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ABSTRACT

Financial Liberalization and the Relationship-Specificity of Exports^{*}

We investigate the causal impact of equity market liberalizations in the period 1980-1997 on sectoral export performance across 91 countries. The increased availability of external finance has boosted trade of industries that intensively use relationship-specific inputs, and lowered exports of industries using standardized inputs.

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1. Introduction

The quality of domestic institutions plays a key role in shaping a country's pattern of comparative advantage. Recent research has, in particular, identified two major institutional characteristics that matter for trade: i) the quality of contract enforcement as it affects the capability to specialize in relationship-specific industries (Nunn, 2007), and ii) the development of the financial system, as credit constraints may prevent firms from investing in R&D or market entry costs, which in turn can negatively affect their export performance (Manova 2008; Antràs and Caballero 2009). Little is known, however, about how trade is affected by the interaction of those aspects.

We investigate the impact of equity market liberalizations in the period 1980-1997 on sectoral export performance across 91 countries. Our focus is on the differential impact of those liberalizations on industries with a varying degree of relationship-specificity. Following the classification by Nunn (2007), we think of a "specific industry" as one where detailed contractual arrangements and unique investments of input suppliers and final goods producers are required, giving rise to hold-up and renegotiation issues.

The recent theoretical literature (Carluccio and Fally, 2012; Antràs, Desai and Foley, 2009), has shown that credit constraints may impede specialization in complex, relationship-specific industries. Possible mechanisms can be that firms are reluctant to source from, or to invest in, financially weak countries as they anticipate opportunistic behavior of their partners who face financial frictions; or because non-standard inputs require higher upfront investments which are more difficult to finance in such countries. The available evidence on the link between financial development and the relationship-specificity of exports is mostly cross-sectional, however, which makes it difficult to establish a causal effect of finance.

Our contribution is to address those issues from a dynamic perspective, by exploiting the drastic *changes* in domestic financial systems that came with the equity market liberalizations. We build on the approach by Manova (2008) who shows that these episodes can be regarded as an exogenous shock to the availability of external capital in the respective country, and do not capture simultaneous trade policy reforms or other institutional changes. While Manova (2008) focuses on the effect of liberalization on the export performance of sectors with different reliance on external finance, we extend that approach by evaluating the importance of relationship-specificity at the industry level.

We obtain two main findings. First, the financial liberalizations have disproportionately boosted exports of industries with a higher degree of relationship-specificity. Our panel results are thus consistent with previous cross-sectional evidence (Carluccio and Fally 2012), and our results therefore support the view that financial frictions have a negative causal effect on the probability of specialization in complex industries. Second, even though trade volumes have increased on average after liberalization, our findings suggests that reforms of financial institutions generate winners and losers: Most sectors have higher, but some sectors have lower export volumes after liberalization. The industries' relationship-specificity contributes more than external finance dependence to the understanding of this sectoral variation.

2. Data

The main data set for this study is from Manova (2008).¹ It combines export flows for 27 (3-digit ISIC) industries and 91 countries over the period 1980-1997 with country-level data on financial liberalizations, and sector-level data on financial dependence.

The latter indicate the reliance of a sector on outside finance as measured by the average ratio of capital expenditures minus cash flow from operations to capital expenditures for the median firm in each industry in the US. As for the liberalizations, 39 countries opened their domestic capital market to foreign equity flows during the observation period, while 16 countries liberalized prior to 1980 and 36 never liberalized. The main variable capturing the event of liberalization is a dummy that is zero in all years before, and one in all years after the official equity market opening. We also use three alternative measures, namely: ii) a similar dummy referring to the “first sign” of an upcoming liberalization, iii) an index that is zero before, and ranges between zero and one in all years after the official liberalization, where the index value captures the reform intensity, and iv) an analogous index for the “first sign” of liberalization.²

To this data set, we merge the 3-digit ISIC sector-level information derived from Nunn (2007).³ There, the relationship-specificity of an industry is measured by the average fraction of inputs not sold on an organized exchange market, as computed from the Rauch (1999) classification together with input-output relationships in the US for the

¹ The data are available under <http://www.stanford.edu/~manova/EMLdata.dta>.

² For all details about these data, see Manova (2008). As further control variables we also use her measure of asset tangibility at the sectoral level, as well as country-level data on GDP and factor endowments.

³ The data are available under <http://scholar.harvard.edu/nunn/pages/data-0>. Below we also report several robustness checks related to this measure of relationship-specificity.

year 1997. This index, which by construction ranges between zero and one, is available for all 27 sectors included in Manova (2008). The data show that machinery or scientific equipment are among the most, and tobacco or non-ferrous metals are among the least specific industries. Furthermore, the correlation between relationship-specificity and external finance dependence across industries is 0.51, that is, specific industries tend to rely more on external finance, although there are also some exceptions (e.g., pottery).

3. Estimation

We investigate the differential impact of financial liberalization on sectoral exports by estimating the following panel specification that is similar as in Manova (2008):

$$X_{cit} = \alpha_0 + \alpha_1 GDP_{ct} + \beta_0 Lib_{ct} + \beta_1 Lib_{ct} \times Spec_i + \beta_2 Lib_{ct} \times FinDep_i + \gamma_1 Y_{cit} + \eta_c + \eta_i + \eta_t + \epsilon_{cit} \quad (1)$$

X_{cit} is the (log) export volume of industry i in country c and year t . GDP_{ct} is c 's (log) gross domestic product. Y_{cit} are further time-varying control variables, and the η 's are country-, industry- and time-fixed effects. Lib_{ct} is the liberalization dummy, $FinDep_i$ is the financial dependence, and $Spec_i$ the degree of relationship-specificity. Standard errors are clustered at the country level.

Notice that the direct effects of $FinDep_i$ and $Spec_i$ on X_{cit} are captured by the fixed effect η_i , while we are interested in the interaction terms. While Manova (2008) has only included the term β_2 , our main focus is on the interaction term β_1 as we are interested in how financial development affects the export performance of sectors with a varying degree of specificity. The identification of β_1 comes from the variation of equity market openness across countries over time, and the variation in specificity across industries. β_1 thus estimates the comparative advantage of financially more open countries in industries with a higher degree of relationship-specificity.

4. Main results

In the first two columns of Table 1, we replicate Manova's (2008) findings.⁴ Column 1 shows that exports have increased by 33.5 % on average, conditional on GDP, general time trends, and the time-invariant characteristics captured by the country- and industry-fixed effects. Introducing the interaction effect with respect to financial

⁴ See her Table 2, columns 1 and 5.

dependence, see column 2, she finds a disproportionally large effect of liberalization on the exports of financially more vulnerable sectors ($\beta_2 > 0$). Moreover, β_0 remains positive and significant, such that the estimates predict that *all* sectors should experience a boost of their export volume after financial liberalization.

Table 1: Estimation results

	Official Liberalization Dummy				First Sign Liberalization Dummy	Official Liberalization Intensity	First Sign Liberalization Intensity
Liberalization (β_0)	0.335*** (0.089)	0.444*** (0.159)	-3.281*** (0.471)	-2.717*** (0.554)	-2.829*** (0.558)	-3.250*** (0.752)	-3.281*** (0.761)
Liberalization \times relationship-specificity (β_1)			3.970*** (0.518)	3.456*** (0.560)	3.592*** (0.563)	4.310*** (0.733)	4.461*** (0.746)
Liberalization \times external finance dependance (β_2)		0.924*** (0.130)		0.274** (0.113)	0.322*** (0.117)	0.357** (0.156)	0.365** (0.159)
Liberalization \times asset tangibility		-1.13*** (0.427)		-0.545 (0.447)	-0.671 (0.446)	-0.077 (0.597)	-0.097 (0.602)
GDP (α_1)	0.871*** (0.268)	0.872*** (0.268)	0.869*** (0.268)	0.870*** (0.268)	0.890*** (0.270)	1.005*** (0.263)	1.001*** (0.263)
Controls	Exporter, year and sector F. E.						
R-squared	0.793	0.795	0.797	0.797	0.798	0.797	0.797
# observations	39,568	39,568	39,568	39,568	39,568	39,568	39,568
# exporters	91	91	91	91	91	91	91

The dependent variable is the log of exports to the world by 3-digit ISIC sector, 1980–1997. The official and first sign liberalization dummies and intensities, external finance dependence, and asset tangibility are defined as in Manova (2008). Relationship specificity is defined as in Nunn (2007) as the fraction of inputs not sold on exchange market, using the conservative classification by Rauch (1999). GDP is the log of the exporter's GDP. All regressions include a constant term, exporter, year and sector fixed effects, and cluster errors at the exporter level. Standard-errors reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level.

In the third column, we now introduce the interaction effect β_1 instead of β_2 . We estimate a strongly positive and highly significant coefficient $\beta_1 > 0$. That is, liberalization has disproportionally boosted exports of more specific industries. Interestingly, the direct effect of liberalization (β_0) turns strongly negative in that case. In column 4 we jointly consider both interaction terms. As before, we find that β_0 is strongly negative while both β_1 and β_2 are positive and significant.⁵

The results in column 4, which we consider as our baseline findings, imply that the impact of financial development on trade is economically substantial and strongly heterogeneous across sectors. For 23 out of 27 industries the export volume is predicted

⁵ Following Manova (2008) we have also included the interaction of liberalization with asset tangibility. That interaction term is no longer significant, however, once we control for relationship-specificity.

to rise after liberalization, $\beta_0 + \beta_1 \cdot Spec_i + \beta_2 \cdot FinDep_i > 0$, with values ranging up to 101% in the plastic products sector. Exports are negatively affected, however, in 4 cases (tobacco, food products, non-ferrous metals, petroleum refineries) with changes as large as -116% in the tobacco industry.⁶ We thus find that financial liberalization generates winning and losing sectors. An intuition may be that the general increase in the availability of external capital in the economy induces tougher selection and reallocation of credit across industries, so that some sectors end up exporting less than before. Further comparing our results with Manova (2008), her main conclusion is supported by our analysis insofar, as we also find that the export volume tends to increase more in sectors with higher external finance dependence. However, our results suggest that the differential relationship-specificity across industries is considerably more important when it comes to explaining the sectoral variation in the effect of liberalization on trade.

Table 2: Predicted changes in sectoral export volumes

		Financial Dependence (<i>FinDep_i</i>)		
		10th percentile (-0.140)	Median (0.219)	90th percentile (0.768)
Relationship-specificity (<i>Spec_i</i>)	10th percentile (0.686)	-0.385	-0.286	-0.136
	Median (0.965)	0.580	0.678	0.828
	90th percentile (0.992)	0.673	0.771	0.922

Table reports the predicted change in export volume for different values of *FinDep_i* and *Spec_i* (reported in parentheses), using the estimated coefficients β_0 , β_1 and β_2 from Table 1, column 4. Prediction is computed as $\beta_0 + \beta_1 \cdot Spec_i + \beta_2 \cdot FinDep_i$

To see this more specifically, Table 2 reports the predicted changes in export volumes for different percentiles of the two sectoral characteristics *FinDep_i* and *Spec_i*. To give an example, suppose *FinDep_i* is hypothetically held fixed at its median value (0.219), while *Spec_i* varies from the 10th percentile (0.686) to the 90th percentile (0.992). Table 2 shows that the predicted changes in exports across industries range from -28.6% to

⁶ Notice that those 4 sectors tend to be relatively standardized and not heavily reliant on external finance.

+77.1% in that case, thus spanning more than 100 percentage points. By contrast, holding $Spec_i$ fixed at the median (0.965), predicted export changes only vary from +58.0% to +82.8% when raising $FinDep_i$ from the 10th to the 90th percentile. Put differently, by how much financial liberalization affects sectoral exports seems to be mainly driven by the relationship-specificity of the respective industry, rather than by the external finance dependence.

5. Robustness checks

Columns 5-7 of Table 1 show that our baseline results from column 4 remain robust when using the “first sign of liberalization” dummy or the indicators of reform intensity instead of the official liberalization dummy. This is important, because a causal interpretation of the results requires that the equity market openings provide an exogenous shock to the availability of external capital, and do not capture other institutional changes that have occurred because countries anticipated future financial deregulations. Those concerns about possible anticipation effects are thus allayed.

Table 3 provides two further robustness checks. In columns 1-4 we control for traditional sources of comparative advantage, namely the countries’ (time-varying) factor endowments with physical capital K , human capital H , and natural resources N , and interactions of those with (time-invariant) factor intensities across industries. In line with factor proportions theory of international trade, we find that countries tend to export goods that intensively use their abundant factor, as can be seen from the (significantly) positive interaction terms. Importantly, our main results remain robust: the coefficients $\beta_1 > 0$ and $\beta_0 < 0$ are both highly significant, regardless of how the liberalizations are conceptualized. In fact, the degree of heterogeneity across sectors even appears to be a bit higher than in the baseline specification. Furthermore, notice that the interaction term β_2 is now mostly insignificant in those specifications.

In columns 5-8 of Table 3 we repeat the exercise, but now focus on those countries that actually liberalized their equity markets during the observation period.⁷ Thereby our coefficients are now only identified from such countries where export flows can be observed both before and after a financial deregulation. As can be seen, our main results remain qualitatively unchanged when focusing on this subsample of “switchers”.

⁷ Factor endowments are not available in all cases. This is why the number of observations drops from 91 to 70 countries in columns 1-4, and why we cannot include all 39 “switching” countries in columns 5-8.

Table 3: Robustness checks

	Official liberalization dummy	First sign liberalization dummy	Official liberalization intensity	First sign liberalization intensity	Official liberalization dummy	First sign liberalization dummy	Official liberalization intensity	First sign liberalization intensity
	Controlling for factor endowments - All countries				Controlling for factor endowments - Switchers only			
Liberalization (β_0)	-1.365*** (0.497)	-3.016*** (0.680)	-3.878*** (0.894)	-3.943*** (0.912)	-1.277 (0.837)	-1.013* (0.563)	-4.111*** (1.255)	-4.071** (1.638)
Liberalization \times relationship-specificity (β_1)	3.358*** (0.440)	4.103*** (0.696)	5.255*** (0.842)	5.470*** (0.860)	3.053*** (0.891)	1.702*** (0.573)	5.540*** (1.282)	5.596*** (1.644)
Liberalization \times external finance dependence (β_2)	0.426** (0.197)	0.151 (0.140)	0.249 (0.171)	0.254 (0.175)	0.056 (0.336)	0.106 (0.137)	0.195 (0.462)	-0.271 (0.342)
Liberalization \times asset tangibility	0.415 (0.938)	-1.461*** (0.502)	-1.388 (0.843)	-1.475* (0.866)	-0.633 (1.640)	-1.806*** (0.484)	-2.641** (1.250)	-2.591 (1.536)
GDP (α_1)	0.551 (0.344)	0.392 (0.339)	0.559 (0.344)	0.545 (0.345)	0.985* (0.542)	0.955* (0.551)	1.054* (0.557)	0.987* (0.542)
K/L	0.314 (0.314)	0.462 (0.303)	0.428 (0.321)	0.439 (0.316)	-0.331 (0.570)	-0.270 (0.578)	-0.326 (0.585)	-0.295 (0.573)
H/L	-0.273 (0.562)	-0.717 (0.534)	-0.710 (0.556)	-0.778 (0.557)	-0.032 (0.873)	-0.201 (0.880)	-0.422 (0.906)	-0.213 (0.862)
N/L	0.096 (0.513)	0.218 (0.518)	0.063 (0.524)	0.080 (0.516)	0.479 (1.460)	0.582 (1.435)	0.266 (1.457)	0.478 (1.460)
K/L \times K intensity	2.947*** (1.091)	1.420 (0.965)	1.213 (1.119)	1.261 (1.142)	4.155** (1.749)	3.450** (1.587)	3.216* (1.692)	3.632** (1.771)
H/L \times H intensity	0.811** (0.318)	1.192*** (0.320)	1.278*** (0.345)	1.305*** (0.342)	0.196 (0.656)	0.399 (0.669)	0.599 (0.715)	0.372 (0.658)
N/L \times N intensity	0.128** (0.063)	0.107* (0.061)	0.136** (0.063)	0.134** (0.063)	0.128 (0.079)	0.110 (0.078)	0.128* (0.076)	0.130 (0.079)
Controls	Exporter, year and sector F. E.							
R-squared	0.809	0.810	0.810	0.811	0.684	0.686	0.702	0.685
# observations	31,971	31,971	31,971	31,971	15,314	15,314	15,800	15,314
# exporters	70	70	70	70	32	32	33	32

The dependent variable is the log of exports to the world by 3-digit ISIC sector, 1980–1997. See Manova (2008) and legend to Table 1 for definitions. All regressions include a constant term, exporter, year and sector fixed effects, and cluster errors at the exporter level. Standard-errors reported in parentheses. ***, **, *, indicate significance at the 1%, 5%, and 10% level.

Finally, we have also conducted robustness checks with respect to Nunn’s (2007) measure of relationship-specificity. In particular, when computing the share of inputs not sold on an exchange market, Rauch (1999) provides a “conservative” and a “liberal” definition. Furthermore, he also suggests a different measure for specificity, namely the share of inputs that is neither sold on exchange markets (in a conservative or a liberal definition) and for which no international reference price exists. The results reported so far refer to the “conservative” definition and do not use the information on the reference prices. As a robustness check, we have reproduced Table 1 for the three alternative measures of relationship-specificity. The detailed results are omitted for brevity, but it turns out that our main results are robust throughout. That is, $\beta_1 > 0$ and $\beta_0 < 0$ holds in all specifications, with β_1 being statistically significant at the 1% level in all cases.

Results also remain robust (with statistical significance in the vast majority of cases) when reproducing Table 3, that is, when adding factor endowments as controls, and when focusing only on the “switchers”.

6. Conclusions

The longitudinal design of our study identifies the causal effect of financial liberalization on sectoral export performance. Our panel estimations show that those equity market openings have disproportionally boosted exports of industries with a higher degree of relationship-specificity. Furthermore, our results indicate that exports of relatively standardized sectors are negatively affected by financial liberalizations. Comparing our results to Manova (2008) suggests that the differential relationship-specificity across industries is more important than the differential reliance on external capital when it comes to explaining the sectoral variation in the effect of liberalization on trade.

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