



Exchange Rate Undervaluation, Economic Institutions and Exports Performance: Evidence from Firm-Level Data

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Motivation (1/3)

➤A robust association between growth and depreciated or undervalued real exchange rates, especially in developing and emerging market economies with relatively underdeveloped financial markets or weak institutions.

Moreover, a small but important strand of this literature also develops a theory suggesting that real exchange rate undervaluation is growth fundamental in a second best world of market coordination failures and weak institutions.



Motivation (2/3)

These institutional problems create a wedge between private and social returns, especially in the more dynamic and transaction-intensive tradable economic activities of the developing economies.

Therefore, by providing an economy-wide subsidy to tradable sectors, real exchange rate undervaluation should at least partially ameliorate the negative effects of institutional underdevelopment by improving static efficiency and enhancing growth in a second-best fashion (Rodrik, 2008).

>This is particularly important for exports and therefore growth.



Motivation (3/3)

- ➢Yet, undervaluation might matter more when financial systems are underdeveloped or when economic institutions are not performing well.
- Undervaluation might matter for small and medium firms more than large firms.



What We Do

Exploiting a new World Bank dataset available for four countries (Egypt, Jordan, Kuwait and Yemen).

- >Using an extended gravity type specification.
- >Controlling for financial development and economic institutions.
- >Disentangling the effect for different firms (small vs. medium vs. large)
- This paper assesses the claim that real exchange rate undervaluation affects:
 - the intensive margin of exports (value of exports),
 - The number of destinations (market-extensive margin)
 - The number of products (product-extensive margin)



Outline

- Data
- Stylized Facts
- Methodology
- Results
- Summary of Findings and Conclusion
- Some emerging issues for future research



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Firm Level Data

- The database records the annual export transactions at the firm product (HS6 level except Egypt HS4) and destination country level (around 200 destinations) for:
 - 3 years in the case of Kuwait,
 - 5 years for Egypt and Yemen
 - 8 years for Jordan.
- Firms are classified as small (the lowest quartile), medium (between the 25th and the 75th) or large (the highest quartile) based on their share in total exports.



Firm Level Data

Number of observations per year and per origin

year	EGY	JOR	KWT	YEM	Total
2003	0	5,139	0	0	5,139
2004	0	5,240	0	0	5,240
2005	0	6,664	0	0	6,664
2006	51,222	8,280	0	2,438	61,940
2007	49,401	9,228	0	2,534	61,163
2008	44,362	10,276	18,358	3,197	76,193
2009	42,298	10,476	16,106	3,719	72,599
2010	41,505	11,053	16,466	3,608	72,632
Total	228,788	66,356	50,930	15,496	361,570

Data Description

Source: Constructed by the authors using the customs datasets



Macro Variables

Control variables come from the World Development Indicators.

Economic institutions are measured by time to export (Doing Business dataset).

Financial development is measured by the share of credit going to private sector.



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Source: Constructed by the authors using the Darvas (2012) dataset. Notes: An increase in the index indicates depreciation of the home currency against the basket of currencies of trading partners.



Estimating RER Undervaluation

Let e_{it} be the log of the observed real exchange rate for country *i* in time *t*. Then we can write the equilibrium RER equation as:

$$e_t^i = \hat{\delta}_0^i + \hat{\beta}' F_t^i + \hat{\varepsilon}_t^i \tag{A1}$$

Then, we could right the equilibrium RER be as follows:

$$\widetilde{e}_{t}^{\ i} = \widetilde{\delta}_{o}^{\ i} + \hat{\beta}' \, \widetilde{F}_{t}^{\ i} \tag{A2}$$

where \tilde{F}_t^i refers to sustainable fundamentals, given by the permanent components of the fundamentals and $\tilde{\delta}_0^i$ is a scaled country-specific intercept satisfying the identification condition that RERmis must equal zero on average for the longer term.

Finally, given this identification condition, RERunderval is given by:

RERunderval
$$s_t^i = (e_t^i - \bar{e}^i) - \hat{\beta}' (\tilde{F}_t^i - \bar{\tilde{F}}^i)$$

(A3)





Undervaluation

(b) Jordan



(c) Kuwait





Exchange Rate

➤The spread between the RER and its (estimated) equilibrium experienced major swings for the cases of Egypt and Kuwait, ranging between -80% (overvaluation) and 60% (undervaluation) for Egypt; and between -40 to 30 for Kuwait.

➤The RER remained much closer to its equilibrium in Jordan, where the swings in the RERunderval were confined to a range of (-15, 15).



Exports

• Despite the significant growth of exports from the MENA region and the Arab world over the past two decades, the two regions are still not sufficiently diversified; neither at the product the level nor at geographical level.

14.0 12.6 12.0 10.7 10.0 8.6 7.8 7.6 8.0 6.9 6.7 5.8 5.8 5.7 6.0 5.2 4.4 4.0 2.0 0.0 Arab MENA Asia Sub-LAC World World Saharan Africa Exports Imports

Exports and Imports of goods and services (annual % growth)

Source: World Development Indicators.





90.0 78.1 80.0 71.3 70.0 60.0 50.0 42.3 40.0 30.0 18.3 20.0 11.3 5.6 10.0 0.0 Arab World MENA Sub-LAC Asia World Saharan Africa

Fuel Exports (% of merchandise exports)

Source: World Development Indicators.







Manufactures exports and imports (% of merchandise exports and imports)

Manufactures exports

Source: World Development Indicators.



Exports

• At the country level, it is worthwhile to note that manufactures exports are more heterogeneous since, on average, they vary from 2 and 7 percent in the oil-dependent economies of Yemen and Kuwait respectively to, respectively, 36 and 66 percent in the much more diversified economies of Egypt and Jordan



Average Manufactures Exports in Four Arab Countries (% of merchandise exports)

Source: The World Development Indicators.



Firm Dynamics

The better performance of Jordan is confirmed also by the firmlevel data since Jordan has the highest average size of firms despite a lower number of exporters and a greater number of destinations compared to Egypt and to Kuwait

			-	-	-	
	Number of firms	Avg firm size (mn USD)	Share of top 5% firm in annual trade	Avg number of product per firm	Avg number of dest. per firm	
EGY	8294	1.8	0.8	4	2.6	
JOR	1953	1.9	0.8	2.8	3.1	
KWT	3323	0.9	0.9	4.4	1.9	
YEM	512	0.8	0.6	4.7	2.4	

Source: Constructed by the authors using the customs datasets



Firm Dynamics

• Egypt has also experienced a similar decline in the number of exporting firms with the financial crisis as it decreased by 5 percent from 8521 firms in 2006 to 8034 in 2010. The number of exporting firms has, on the hand, increased in Yemen and Jordan but remained much smaller than in Egypt

Number of Firms per country and per year

	EGY	JOR	KWT	YEM
2003	-	1,443	-	-
2004	-	1,368	-	-
2005	-	1,580	-	-
2006	8,521	1,893	-	487
2007	8,544	1,997	-	474
2008	8,325	2,167	3,531	571
2009	8,200	2,339	3,370	589
2010	8,134	2,477	3,367	580

Source: Constructed by the authors using the customs datasets



Average Number of Exporters by HS4 Product





These figures show the highest ten number of exporters by HS4 product (average over years)

Average Number of Exporters by HS4 Product



These figures show the highest ten number of exporters by HS4 product (average over years)

Economic Institutions: Documents to Export and to Import



Doc. to export Doc. to import

MENA stands for Middle East and North Africa, HI High-Income countries, LAC Lantin-America and Caribbean and EAP East Asia and Pacific. (iii) Figures here are average between 2005 and 2010.



Economic Institutions: Number of Days to Export and to Import



□ Time to exp. □ Time to imp.

MENA stands for Middle East and North Africa, HI High-Income countries, LAC Lantin-America and Caribbean and EAP East Asia and Pacific. (iii) Figures here are average between 2005 and 2010.



Financial Development: Credit to Private Sector

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MENA stands for Middle East and North Africa, HI High-Income countries, LAC Lantin-America and Caribbean and EAP East Asia and Pacific. (iii) Figures here are average between 2005 and 2010.



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Empirical Strategy

➤We estimate the determinants of trade margins (ExpMRG), namely intensive and extensive margins of exports:

• The intensive margin of exports is given by the value of total exports from firm f in country i to country j in year t (EXP_{fijt}).

 \circ At the extensive margin of exports, we consider two measures:

✓ Number of destinations of exports from firm *f* in country *i* to country *j* in year *t* (*NumDest*_{*fijt*});

✓ Number of products exported by firm *f* in country *i* to country *j* in year *t* (*Numprod*_{*fijt*}).

➢We estimate these equations using the whole sample as well as subsamples, stratified by size of firm, in order to assess the differential impact of undervaluation on small, medium and large firms.



Basic Model

• First, we estimate a basic specification including the determinants of the intensive margin of exports, given by the value of trade between firm f in country i and country j in year t (X_{fijt}).

 $Ln(ExpMRG_{fijt}) = \beta_0 + \beta_1 ln(GDPcap_{it}) + \beta_2 ln(Pop_{it}) + \beta_3 ln(GDPcap_{jt}) + \beta_4 ln(Pop_{jt}) + \beta_5 X_{ij} + \beta_6 (Time \ to \ exp_{it}) + \gamma f + \varepsilon_{fijt}$ (1)



First Extended Model

 $Ln(ExpMRG_{fijt}) = \beta_0 + \beta_1 ln(GDPcap_{it}) + \beta_2 ln(Pop_{it}) + \beta_3 ln(GDPcap_{jt}) + \beta_4 ln(Pop_{jt}) + \beta_5 X_{ij} + \beta_6 (Time \ to \ exp_{it}) + \beta_7 Underval_{-1} + \beta_8 (Underval_{-1})^2 + \gamma f + \varepsilon_{fijt}$ (2)

- The above extended regression allows the testing of two central hypotheses in the recent literature on the role of the RER undervaluation as a growth fundamental in the second-best world of market coordination failures and institutional weakness (Rodrik, 2008):
 - H1: Underval has a positive but nonmonotonic impact on firm export performance (i.e while Underval is expected to be positively associated with firm export performance, Underval² should have a negative impact).
 - H2: Underval renders the expected negative effect of "time to export" insignificant or, at least, reduces its economic and/or statistical significance.



Second Extended Model

• The second extended model controls for financial development, which we proxy by the amount of credit to the private sector as a share of GDP (*Credit*):

 $Ln(ExpMRG_{fijt}) = \beta_0 + \beta_1 ln(GDPcap_{it}) + \beta_2 ln(Pop_{it}) + \beta_3 ln(GDPcap_{jt}) + \beta_4 ln(Pop_{jt}) + \beta_5 X_{ij} + \beta_6 (Time \ to \ exp_{it}) + \beta_7 Underval_{-1} + \beta_8 (Underval_{-1})^2 + \beta_9 (Credit_{it}) + \gamma f + \varepsilon_{fijt}$ (3)

- Financial development is another pivotal variable discussed in the context of the effectiveness of the RER undervaluation for export promotion. It has been argued that RER undervaluation, as a second-best strategy for promoting exports, is not likely to be effective in financially developed economies. Therefore, in the context of the above model, we test the following hypothesis:
 - H3: Credit promotes firm exports but will likely renders Underval effect to be insignificant or, at least, reduce its economic and/or statistical significance.



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Intensive Margin: Total Exports

	Baseline Model				Extended Model 1: time to trade, RER underval				Extended Model 2: time to trade, RER underval, Fin Devlp.			
	All	Small	Medium	Large	All	Small	Medium	Large	All	Small	Medium	Large
Ln(Time Exp.)	-0.603***	-0.555**	-0.438	0.148	-0.594***	-0.379**	-0.369**	-0.0485	-0.603***	-0.347*	-0.392**	-0.0788
	(0.185)	(0.214)	(0.291)	(0.396)	(0.108)	(0.175)	(0.168)	(0.164)	(0.103)	(0.191)	(0.167)	(0.149)
Underval.					0.0171***	0.0345***	0.0393***	0.0337***	0.0128***	0.0305***	0.0351***	0.0280***
					(0.00350)	(0.00809)	(0.00691)	(0.00638)	(0.00374)	(0.00691)	(0.00609)	(0.00602)
Underval. Sq.					-0.000561***	-0.00121***	-0.00128***	-0.00104***	-0.000603***	-0.00123***	-0.00130***	-0.00102***
					(9.29e-05)	(0.000267)	(0.000234)	(0.000199)	(9.58e-05)	(0.000256)	(0.000228)	(0.000208)
Ln(Priv. Credit)									0.0223	0.0320	0.0285	0.0540
									(0.0253)	(0.0316)	(0.0358)	(0.0518)
Constant	-8.486	1.378	-5.970	-44.48	-1.214	9.478*	6.669	-15.20	-0.624	6.692	7.366	-17.06
	(9.348)	(11.29)	(17.09)	(32.17)	(5.715)	(5.379)	(7.214)	(13.07)	(5.366)	(4.865)	(6.482)	(15.83)
Firm dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	319,286	80,818	158,818	79,650	319,286	80,818	158,818	79,650	276,538	71,320	136,613	68,605
R-squared	0.558	0.467	0.514	0.689	0.559	0.474	0.535	0.700	0.570	0.495	0.556	0.703

Notes: (i) The dependent variable is total exports by firm. Gravity controls are included (GDP per capita, population, distance, contiguity, common language, colony).

(ii) Robust standard errors in parentheses.

(iii) Errors are clustered by country and year.

(iv) *** p<0.01, ** p<0.05, * p<0.1.



Extensive Margin: Number of Markets

	Baseline Model				Extended Model 1: time to trade, RER underval				Extended Model 2: time to trade, RER underval, Fin Devlp.			
	All	Small	Medium	Large	All	Small	Medium	Large	All	Small	Medium	Large
Ln(Multi)	0.809***	0.835***	1.013***	0.636***	1.054***	0.930***	1.411***	1.072***	1.143***	0.957***	1.541***	1.004***
	(0.265)	(0.227)	(0.152)	(0.113)	(0.264)	(0.277)	(0.217)	(0.239)	(0.324)	(0.310)	(0.299)	(0.291)
Ln(Time Exp.)	0.207**	0.231***	0.191*	0.135*	0.148**	0.227***	0.0702	0.0499	0.114	0.186**	0.0370	0.0323
	(0.0849)	(0.0599)	(0.0968)	(0.0731)	(0.0652)	(0.0632)	(0.0536)	(0.0668)	(0.0725)	(0.0769)	(0.0596)	(0.0577)
Underval.					0.000763	-0.00160	0.00634***	0.00641***	-0.000292	-0.00260	0.00497**	0.00754***
					(0.00205)	(0.00167)	(0.00135)	(0.00166)	(0.00268)	(0.00227)	(0.00199)	(0.00164)
Underval. Sq.					-0.000114	-1.07e-08	-0.000312***	-0.000353***	-0.000113	4.00e-05	-0.000310***	-0.000356***
					(6.62e-05)	(3.92e-05)	(5.97e-05)	(9.42e-05)	(7.86e-05)	(5.03e-05)	(5.60e-05)	(7.59e-05)
Ln(Priv. Credit)									0.0183	0.0269**	0.0251*	0.0222**
									(0.0127)	(0.0103)	(0.0132)	(0.00824)
Constant	-1.104	2.918	-3.663	1.762	7.030	4.289	12.98***	17.81**	5.884	1.260	11.78**	14.15**
	(6.153)	(4.203)	(7.015)	(5.113)	(4.237)	(4.844)	(4.195)	(6.345)	(3.626)	(5.220)	(4.816)	(5.787)
Firm dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	84,371	32,658	39,201	12,512	84,371	32,658	39,201	12,512	73,344	28,919	33,817	10,608
R-squared	0.808	0.855	0.822	0.882	0.808	0.855	0.823	0.882	0.819	0.866	0.835	0.891

Notes: (i) The dependent variable is the natural logarithm of the number of destinations. Gravity controls are included (GDP per capita, population, distance, contiguity, common language, colony).

(ii) Robust standard errors in parentheses.

(iii) Errors are clustered by country and year.

(iv) *** p<0.01, ** p<0.05, * p<0.1.



Extensive Margin: Number of Products

	Baseline Model				Extended Model 1: time to trade, RER underval				Extended Model 2: time to trade, RER underval, Fin Devlp.			
	All	Small	Medium	Large	All	Small	Medium	Large	All	Small	Medium	Large
Ln(Multi)	0.308	0.275	0.330	0.423	0.383	0.155	0.826	0.781*	0.588	0.208	1.147	1.227**
	(0.266)	(0.312)	(0.332)	(0.276)	(0.316)	(0.379)	(0.488)	(0.398)	(0.459)	(0.456)	(0.673)	(0.509)
Ln(Time Exp.)	0.102	0.0867	0.0872	0.227	0.0783	0.0924	0.0180	0.0726	0.0447	0.0836	-0.0285	0.0364
	(0.107)	(0.129)	(0.168)	(0.144)	(0.0795)	(0.118)	(0.125)	(0.106)	(0.0933)	(0.139)	(0.150)	(0.0974)
Underval.					0.00436	0.00406	0.00849*	0.00871***	0.00169	0.00318	0.00414	0.00327
					(0.00370)	(0.00391)	(0.00444)	(0.00271)	(0.00465)	(0.00430)	(0.00568)	(0.00435)
Underval. Sq.					-0.000150	-6.47e-05	-0.00043***	-0.00040***	-0.000164	-5.83e-05	-0.00044***	-0.00041***
					(0.000104)	(0.00010)	(0.000121)	(9.46e-05)	(0.000118)	(0.00011)	(0.000139)	(9.35e-05)
Ln(Priv. Credit)									0.0238	0.00875	0.0450**	0.0495***
									(0.0141)	(0.0166)	(0.0177)	(0.0124)
Constant	0.0389	4.137	1.822	-4.002	4.412	2.922	18.01*	19.34	6.592	2.999	20.96*	22.13*
	(6.814)	(6.926)	(8.620)	(11.24)	(5.421)	(6.975)	(8.889)	(11.67)	(7.415)	(7.735)	(11.26)	(11.24)
Firm dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	319,288	80,820	158,818	79,650	319,288	80,820	158,818	79,650	276,540	71,322	136,613	68,605
R-squared	0.692	0.575	0.770	0.882	0.692	0.575	0.772	0.884	0.699	0.588	0.774	0.889

Notes: (i) The dependent variable is the natural logarithm of the number of products. Gravity controls are included (GDP per capita, population, distance, contiguity, common language, colony).

(ii) Robust standard errors in parentheses.

(iii) Errors are clustered by country and year.

(iv) *** p<0.01, ** p<0.05, * p<0.1.



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Conclusions: 1

- ➢Overall, this paper's results lend support to the received finding from the macroeconomic growth and export literature, in that RER undervaluation has a positive but non-monotonic impact on exports. However, our analysis also provides new and more nuanced evidence on the effectiveness of RER-led export promotion strategy.
- ≻At the intensive margin level:
 - ✓ We find that moderate RER up to a certain threshold unconditionally promotes firms' exports at the intensive margin (value of exports), for all firm sizes and for financially developed and underdeveloped economies alike.
 - ✓ We also find that institutional impediment to trade tends to exact a high cost on all firms, especially small ones, but its negative effect was partially, though not completely, ameliorated by RER undervaluation.
 - ✓ Instead, financial underdevelopment does not seem to affect the intensive margin of exports at the firm level. This might be explained by the increasing recourse by non-financial firms to retained savings for financing growth at the intensive margin, a phenomenon widely documented in the literature.



Conclusions: 2

>At the market and product-extensive margins:

- The evidence suggests that the export promoting impact of moderate RER undervaluation was confined to medium and large firms only, as it had no effect on exports by small firms. Therefore, at the extensive margin of firms' exports, the RER effect is conditional on the size of the firm.
- ➢ Moreover, unlike the case of the intensive margin of exports, access to credit tends to promote exports at the market-intensive margin for all firms as well as at the product-intensive margin for medium and large firms. Also, controlling for financial development does not affect the role of RER undervaluation as an effective export promotion strategy at the market-intensive margin.
- RER undervaluation becomes a counter-productive policy instrument for promoting exports at the product-extensive margin, once we account for financial development.



Issues for Future Research

- Though RER undervaluation might ameliorate the development consequences of institutional weaknesses (e.g. Rodrik, 2008), engineering sustained RER undervaluation episodes will likely require some minimum critical institutional capacity (forthcoming Patrick Plane)
 - Fragile countries are likely to experience free falling nominal exchange rates cum rampant inflation
 - Instead, countries that achieved sustained RER-led export growth are endowed with relatively strong
 institutional capacity
- Political economy: though RER underval promote growth and export diversification, why only some, not all, developing countries adopt RER undervaluation as a development strategy:
 - Only those with large agricultural/industrial communities (e.g. Chile)
 - Specific political economy considerations: offsetting inflationary and growth effects of undervaluation lead countries with high levels of political competition to avoid sustained undervaluation (e.g. advanced countries)
- How effective could RER undervaluation be as a growth fundamental in an emerging digital world economy dominated by TIVA and GVCs?
 - The results for the intensive margin might continue to hold for relatively low technology products
 - However, the role of RER undervaluation at the extensive margin might perhaps be confined to large firms that are also participating in GVCs



Thanks for your attention

