of squared log daily returns. To convert to an annualized value, this is multiplied by the square root of 252 divided by the number of trading days in a given month.	Data Stream

GDP growth forecast (one year ahead)	The one-year ahead forecast of real GDP growth.	World Economic Outlook, IMF
Industry Production Growth	Quarter-on-quarter growth rates of an index of industry production in each country. Growth rates have been computed based on changes in the natural logarithm.	Haver Analytics
Inflation	Quarter-on-quarter growth rates of the consumer price index. Growth rates computed based on changes in the natural logarithm.	Haver Analytics.
IR differential (Changes, FW)	Financially-weighted interest differential, defined as $= \Delta i_t^D - \sum w_{n,t}^F \cdot \Delta i_{n,t}^F$, where Δi_t^D is the nominal money market rate in quarter t; $w_{n,t}^F$ is the (annual) financial weight of foreign (F) country *n* in quarter *t*; $i_{n,t}^F$ is the foreign money market rate of country *n* in quarter *t*. n is the major currencies/currency areas: USD, GBP, EUR, YEN, CHF. Financial weights based on foreign debt liabilities, from Bénétrix *et al.* (2015), and extrapolated for 2013/2014 based on 2012 values. We use discount rates or policy rates when available for longer than money market rates.	IFS; Bénétrix *et al.* (2015)
Number (#) of Bank Borrowers	Borrowers from commercial banks (per 1,000 adults) is the reported number of resident customers that are nonfinancial corporations (public and private) and households who obtained loans from commercial banks and other banks functioning as commercial banks. For many countries data cover the total number of loan accounts due to lack of information on loan account holders.	World Development Indicators Database, The World Bank
Real GDP Growth (Domestic)	Quarterly GDP growth (yoy, %). We use annual GDP growth (% and lagged by 1 year in the analysis rather than 1 quarter) where quarterly GDP growth was not available for the full time series.	WEO, IMF
Real Growth in House Prices	Quarterly growth (%) in real house prices based on the selected property price series from the BIS. If these data are not available we rely on data from Cesa-Bianchi *et al.* (2015).	BIS and Cesa-Bianchi *et al.* (2015).
Net Borrowing Costs	Net borrowing costs (i.e., the risk premium on lending) are defined as the interest rate charged by banks on loans to private sector customers minus the "risk free" treasury bill interest rate at which short-term government securities are issued or traded.	World Development Indicators Database, The World Bank
Rule of Law	This variable is a proxy for the domestic risk premium factors that affect stock market returns and is defined as: "*perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.*" The original variable is of annual frequency and has been interpolated to quarterly frequency.	Worldwide Governance Indicators Database, The World Bank
Share of NP Loans (%)	The value of nonperforming bank loans divided by the total value of the loan portfolio (including nonperforming loans before the deduction of specific loan-loss provisions). The loan amount recorded as nonperforming should be the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	World Development Indicators Database, The World Bank

Short-term interest rate	Quarterly change in the nominal money market rate. We use discount rates or policy rates when those are available for a longer time series than money market rates.	IFS
Sovereign Ratings	Quarterly sovereign foreign currency ratings from Fitch, S&P and Moody's are converted into a numerical scale ranging from 0 to 20 before averaging across the three ratings.	tradingeconomics.com
Stock Market Turnover Ratio (%)	This variable is a proxy for domestic liquidity factors that affect stock market returns and is defined as: "*Total value of shares traded during the period divided by the average market capitalization for the period*." The original variable is of annual frequency and has been interpolated to quarterly frequency.	Global Financial Development Database, The World Bank
Stock Returns - Broad	Quarter-on-quarter growth rates of the most commonly used stock market index in each country. Growth rates computed as changes in the natural logarithm. Index values are quarterly averages.	Haver Analytics
Stock Returns - Financial	Quarter-on-quarter growth rates of stock market indices that comprise each country's major companies in the financial sector, largely banks. Growth rates computed as changes in the natural logarithm. Index values represent quarterly averages.	Bloomberg

Appendix C: Sensitivity Tests and Extensions

This section includes a selection of the sensitivity tests reported and discussed in Sections IV and V.

	Exclude offshore centres						Exclude global financial crisis					
	IBS: Cross-border loans to banks			IDS: Int. debt issuance by corporates			IIBS: Cross-border loans to banks			IDS: Int. debt issuance by corporates		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	FX Inflows	FX Share	Non-FX Inflows	FX Inflows	FX Share	Non-FX Inflows	FX Inflows	FX Share	Non-FX Inflows	FX Inflows	FX Share	Non-FX Inflows
FX regulation (t to t-3)	**-0.524****	**-0.997****	**0.0744**	**0.0531****	**0.506****	**0.00922**	**-0.548****	**-1.030*****	**0.111**	**0.0526****	**0.537****	**0.00229**
p-value	***0.0361***	***0.0114***	***0.522***	***0.0432***	***0.0271***	***0.785***	***0.0343***	***0.00656***	***0.381***	***0.0420***	***0.0315***	***0.943***
Domestic variables												
Non-FX regulation (t to t-3)	0.0830	-0.122	0.113	-0.000343	0.0750	-0.00407	0.230	-0.147	0.163	-0.00153	0.0749	-0.00285
p-value	*0.477*	*0.554*	*0.224*	*0.986*	*0.446*	*0.409*	*0.173*	*0.471*	*0.116*	*0.938*	*0.466*	*0.606*
Real GDP Growth (t-1)	0.0451***	0.0198	0.0159*	0.0026**	-0.0028	-0.0002	0.0652***	0.0274*	0.0156**	0.0020	0.0043	-0.0002
	(0.0098)	(0.0154)	(0.0080)	(0.0012)	(0.0084)	(0.0004)	(0.0171)	(0.0157)	(0.0077)	(0.0014)	(0.0078)	(0.0004)
Volatility of exchange rate (FW, t-1)	-0.1252	0.0886	0.0690**	0.0119	0.0262	-0.0069*	-0.1559	0.1774	0.0502	0.0130	0.0479	-0.0075*
	(0.1002)	(0.1705)	(0.0315)	(0.0109)	(0.0436)	(0.0040)	(0.1437)	(0.1778)	(0.0319)	(0.0115)	(0.0465)	(0.0041)
IR differential (Changes, FW, t-1)	0.0169	0.0118	-0.0104	-0.0036**	-0.0135	0.0003	0.0021	-0.0087	-0.0055	-0.0031	-0.0137	0.0004
	(0.0136)	(0.0622)	(0.0067)	(0.0016)	(0.0166)	(0.0005)	(0.0180)	(0.0631)	(0.0063)	(0.0019)	(0.0164)	(0.0004)
Sovereign Ratings (t-1)	0.0795***	-0.0628*	0.0499***	0.0095	0.0037	-0.0008	0.0728**	-0.0547	0.0456***	0.0108	0.0026	-0.0012
	(0.0226)	(0.0363)	(0.0175)	(0.0066)	(0.0147)	(0.0014)	(0.0275)	(0.0362)	(0.0157)	(0.0066)	(0.0147)	(0.0015)
Financial Openness (Changes, t-4)	0.3505	0.4595	-0.0183	0.0163	0.3368	-0.0193*	0.2548	0.4532	-0.0105	0.0126	0.3481	-0.0194
	(0.2684)	(0.8139)	(0.1610)	(0.0497)	(0.2269)	(0.0114)	(0.2290)	(0.8369)	(0.1599)	(0.0475)	(0.2427)	(0.0135)
Constant	-0.9833**	1.0596	-0.6639**	-0.1102	0.0328	0.0152	-1.1222**	0.8854	-0.6060**	-0.1294	0.0514	0.0198
	(0.3742)	(0.8187)	(0.2622)	(0.0930)	(0.2755)	(0.0168)	(0.4458)	(0.7905)	(0.2413)	(0.0938)	(0.2689)	(0.0182)
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,229	3,196	3,216	2,995	2,576	2,461	3,189	3,161	3,176	2,971	2,568	2,469
Adj. R-squared	0.09	0.011	0.049	0.102	0.038	0.212	0.091	0.014	0.058	0.097	0.042	0.198
Countries	46	45	46	42	42	34	48	47	48	44	44	36

Appendix Table C1: Sensitivity analysis of the impact of macroprudential FX regulations

All variable definitions and notes are the same as for Table 2. In columns (1) to (6), we exclude offshore financial centers as classified by the BIS (*i.e.*, Hong Kong and Singapore). In columns (7) to (12), we exclude the quarters from 2008 Q3 to 2009 Q2, *i.e.*, the quarters from the collapse of Lehman brothers until banking flows stabilized.

	Lagged Controls		Exclude Annual Vars		Exclude 2008Q4	
Stock Returns	(1)	(2)	(3)	(4)	(5)	(6)
By	*Fin.*	*Broad*	*Fin.*	*Broad*	*Fin.*	*Broad*
Cum. FX Regulation (t to t-3)	-1.707	-0.989	-1.230	-0.465	-1.404	-0.541
	(1.358)	(1.273)	(1.305)	(1.401)	(1.334)	(1.478)
Ex. Rate Depreciation (FW) (t)	-1.880***	-1.605***	-1.472***	-1.221***	-1.415***	-1.117***
	(0.217)	(0.156)	(0.214)	(0.156)	(0.231)	(0.169)
FX Regulation X Ex. Rate Depr. (FW) (t)	**0.700****	0.402	**0.741****	0.445*	**0.894*****	0.467*
	(0.334)	(0.250)	(0.269)	(0.221)	(0.293)	(0.241)
Industry Production Growth (t)	-0.013	0.014	0.087*	0.060	0.086*	0.058
	(0.046)	(0.039)	(0.043)	(0.044)	(0.043)	(0.040)
Inflation (t)	-1.825***	-2.115***	-0.159	-0.161	-0.249	-0.456
	(0.342)	(0.292)	(0.413)	(0.318)	(0.420)	(0.308)
Short-Term Interest Rate (t)	-0.192	-0.318	-0.223*	-0.388**	-0.279*	-0.408**
	(0.184)	(0.221)	(0.112)	(0.160)	(0.149)	(0.193)
Stock Market Turnover Ratio (t)	-0.037	-0.007			0.018	0.050***
	(0.022)	(0.020)			(0.020)	(0.016)
Rule of Law (t)	0.239	3.476			-3.874	-1.189
	(3.296)	(3.820)			(3.161)	(3.631)
Global Volatility (t)	-3.620***	-2.515***	-9.833***	-9.288***	-9.278***	-8.923***
	(0.507)	(0.498)	(0.754)	(0.669)	(0.899)	(0.772)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,095	1,095	1,125	1,125	1,073	1,073
R-squared	0.23	0.25	0.34	0.38	0.26	0.30
Number of Countries	23	23	23	23	23	23

Appendix Table C2: Sensitivity analysis of market vulnerability to currency movements

The table shows the estimated parameter values from a panel regression of equation (16). All columns include country fixed effects. The dependent variables are stock returns of financials ("Fin."; which is primarily banks), the broad market ("Broad"; which includes both banks, non-bank financial institutions, and corporates). Columns (1) and (2) lag all the control variables (except the first three) by one quarter. Columns (3) and (4) exclude the Stock Market Turnover Ratio and the Rule of Law variables, which are interpolated from annual to quarterly frequency. Columns (5) and (6) exclude 2008Q4, which contains the largest exchange rate movement in the sample. The specifications and data are discussed in Section III. Additional information is provided in in Appendix B. The sample period is 2000 Q1 – 2014 Q4. Robust standard errors are clustered at the country level and reported in brackets. ***/**/* is significant at the 1%, 5%, and 10% levels, respectively. The larger value of each coefficient pair in absolute terms is marked in bold.