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How internationalization affects firms' growth in the MENA region? A quantile regression approach

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Abstract

In this paper, we contribute to the literature by studying the effect of internationalization on the conditional firm growth rate distribution in eight countries from the MENA region. We use four measures of internationalization: exporting status, two-way trade, export intensity and export experience. We use the BEEPS data from the Enterprise Survey of the European Bank for Reconstruction and Development and the World Bank. The main results show that exporting status and export experience play an important role to improve both employment and sales growth in various quantiles. However, two-way trade has an effect on employment growth and export intensity has an effect on lower sales growth quantiles.

1. Introduction:

Within the debate over the rising importance of trade as a key driver of economic growth, the literature argues that countries in the MENA region are below their potential for international trade (Wolde and Bhattacharya, 2010). In the past two decades, the MENA region was unable to best exploit the opportunity for trade, which has led it to miss out on global trade integration (Iqbal and Nabli, 2007). In this context, increasing attention has been given to the determinants and the impact of trade on economic growth in this region. However, less attention has been given to the impact of internationalization on firms' growth.

Taking together size and age as main determinants of firm growth (see Mead and Liedholm, 1998; Burki and Terrell, 1998; Fariñas and Moreno, 2000; Johansson, 2004), some empirical studies extended the pioneer study of Evans (1987) on the characteristics of firms' growth and show that an exporter firm's growth is greater (Wagner 2002, 2007, 2012, Falkand and Hagsten, 2015). The entering of firms into foreign markets enriches their home economy and particularly their growth rate.

Theoretically, exporting could increase firm growth by engaging in economies of scale[1]. A firm could cope with the decline in demand for its products by exporting. Also, exporting allows for an increase in competition between exporters and foreign firms, which makes these firms grow more and become more competitive in the local market (Wargner, 2002). Furthermore, firms that import a greater variety of inputs of better quality can increase their profits (Seker, 2012). In addition, having a foreign network can lead to firms' internationalization, by facilitating information and knowledge exchange, introduction of new products, implementation of technological innovations, and better integration into global value chains (Mitgwe, 2006; Johanson and Vahlne, 2009; Seker, 2012; Fakih and Ghazalian, 2014; Love and Roper, 2015; European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), and The World Bank (WB), 2016; Paul et al., 2017; Francis and Schweiger, 2017). Some contributions offer evidence for these claims; for instance, Seker (2012) argues that two-way traders are better performers compared to those who export or import only. A recent study on the Middle East and North Africa (MENA) region, Francis and Schweiger (2017) found that two-way traders exhibit an increasing size. Aterido et al., (2007) conclude that foreign ownership and being exporter boost firm growth. This positive relationship is supported by findings of Ricci and Trionfetti (2012).

However, exporting might have a negative impact on firms' growth. Indeed, by entering a foreign market, firms face a high level of risk because they are characterized by limited resources, which make them vulnerable to negative implications of expansion activity (Lu and Beamish, 2001).

Different methodologies are used in the literature. For example, Sleuwaegen and Goedhuys (2002) estimate an extension of Evans's model with the ordinary least square (OLS) to determine the effects of the institutional features and the high transaction costs on firm growth using data of manufacturing firms from Ivory Coast, and the study of Falk and Hagsten (2015) who examine the link between exporting status and firm growth in some European countries. However, the literature is still limited on the effect of trading at the conditional mean of the growth distribution. The most relevant study in this context is Goedhuys and Sleuwaegen (2010) where they use quantile regression to examine the existence of characteristics and stimulating factors of high-growth firms (HGFs) in some Sub-Saharan African countries.

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[1] The economy of scale arises when costs fall as output production increases. This cost advantage leads to increase the firm profit.

Moreover, studies using firm-level data from the MENA region are limited (see, for example, Fakih and Ghazalian, 2014; Francis and Schweiger, 2017).

This paper aims to contribute to the literature on the internationalization of firms. We propose a deeper analysis in which we focus on the effect of some trade characteristics of the firm on its growth, with particular attention to the response of the conditional mean of growth distribution. Unlike all previous studies on the MENA region, we investigate the effect of firms' export behavior using exporting status, export intensity, and two-way trading. We also check the hypothesis of learning by exporting using export experience. We rely on cross-sectional data from three economic sectors: manufacturing, services, and retail, using the Business Environment and Enterprise Performance Surveys (BEEPS) data of the EBRD and WB.

The remainder of the paper is organized as follows: the next section presents the data, the descriptive statistics, and the firm growth distribution; Section Three gives the econometric framework; Section Four presents the empirical results; Section Five tests the sensitiveness of trade variables, while Section Six concludes.

2. Data, descriptive statistics and firm growth distribution

2.1. Data and descriptive statistics

We use data from BEEPS, Table 1 shows the countries we are interested in. A total of 6,083 firms distributed in three sectors: manufacture, services, and retail, in eight countries from the MENA region. Egypt accounts for 47.6% of the total firms and Djibouti accounts for a 4.37 percent share, which is the lowest portion.

Table 1: Countries sample

Country	Frequency	Percent	Cum.
West Bank and Gaza	434	7.13	7.13
Morocco	407	6.69	13.83
Egypt	2,897	47.62	61.45
Yemen	353	5.80	67.25
Lebanon	561	9.22	76.48
Djibouti	266	4.37	80.85
Tunisia	592	9.73	90.58
Jordan	573	9.42	100 %
Total	6,083	100 %	

The calculation of growth has been a subject of disagreement in the literature. Indeed, there are at least two methods to calculate growth in firm heterogeneity literature[2]. In some studies, growth is measured by the natural logarithm of employment and sales. However, growth is measured as the annual logarithmic change in employment and sales (Evans, 1987) in other studies (see Table A1 for variables definitions). In this paper, we follow Evans (1987) and we calculate the growth rate as follows:

$$AGRe = \frac{(\ln(employment_{2012}) - \ln(employment_{2009}))}{2012 - 2009}$$

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[2] We are talking about the literature excluding HGFs, because there are some alternative formulas to calculate growth for this kind of firms.

$$AGRs = \frac{(\ln(sales_{2012}) - \ln(sales_{2009}))}{2012 - 2009}$$

Where AGRe is the average growth rate of employment and AGRs is the average growth rate of sales. Table 2 summarizes the descriptive statistics of variables used in this paper.

Table 2: Summary statistics

	Variables	Obs	Mean	Std. Dev.	Min	Max
Ln(size$_{2012}$):	(1) Employment	6,014	3.25	1.407	0	9.952
	(2) Sales	5,375	15.61	2.976	3.912	28.161
Ln(size$_{2009}$):	(3) Employment	5,313	3.305	1.424	0	10.596
	(4) Sales	4,466	15.656	2.954	1.945	27.540
Firm age:	(5) Ln(age)	6,011	2.638	0.934	0	5.049
Trade variables:	(6) Exporting Status	6,083	0.286	0.452	0	1
	(7) Two-way Trade	6,083	0.112	0.316	0	1
	(8) Export Intensity	5,977	2.636	11.762	0	100
	(9) Export Experience	5,910	0.632	1.153	0	4.859
Control variables:	(10) Foreign ownership	5,986	0.088	0.284	0	1
	(11) Access to finance	6,030	1.608	1.387	0	4
	(12) Loan line	5,899	0.246	0.431	0	1
	(13) Affiliation	6,083	0.177	0.382	0	1
	(14) Political instability	6,018	2.718	1.370	0	4
Sectors:	(15) Manufacturing	6,083	0.587	0.492	0	1
	(16) Retail	6,083	0.127	0.333	0	1
	(17) Services	6,083	0.285	0.451	0	1

The key variables of interest are employment, sales, export status, export intensity, two-way trading, and export experience. Table A1 presents all variables and their definitions. The logarithm of employment in 2012 is an average of 3.25, not far from the average of 3.30 three years before. The same slight variation can be seen for sales, where the average is about 15.61 in 2012 and 15.65 in 2009.

As shown in the correlation matrix (Table A2) for all variables used in this paper, the pairwise correlation between firm growth variables (AGRe and AGRs) and difficulties to access to finance and political instability is negative and extremely weak. As expected, four trade variables, foreign ownership and having a loan line from financial institutions are all positively correlated to the firms' growth. It seems to be that only affiliation to a larger firm negatively correlated to AGRe and positively correlated to AGRs.

2.2. Firm growth distribution

We start our analysis by examining firms' size distribution using AGRe and AGRs. Gibrat's (1931) law implies a log-normality distribution in size. In other words, if AGRe and AGRs distributions are not normally distributed, they cannot follow Gibrat's law. Figure 1 shows a comparison between firms' kernel density and the normal distribution curves of firms' employment growth. However, Figure 2 shows the comparison between firms' kernel density and the normal distribution curves of firms' sales growth. The dashed line represents a normal density curve and the unbroken line represents the kernel density curve. The two figures show a difference between the shapes of the two curves, which means that AGRe and AGRs are far from normally distributed.
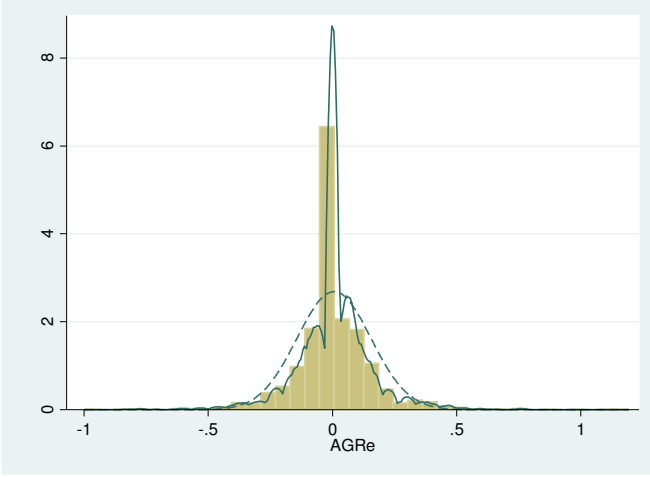
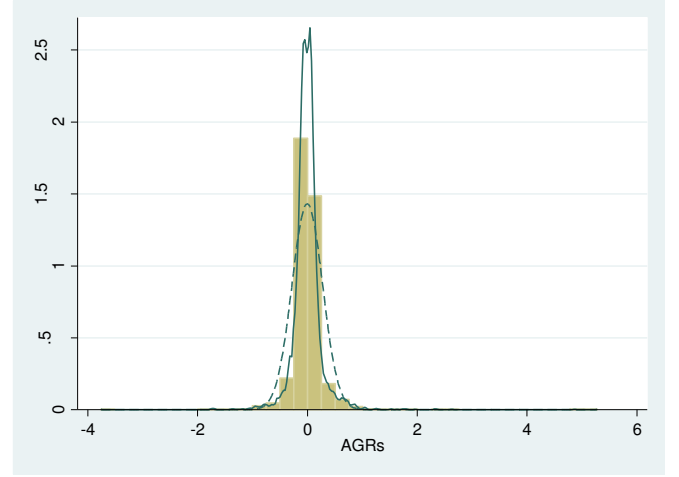Figure 1. Firm employment growth distribution

Figure 2. Firm sales growth distribution

To confirm this finding, we have also tested normality assumptions using numerical methods such as skewness, kurtosis, and Shapiro-Francia normality tests. All tests reject the normality assumption of the log-normal distribution of AGRe and AGRs (see Table 3). These results are consistent with several studies that rejected the Gibrat hypothesis (see for instance Bigsten and Gebreeysus, 2007; Dinh et al., 2010, Ayyagari et al., 2013).

Table 3. The log normality test of firm growth distribution

Firm growth rate	Kurtosis	Skewness	Shapiro-Francia statistic
AGRe	0.00	0.64	14.492***
AGRs	0.00	0.00	16.417***

Note: (***) significant at the level of 1%.

3. Econometric framework

We follow the model proposed by Evans (1987) to estimate the effect of exporting, two-way trader, export intensity and export experience on firm growth. First, we examine if these trade variables have an effect on the mean level of growth distribution, for which we regress AGRe and AGRs on trade variables, taking into account the sector dummies and the country dummies. For sectors, we consider services sector as the reference population and for Djibouti as the reference country.

We estimate using OLS the effect of each trade variable separately to avoid high correlation issues. Indeed, in the matrix of correlations (Table A2), export status shows a high correlation with two-way trade and export experience. However, the latter is highly correlated with all the three trade variables. Hence our basic specification is as follows:

$$
\begin{aligned}
Firm\ growth\ rate = {} & \alpha_0 + \alpha_1 \ln(\text{size}_{2009}) + \alpha_2 \ln(\text{size}_{2009})^2 \\
& + \alpha_3 \ln(age) + \alpha_4 \ln(age)^2 \\
& + \alpha_5 \ln(age) \times \ln(\text{size}_{2009}) \\
& + \alpha_6 Trade_i \\
& + \sum_{i=1}^{2} \delta_i\ sector\_dummies_i \\
& + \sum_{i=1}^{7} \theta_i\ country\_dummies_i + \varepsilon
\end{aligned}
\tag{1}
$$

Where, firm growth rate is the average growth rate of employment (AGRe) and the average growth rate of sales (AGRs) over the period 2009-2012. α, δ and θ are coefficient vectors. $Trade_i$ is the variable of concern (exporting status, export intensity, two-way trade and export experience).

However, a large literature underlines the importance of other factors on firm growth other than trade. In fact, over their life cycle, firms face financial constraints and institutional obstacles. To fund investment plans, some firms need access to finance and loans, others may get funds from their owners or parent firms (see, for instance, Beck et al., 2005; Coad, 2007; Goedhuys et al., 2016). To address this task, we added a vector X_i of control variables: foreign ownership, access to finance, loan line, affiliation, and political instability, as follows:

$$
\begin{aligned}
Firm\ growth\ rate = \ & \alpha_0 + \alpha_1 \ln(\text{size}_{2009}) + \alpha_2 \ln(\text{size}_{2009})^2 \\
& + \alpha_3 \ln(age) + \alpha_4 \ln(age)^2 \\
& + \alpha_5 \ln(age) \times \ln(\text{size}_{2009}) \\
& + \alpha_6 Trade_i + \sum_{i=1}^{n} \beta_i X_i \\
& + \sum_{i=1}^{2} \delta_i\ sector\_dummies_i \\
& + \sum_{i=1}^{7} \theta_i\ country\_dummies_i + \varepsilon
\end{aligned}
\tag{2}
$$

Where β is the vector of control variable coefficients.

We estimate Equation 2 using two different techniques: Ordinary Least Square (OLS) and quantile regression. As suggested by Coad and Hölzl (2009) using quantile regression to analyze a heavy-tailed distribution is more appropriate than the use of OLS because its results are characteristically robust to this kind of distribution. In addition, the growth rate in our data does not follow an exponential distribution (see Figure 1 and Figure 2), but a Gaussian one, which means that the standard least-squares assumption of normally distributed errors cannot hold. Nevertheless, the focus on the mean may hide many features of the dependent variable and ignore its distribution characteristics. However, the use of quantile regression along with OLS allows the estimation of the effects of explanatory variables on the mean and the whole conditional distribution of the dependent variable. According to Mello and Perelli (2003), quantile regression is a suitable estimation methodology in a growth firm. First, quantile regression allows for capturing firms' heterogeneity. Second, it indicates one solution for each quantile in terms of policy. Quantile regressions are a more flexible approach, able to describe the entire conditional distribution of the dependent variable. Coefficients can be interpreted as the partial derivative of the conditional quantile of the dependent variable with respect to particular regressors. Put differently, the derivative is interpreted as the marginal change in firm growth rate at the ith conditional quantile due to marginal change.

In our case, we examine the effect of trade characteristics on firm growth rate. To be exact, we test the 0.1, 0.25, 0.5, 0.75 and 0.9 quantiles. The two extreme quantiles: 0.1 and 0.9 present the lowest and the highest firm growth rates.

Firm size and firm age in normal and squared form allow us to test the non-linearity hypothesis of firm growth with the size and the age. For instance, the findings of Goedhuys and Sleuwaegen (2010) suggest that small firms grow faster than larger ones and young firms learn better than older ones. Indeed, they found that firm size and firm age are negatively linked to firm growth, and positively linked when size and age are squared.

4. Empirical Results

Table 4 provides the estimation of Equation 2, i.e. the extended model. It provides estimates of the effect of the independent variables on the mean level of firms' growth distribution. The preliminary results show that exporting status, two-way trade and export intensity are most significant and positive. For instance, being exporter can lead to an increase in growth by about 4 percent each year. In this model, we note that exporting status and export experience are both significant and robust to the two measures of firm growth. Nevertheless, the effect of being an exporter is four to five times higher on growth.

Table 4. Estimation with OLS of the extended firm growth model

	Dependent variable: AGRe				Dependent variable: AGRs			
	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)	OLS (7)	OLS (8)
Ln(age)	-0.0771***	-0.0795***	-0.0748***	-0.0792***	-0.187*	-0.190*	-0.205*	-0.219*
	(0.0191)	(0.0192)	(0.0192)	(0.0193)	(0.0932)	(0.0942)	(0.0936)	(0.0931)
Ln(age)^2	0.00643	0.00701*	0.00635	0.00689*	0.0127	0.0129	0.0137	0.0161*
	(0.00339)	(0.00341)	(0.00341)	(0.00345)	(0.00841)	(0.00844)	(0.00795)	(0.00803)
Ln(size$_{2009}$)	-0.104***	-0.103***	-0.100***	-0.105***	-0.130*	-0.131	-0.0915	-0.0905
	(0.0121)	(0.0122)	(0.0124)	(0.0127)	(0.0662)	(0.0674)	(0.0617)	(0.0617)
Ln(size$_{2009}$)^2	0.00912***	0.00919***	0.00936***	0.00967***	0.00253	0.00260	0.00150	0.00139
	(0.00148)	(0.00149)	(0.00150)	(0.00155)	(0.00174)	(0.00178)	(0.00154)	(0.00155)
Ln(age) × ln(size)	0.00469*	0.00445*	0.00393	0.00378	0.00581	0.00596	0.00665	0.00655
	(0.00224)	(0.00223)	(0.00222)	(0.00225)	(0.00400)	(0.00404)	(0.00412)	(0.00412)
Exporting status	0.0379***				0.0595***			
	(0.00591)				(0.0154)			
Two-way trade		0.0380***				0.0328*		
		(0.00728)				(0.0127)		
Export intensity			0.000363*				0.000288	
			(0.000146)				(0.000301)	
Export experience				0.0103***				0.0127***
				(0.00198)				(0.00340)
Foreign ownership	0.0108	0.0124	0.0179*	0.0136	0.0584***	0.0643***	0.0624***	0.0613***
	(0.00751)	(0.00743)	(0.00738)	(0.00744)	(0.0149)	(0.0153)	(0.0141)	(0.0147)
Access to finance	-0.00275	-0.00264	-0.00312*	-0.00283	-0.0101**	-0.00984**	-0.0101**	-0.00923**
	(0.00154)	(0.00155)	(0.00156)	(0.00157)	(0.00330)	(0.00331)	(0.00326)	(0.00332)
Loan line	0.0217***	0.0214***	0.0228***	0.0235***	0.0563***	0.0570***	0.0501***	0.0488***
	(0.00481)	(0.00481)	(0.00480)	(0.00486)	(0.0126)	(0.0127)	(0.0104)	(0.0106)
affiliation	0.0289***	0.0281***	0.0271***	0.0257***	0.0293**	0.0293**	0.0262*	0.0264*
	(0.00559)	(0.00560)	(0.00553)	(0.00550)	(0.0109)	(0.0110)	(0.0105)	(0.0105)
Political instability	-0.00423*	-0.00433*	-0.00404*	-0.00407*	-0.0109**	-0.0109**	-0.00992*	-0.0104*
	(0.00169)	(0.00170)	(0.00169)	(0.00169)	(0.00406)	(0.00407)	(0.00402)	(0.00414)
Manufacturing	0.0126**	0.00792	0.0153***	0.0114**	0.0593***	0.0590***	0.0698***	0.0635***
	(0.00433)	(0.00455)	(0.00434)	(0.00438)	(0.0112)	(0.0116)	(0.0101)	(0.0106)
Retail	-0.00612	-0.00676	-0.00495	-0.00532	0.00106	-0.00129	0.00579	0.00495
	(0.00699)	(0.00696)	(0.00691)	(0.00698)	(0.0148)	(0.0150)	(0.0137)	(0.0140)
Constant	0.370***	0.379***	0.364***	0.382***	1.671**	1.679*	1.310*	1.362*
	(0.0334)	(0.0334)	(0.0339)	(0.0342)	(0.642)	(0.652)	(0.632)	(0.631)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	4955	4955	4906	4852	4106	4106	4082	4037
R^2	0.167	0.163	0.159	0.169	0.120	0.114	0.101	0.104
F statistic	38.75***	38.66***	37.16***	38.62***	14.24***	13.35***	14.84***	15.54***

Note: First, we estimated the basic model but we dropped the results to avoid repetition because we found no significant difference between the variables of the basic model in the extended model. Robust Standard errors in parentheses.
* p-value <0.05, ** p-value <0.01, *** p-value <0.001

In addition, eight specifications show that age has a negative and significant sign at one percent of significance level on employment growth and ten percent of significance level on sales growth. The squared age, however, has a positive and significant sign at ten percent significance level on employment growth, which means learning effects operate better for young firms and thus young firms grow faster than older ones. Results show a positive and significant effect of the initial size and a negative and significant effect of the squared initial size on employment growth. This result suggests that smaller firms grow faster than larger ones. Age hampers growth beyond a certain age. These results corroborate findings of Goedhuys and Sleuwaegen (2010). The effect of size on sales growth is not significant.

Control variables show the expected sign and significance. The variables foreign ownership, affiliation, and loan line have a significant and positive effect on firms growth, except that the foreign ownership has a significant effect only on sales growth. The results show that having difficulties to access finance have significant and negative effects only on sales growth. In addition, the results show that firms' growth is negatively associated with political instability. At the sectoral level, it seems that firms in the manufacturing sector grow better than firms in the services sector. For the retail sector, we did not find any significant effect.

Tables 5, 6, 7 and 8 display the quantile regression estimation results of Equation 2. Considering size and age, quantile regression results show that their negative effect on growth has a stronger impact on high-growth firms than on low-growth firms. This suggests that large firms grow more slowly than small ones. We also find important non-linearity as the squared size variable is positively statistically significant. The non-linearity is only verified with upper deciles when measuring growth with employees [3].

In Table 5, exporting status is robust at all quantiles for the two measures of firm growth. In the employment growth regression, the coefficient decreases and then increases across the continuum of quantiles. For instance, in the 0.9 quantile and 0.1 quantile, firms who are exporting are growing by about 3.97 percent and 4.57 percent respectively more than firms who are not exporting. However, the effect is less pronounced when moving to the median of the distribution (i.e. at the 0.5 quantile). In the median, exporters can grow by about 1.76 percent more than non-exporters. This result means that the exporter status affects the shape of the conditional growth distribution especially along the tails, implying that engaging in exports will raise growth in upper and lower quantiles growth, but to a lesser extent than it does in the median. In other words, the effect of being exporter is U-shaped along the employment growth distribution.

In the sales growth regression, the magnitude of the estimated coefficients is more pronounced when moving from the lowest quantile to the highest quantile of the distribution. Being exporter leads to 2.51 percent more growth at the 0.1 quantile and to 4.44 percent more growth on the 0.9 quantile.

Regarding the two-way trade variable in Table 6, the quantile regression coefficients are positive and significant in the employment growth regression. The results indicate that firms who are involved in export and import grow by 4.9 percent at the 0.1 quantile and by 4.1 percent at the 0.9 quantile more than the rest of the firms. For sales growth, the result shows a positive but non-significant effect on all quantiles, except for the 0.75 quantile where the effect is significant.

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[3] To make the results of our key variables clearer, the variables Ln(age), Ln(age)^2, Ln(size2009), Ln(size2009)^2, Ln(age) x ln(size) are dropped from the tables 5, 6, 7, and 8 but of course they are included in the estimation. Complete tables are available upon request

Table 5. Estimation with the quantile regression using Exporting Status

	Dependent variable: AGRe					Dependent variable: AGRs				
	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)
Exporting Status	0.0447***	0.0270***	0.0175***	0.0250***	0.0390***	0.0248**	0.0220**	0.0217***	0.0347***	0.0433**
	(0.00947)	(0.00536)	(0.00337)	(0.00518)	(0.00611)	(0.00900)	(0.00750)	(0.00608)	(0.00687)	(0.0165)
Foreign ownership	-0.00642	0.0152*	0.0102*	0.0141*	0.0144	0.00850	0.0112	0.0233*	0.0338***	0.0781***
	(0.0144)	(0.00760)	(0.00412)	(0.00652)	(0.0118)	(0.0244)	(0.0127)	(0.00955)	(0.00749)	(0.0235)
Access to finance	-0.00546	-0.00365*	-0.000167	0.00106	0.000292	-0.0101**	-0.00897***	-0.00775***	-0.00969***	-0.00619
	(0.00281)	(0.00148)	(0.000869)	(0.00121)	(0.00219)	(0.00324)	(0.00247)	(0.00177)	(0.00237)	(0.00452)
Loan line	0.0242**	0.0196***	0.0101***	0.0123**	0.0224***	0.0143	0.00179	0.0168**	0.0175**	0.0422**
	(0.00879)	(0.00469)	(0.00289)	(0.00432)	(0.00638)	(0.00913)	(0.00754)	(0.00552)	(0.00605)	(0.0157)
Affiliation	0.0291**	0.0187***	0.0141***	0.0149***	0.0406***	0.0350**	0.00825	0.00106	0.00753	0.0194
	(0.00904)	(0.00423)	(0.00280)	(0.00364)	(0.00874)	(0.0126)	(0.00800)	(0.00601)	(0.00639)	(0.0143)
Political instability	-0.00477	-0.00655***	-0.000922	-0.00244	-0.00382	-0.0214***	-0.0133***	-0.00749***	-0.000536	-0.0110*
	(0.00320)	(0.00165)	(0.00110)	(0.00144)	(0.00235)	(0.00325)	(0.00264)	(0.00195)	(0.00259)	(0.00533)
Manufacturing	0.00830	0.00255	0.00610*	0.0150***	0.0212***	0.106***	0.0653***	0.0434***	0.0252**	0.0309*
	(0.00840)	(0.00467)	(0.00261)	(0.00391)	(0.00585)	(0.0145)	(0.0100)	(0.00597)	(0.00907)	(0.0128)
Retail	-0.00188	-0.000218	-0.00397	-0.000317	0.00350	0.0886***	0.0420***	0.0173*	-0.0115	-0.0179
	(0.0151)	(0.00651)	(0.00338)	(0.00685)	(0.0108)	(0.0185)	(0.0108)	(0.00767)	(0.00911)	(0.0210)
Constant	0.149**	0.153***	0.199***	0.443***	0.685***	-0.0668	0.128	0.315***	0.835***	2.010***
	(0.0518)	(0.0271)	(0.0237)	(0.0364)	(0.0565)	(0.179)	(0.0879)	(0.0808)	(0.129)	(0.286)
Country dummies	Yes					Yes				
Observations	4955					4106				

Note: Robust standard errors in parentheses
* p-value <0.05, ** p-value <0.01, *** p-value <0.001

Table 6. Estimation with the quantile regression using Two-way Trade

	Dependent variable: AGRe					Dependent variable: AGRs				
	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)
Two-way Trade	0.0479***	0.0285***	0.0197***	0.0247***	0.0406***	0.00840	0.00916	0.00833	0.0256**	0.0305
	(0.0102)	(0.00714)	(0.00523)	(0.00605)	(0.00894)	(0.0106)	(0.00754)	(0.00777)	(0.00814)	(0.0200)
Foreign ownership	-0.00199	0.0130*	0.00996*	0.0129*	0.0161	0.00864	0.0189	0.0197*	0.0368***	0.0702***
	(0.0177)	(0.00595)	(0.00500)	(0.00524)	(0.0108)	(0.0226)	(0.00967)	(0.00859)	(0.00618)	(0.0188)
Access to finance	-0.00487	-0.00401*	0.000128	0.00144	0.000557	-0.0102**	-0.00838***	-0.00782***	-0.00984***	-0.00553
	(0.00284)	(0.00156)	(0.000890)	(0.00111)	(0.00222)	(0.00328)	(0.00204)	(0.00174)	(0.00223)	(0.00427)
Loan line	0.0231*	0.0199***	0.00970**	0.0113**	0.0201**	0.0107	0.00575	0.0189***	0.0168**	0.0447**
	(0.00950)	(0.00467)	(0.00295)	(0.00360)	(0.00647)	(0.00869)	(0.00688)	(0.00545)	(0.00591)	(0.0150)
Affiliation	0.0278***	0.0167***	0.0133***	0.0153***	0.0393***	0.0344***	0.00335	-0.00202	0.00787	0.0242
	(0.00744)	(0.00471)	(0.00324)	(0.00318)	(0.00772)	(0.0101)	(0.00649)	(0.00602)	(0.00655)	(0.0139)
Political instability	-0.00477	-0.00655***	-0.00126	-0.00274*	-0.00550*	-0.0190***	-0.0128***	-0.00719***	-0.000585	-0.00937
	(0.00296)	(0.00167)	(0.00110)	(0.00136)	(0.00227)	(0.00358)	(0.00219)	(0.00195)	(0.00240)	(0.00522)
Manufacturing	-0.000372	-0.00367	0.00493	0.0114***	0.0200**	0.113***	0.0676***	0.0414***	0.0275***	0.0225
	(0.00904)	(0.00508)	(0.00274)	(0.00332)	(0.00670)	(0.0157)	(0.00708)	(0.00607)	(0.00824)	(0.0130)
Retail	0.00290	-0.000929	-0.00305	-0.00165	0.00594	0.0879***	0.0383***	0.0145*	-0.0155	-0.0282
	(0.0151)	(0.00632)	(0.00387)	(0.00603)	(0.0123)	(0.0167)	(0.00923)	(0.00680)	(0.00837)	(0.0154)
Constant	0.177***	0.168***	0.211***	0.453***	0.708***	-0.0453	0.162*	0.354***	0.836***	1.915***
	(0.0425)	(0.0252)	(0.0235)	(0.0345)	(0.0569)	(0.184)	(0.0787)	(0.0730)	(0.142)	(0.264)
Country dummies			Yes					Yes		
Observations			4955					4106		

Note: Robust standard errors in parentheses

* p-value <0.05, ** p-value <0.01, *** p-value <0.001

Table 7. Estimation with the quantile regression using Export Intensity

	Dependent variable: AGRe					Dependent variable: AGRs				
	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)
Export Intensity	0.000555	0.000348	0.000114	0.0000686	-0.000264	0.000738***	0.000386*	0.000195	0.0000291	0.00109
	(0.000299)	(0.000199)	(0.0000934)	(0.0000695)	(0.000310)	(0.000206)	(0.000151)	(0.000168)	(0.000452)	(0.000970)
Foreign ownership	0.0192	0.0180**	0.0119**	0.0185***	0.0250***	0.00632	0.0216*	0.0215*	0.0352***	0.0665**
	(0.0129)	(0.00577)	(0.00380)	(0.00502)	(0.00714)	(0.0174)	(0.00903)	(0.00958)	(0.00942)	(0.0250)
Access to finance	-0.00540*	-0.00382*	0.000308	0.000890	0.0000469	-0.0104**	-0.00814***	-0.00805***	-0.00915***	-0.00588
	(0.00266)	(0.00154)	(0.000906)	(0.00113)	(0.00223)	(0.00330)	(0.00198)	(0.00172)	(0.00233)	(0.00412)
Loan line	0.0308***	0.0218***	0.0104***	0.0113**	0.0270***	0.0153	0.00847	0.0200***	0.0175**	0.0523***
	(0.00872)	(0.00454)	(0.00283)	(0.00395)	(0.00650)	(0.00944)	(0.00662)	(0.00549)	(0.00574)	(0.0131)
Affiliation	0.0257***	0.0174***	0.0138***	0.0155***	0.0408***	0.0290**	0.00126	-0.00265	0.00653	0.0212
	(0.00734)	(0.00482)	(0.00339)	(0.00356)	(0.00860)	(0.0112)	(0.00570)	(0.00583)	(0.00774)	(0.0148)
Political instability	-0.00594*	-0.00612***	-0.000641	-0.00198	-0.00365	-0.0210***	-0.0127***	-0.00726***	0.000244	-0.0106*
	(0.00280)	(0.00167)	(0.00107)	(0.00137)	(0.00222)	(0.00300)	(0.00203)	(0.00190)	(0.00229)	(0.00479)
Manufacturing	0.00935	0.00285	0.00672*	0.0167***	0.0298***	0.109***	0.0675***	0.0423***	0.0356***	0.0336**
	(0.00717)	(0.00450)	(0.00275)	(0.00328)	(0.00578)	(0.0138)	(0.00640)	(0.00587)	(0.00834)	(0.0116)
Retail	-0.00372	0.00190	-0.00275	-0.00242	0.00478	0.0813***	0.0369***	0.0158*	-0.0148	-0.0332*
	(0.0107)	(0.00692)	(0.00390)	(0.00673)	(0.0118)	(0.0184)	(0.00797)	(0.00684)	(0.00884)	(0.0140)
Constant	0.118**	0.163***	0.203***	0.432***	0.709***	-0.0955	0.156*	0.308***	0.773***	1.954***
	(0.0410)	(0.0285)	(0.0223)	(0.0355)	(0.0588)	(0.158)	(0.0661)	(0.0706)	(0.134)	(0.292)
Country dummies			Yes					Yes		
Observations			4906					4082		

Note: Robust standard errors in parentheses

* p-value <0.05, ** p-value <0.01, *** p-value <0.001

Table 8. Estimation with the quantile regression using Export Experience

	Dependent variable: AGRe					Dependent variable: AGRs				
	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)	Q (0.1)	Q (0.25)	Q (0.5)	Q (0.75)	Q (0.9)
Export Experience	0.0141***	0.00917***	0.00478***	0.00465***	0.00852***	0.00947**	0.00791***	0.00563**	0.00810***	0.0146**
	(0.00366)	(0.00206)	(0.00106)	(0.00119)	(0.00205)	(0.00324)	(0.00191)	(0.00211)	(0.00231)	(0.00486)
Foreign ownership	-0.00525	0.0147	0.0126**	0.0151**	0.0165*	-0.00446	0.0177	0.0205	0.0330***	0.0820***
	(0.0104)	(0.00760)	(0.00405)	(0.00464)	(0.00734)	(0.0224)	(0.00937)	(0.0105)	(0.00832)	(0.0232)
Access to finance	-0.00397	-0.00304	-0.0000965	0.00118	0.0000635	-0.00973**	-0.00765***	-0.00788***	-0.00990***	-0.00462
	(0.00271)	(0.00167)	(0.000906)	(0.00107)	(0.00218)	(0.00360)	(0.00192)	(0.00176)	(0.00239)	(0.00380)
Loan line	0.0237**	0.0189***	0.0110***	0.0137***	0.0265***	0.00741	0.00367	0.0177**	0.0131	0.0454***
	(0.00851)	(0.00535)	(0.00299)	(0.00372)	(0.00661)	(0.0113)	(0.00643)	(0.00568)	(0.00670)	(0.0136)
Affiliation	0.0259***	0.0198***	0.0143***	0.0156***	0.0372***	0.0375***	0.00590	0.000319	0.0105	0.0179
	(0.00775)	(0.00569)	(0.00322)	(0.00311)	(0.00855)	(0.0114)	(0.00612)	(0.00628)	(0.00669)	(0.0177)
Political instability	-0.00474	-0.00566**	-0.00108	-0.00203	-0.00497*	-0.0177***	-0.0119***	-0.00726***	-0.00109	-0.0121**
	(0.00313)	(0.00184)	(0.00113)	(0.00136)	(0.00238)	(0.00342)	(0.00208)	(0.00198)	(0.00254)	(0.00423)
Manufacturing	0.00256	-0.00123	0.00588*	0.0144***	0.0233***	0.111***	0.0647***	0.0435***	0.0288**	0.0296*
	(0.00838)	(0.00528)	(0.00272)	(0.00350)	(0.00592)	(0.0152)	(0.00630)	(0.00601)	(0.00930)	(0.0117)
Retail	-0.00619	-0.00318	-0.00367	-0.00408	0.00579	0.0868***	0.0367***	0.0152	-0.0115	-0.0242
	(0.0133)	(0.00625)	(0.00367)	(0.00546)	(0.00887)	(0.0183)	(0.00795)	(0.00801)	(0.00979)	(0.0131)
Constant	0.154**	0.172***	0.211***	0.453***	0.708***	-0.102	0.158*	0.316***	0.756***	1.967***
	(0.0502)	(0.0221)	(0.0244)	(0.0369)	(0.0414)	(0.173)	(0.0714)	(0.0739)	(0.128)	(0.282)
Country dummies			Yes					Yes		
Observations			4852					4037		

Note: Robust standard errors in parentheses

* p-value <0.05, ** p-value <0.01, *** p-value <0.001

In Table 7, the export intensity variable has a non-significant impact on employment growth distribution and a positive and significant impact only on the lowest quantiles of sales growth distribution. This means that an increase of one percent in the share of export over total sales leads to a 0.07 percent increase in sales growth at the 0.1 quantile. These results indicate that export intensity is not a determinant of firm growth.

According to the results reported in Table 8, the export experience seems to be a determinant of firms' growth. The results of our last main variable show that its coefficient, relating to all quantiles, is positive and significant for employment and sales growth regressions. A one percent increase in the export experience leads to 1.41 percent, 0.4 percent and 0.85 percent increase in employment growth at 0.1, 0.5 and 0.9 quantiles, respectively. For the same increase in the export experience at 0.1, 0.5 and 0.9 quantiles, sales growth increases by 0.94 percent, 0.56 percent and 1.4 percent, respectively.

Coming to control variables in Tables 5, 6, 7 and 8, the results show that financial and institutional obstacles are significant only for some quantiles. Their significance also differs according to the measure of growth. For instance, it appears that the difficulty of accessing to finance hurts the sales growth in all quantiles except those of the upper quantile and it has a no significant effect on employment growth. Firms in the lowest quantiles need external funding to grow better. This may be due to the low available funding and the lack of stable resources in small and medium firms. The second obstacle is political instability. The estimated coefficients of political instability are significant mostly in lower quantiles and as expected, they have negative signs. These results may also be an explication of the greater impact of being an exporter on the left tail of the employment growth distribution. Firms in the lowest quantile may have the potential to grow, but because they face financial difficulties and political instability in the markets in which they operate, they are unable to scale up. Results in Table 7 support our interpretation, export intensity has boosted sales for firms in lower tails showing that these enterprises have capacities to grow more and even internationalize. However, access to finance impacts them negatively and significantly which is not the case for firms in upper tail. This result underline that access to funding is not particularly targeted to firms with high growth potential. Access to finance seems not to be equal and appears as a real barrier to firms growth. As Table 6 shows, these two obstacles, more than in the rest of quantiles, hamper the sales growth of the lowest quantile. So, thanks to the economics of scale of their products to foreign markets, firms in the 0.1 quantile can increase their sales, and thus they can hire again and grow.

Regarding the ownership, sharing capital with foreigners seems to have a low influence on sales growth in the 0.75 and 0.9 quantiles and on employment growth in 0.75 quantile only. However, having a loan line with a financial institution explains the sales growth of the 0.5, 0.75 and 0.9 quantiles. The significance of the loan line variable is observed in all quantiles when the dependent variable is employment growth. In addition, results show that being affiliated to a large establishment is important for employment growth across the quantiles and only for the lowest quantile of sales growth.

The analysis of quantile regressions tables gives evidence on the importance of the manufacturing sector on firms' growth. The results show that firms in the manufacturing industry exhibit more growth than firms in other sectors. Figures 3 and 4 give an overview of the coefficient of our four main trade variables over the conditional quantiles and only in the manufacturing sector.

The estimated effects indicate that exporting status, two-way trade and export experience have a positive and significant effect at the most quantiles on employment growth. Concerning the sales growth, the effect is positive and significant on the upper quantiles except for export

intensity where the effect is non-significant. In the Services sector and Retail sector, we have not found a significant effect of trade variables on growth over most of the quantiles (see Figure A1 and Figure A2 in the Appendix).

Figure 3. Variation in the coefficient on export status and two-way trader over the conditional quantiles in the manufacturing sector.
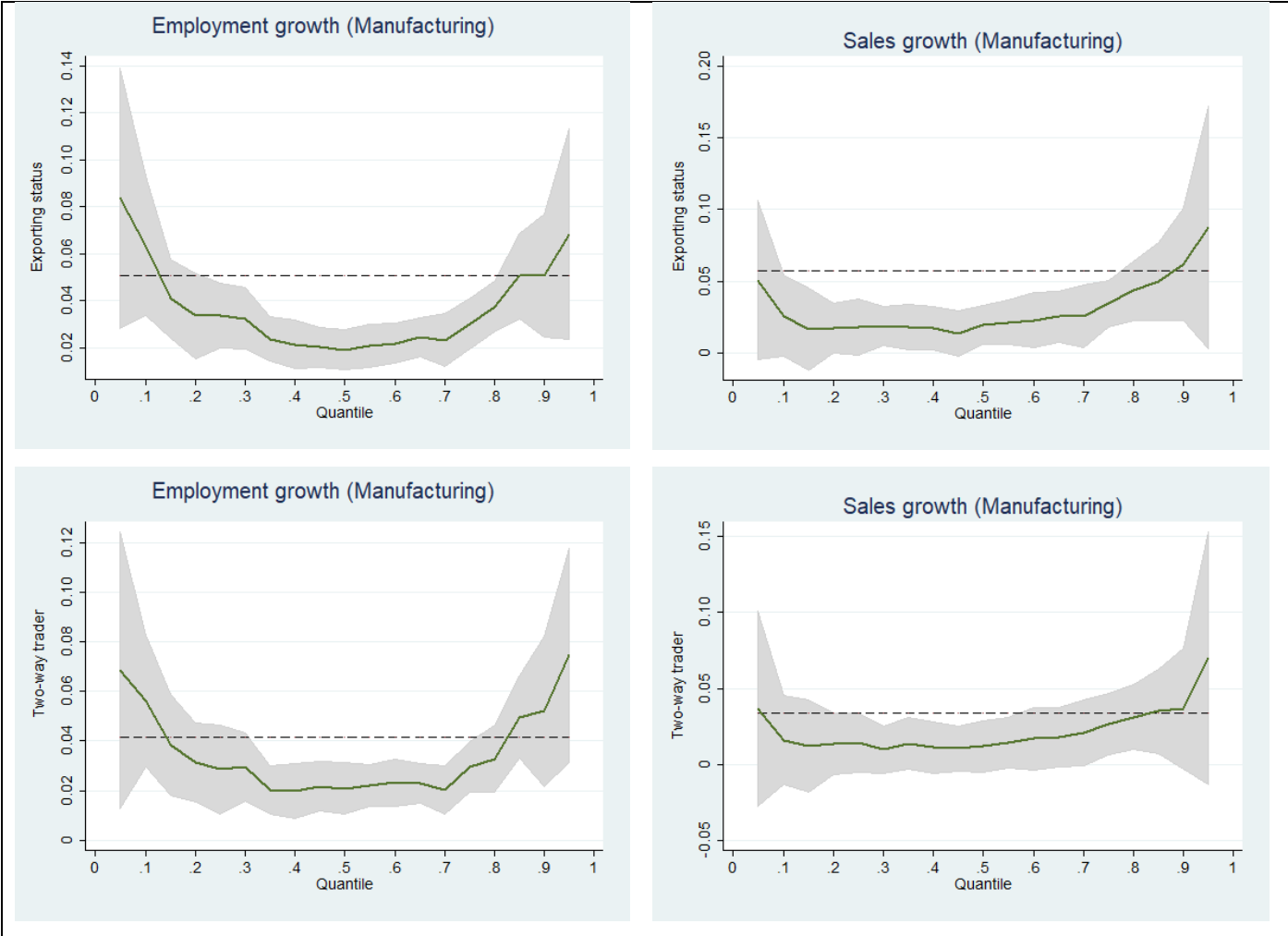
Notes: The continuous line is the estimated coefficients over the conditional quantiles. The confidence interval of quantile regression is in grey. Horizontal dashed lines represent OLS.

Figure 4. Variation in the coefficient on export intensity and export experience over the conditional quantiles in the manufacturing sector.
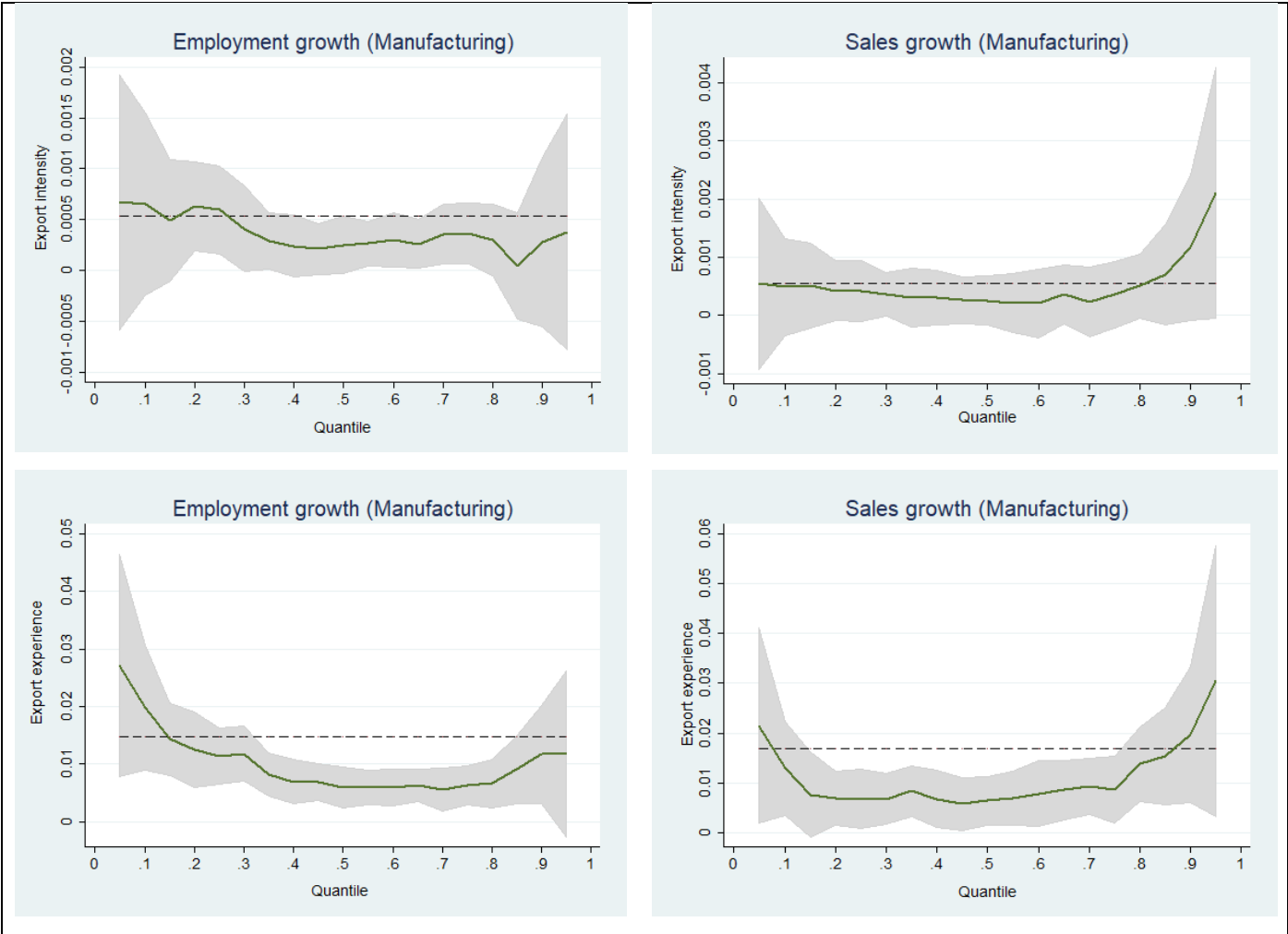
Notes: The continuous line is the estimated coefficients over the conditional quantiles. The confidence interval of quantile regression is in grey. Horizontal dashed lines represent OLS.

5. Sensitive analysis

In this section, we try to check the sensitivity of our empirical results using another measure of firm growth, which is the Birch index. This indicator allows us for better identification of small firms that have high growth. Birch index is a combination of absolute and relative measures (OECD, 2007). The absolute is the difference of size over the period of three-year, while the relative signifies the percentage change over the same period. By taking the product of both measures, Birch index gives a value that has to be ranked from the lowest growth to the highest growth.

Table 9 reports the estimated coefficients of trade variables across the quantiles using the Birch index of employment and sales as the dependent variable. We found the expected signs as in our results in Tables 5, 6, 7 and 8. The variables exporting status, two-way trade and export experience are very significant across quantiles in explaining the employment growth. However, when Birch index is calculated by sales, only the effects of exporting status and

export experience are statistically significant. In addition, exporting status has a greater influence on the tails of the growth distribution than in the median. These results confirm our finding in the previous section.

Table 9. The effect of trade variables on Birch growth index

	Birch index (employment)				Birch index (sales)			
	Exporting Status	Two-way Trade	Export Intensity	Export Experience	Exporting Status	Two-way Trade	Export Intensity	Export Experience
Q (0.1)	0.110***	0.135***	0.00101	0.0356***	0.0725**	0.0255	0.00212***	0.0270**
	(-0.0236)	(-0.0218)	(-0.00066)	(-0.00797)	(-0.0247)	(-0.0292)	(-0.00048)	(-0.00958)
Q (0.25)	0.0715***	0.0756***	0.00125**	0.0238***	0.0658**	0.0281	0.00112*	0.0232***
	(-0.0169)	(-0.0192)	(-0.00041)	(-0.00587)	(-0.0205)	(-0.0223)	(-0.00045)	(-0.00576)
Q (0.5)	0.0563***	0.0639***	0.000347	0.0145***	0.0656***	0.0276	0.000599	0.0165*
	(-0.00975)	(-0.0159)	(-0.00027)	(-0.00324)	(-0.0182)	(-0.0228)	(-0.00056)	(-0.0064)
Q (0.75)	0.0851***	0.0779***	0.000176	0.0152***	0.107***	0.0788**	8.83E-05	0.0244***
	(-0.017)	(-0.0226)	(-0.00029)	(-0.00396)	(-0.0238)	(-0.0246)	(-0.00123)	(-0.00702)
Q (0.9)	0.137***	0.142***	-0.00034	0.0280***	0.137**	0.0869	0.00372	0.0487**
	(-0.0228)	(-0.0305)	(-0.00053)	(-0.00779)	(-0.0517)	(-0.062)	(-0.00411)	(-0.0172)

Note: Robust standard errors in parentheses
* p-value <0.05, ** p-value <0.01, *** p-value <0.001

6. Conclusion

This paper presents crucial evidence in support of the internationalization in firms' growth. We used the BEEPS data of the EBRD and WB for eight developing countries from the MENA region. We focused on the influence of trade characteristics on the mean and the whole conditional distribution of firms' growth. We opted for two measures of firms' growth: employment growth and sales growth. To check the sensitiveness of our results, we have used the Birch index instead of the Evans measure of firms' growth. As expected, the effect of trading at the conditional mean of the growth distribution didn't tell the whole story. Indeed, the quantile regressions show that the coefficients of trade variables vary over the conditional growth distribution. However, our analysis has some limitations. The cross-sectional nature of the BEEPS data does not allow us to check out whether firms in the tails of the growth distribution are persistent over the study period or not.

Our findings imply that internationalization has an effect on firms' growth. The most impactful trade variable is the exporter status. Our results point out that the export status has a more important impact on lowest and highest quantiles than on central ones. Despite the positive and significant impact of export experience on firms' growth, the effect has been generally weak. Although the positive effects of being a two-way trader and export intensity on firms' growth have not always been significant, no negative effects have been demonstrated. This contradicts the argument that exports could be a risk. In addition, our results show that firms in the highest quantile are more attractive for foreign capital as well as local financing sources, and firms in the lowest quantile are facing the difficulty of accessing finance and are affected by the political instability reigning over the region. These findings might indicate that the gain in growth from internationalization maybe offset by the political instability and the difficulty of accessing finance. The internationalization helps firms with lower growth to increase their sales. However, our findings suggest that despite their potential, difficulty to access finance is a barrier to growth and to scaling up for firms in lower tails engaged in trade. Moreover, our results show that these firms are more impacted by political factors than those in higher tails. We believe that developing more financial tools such as equity funding is needed to develop

capacities of MENA firms and to support their internationalization efforts. Having several ways of funding could also enable firms in lower tails to grow.

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Appendix

Table A1: Definition of variables

| Variable	Description
AGRe	Average annual employment growth over the period 2009–2012, calculated by (ln(employment 2012) - ln(employment 2009))/ 3
AGRs	Average annual employment growth over the period 2009–2012, calculated by (ln(sales 2012) - ln(sales 2009))/ 3
Ln(age)	The natural logarithm of firm age
Ln(size$_{2009}$)	The natural logarithm of employment in 2009 and the natural logarithm of sales in 2009.
Exporting status	Dummy; 1 if the firm is an exporter
Export intensity	Share of export over total sales (%)
Two-way trader	Dummy; 1 if the firm is both importer and exporter
Export experience	We use this formula: $Ln(X_t+1)$ where X_t is the difference between the year of survey and the year in which the firm starts exporting. We added +1 to the experience to avoid the natural logarithm of a zero experience.
Foreign ownership	Dummy; 1 if the firm has foreign ownership.
Access to finance	A score between 0 (No obstacle) and 4 (Very severe obstacle)
Loan line	Dummy; 1 If the firm has a line of credit or a loan from a financial institution
Affiliation	Dummy; 1 if the firm is part of a larger firm
Political instability	A score between 0 (No obstacle) and 4 (Very severe obstacle)
Manufacturing	Dummy; 1 if the sector is manufacturing
Retail	Dummy; 1 if the sector is Retail
Services	Dummy; 1 if the sector is services

Table A2. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) AGRe	1.000															
(2) AGRs	0.287	1.000														
(3) Ln(age)	-0.062	-0.134	1.000													
(4) Ln(employement$_{2009}$)	-0.003	-0.162	0.211	1.000												
(5) Ln(sales$_{2009}$)	-0.049	0.087	0.174	0.381	1.000											
(6) Exporting Status	0.118	0.143	0.038	0.218	0.156	1.000										
(7) Two-way Trade	0.084	0.092	0.044	0.309	0.139	**0.629**	1.000									
(8) Export Intensity	0.021	0.033	0.007	0.083	0.048	0.005	-0.005	1.000								
(9) Export Experience	0.078	0.075	0.160	0.342	0.252	**0.746**	**0.562**	**0.349**	1.000							
(10) Foreign ownership	0.062	0.039	-0.071	0.210	0.071	0.138	0.164	0.043	0.149	1.000						
(11) Access to finance	-0.033	-0.011	-0.021	-0.096	-0.057	-0.005	-0.020	-0.003	-0.029	-0.064	1.000					
(12) Loan line	0.100	0.090	0.118	0.173	0.300	0.158	0.168	0.024	0.214	0.025	0.017	1.000				
(13) Affiliation	-0.008	0.039	0.082	0.169	0.167	0.048	0.019	0.070	0.067	0.033	-0.041	0.023	1.000			
(14) Political instability	-0.099	-0.127	0.039	-0.026	0.107	-0.056	-0.086	0.000	-0.063	-0.047	0.162	-0.096	0.004	1.000		
(15) Manufacturing	0.082	-0.042	0.007	0.232	-0.085	0.091	0.298	0.041	0.149	0.045	0.016	-0.025	-0.103	-0.031	1.000	
(16) Retail	-0.001	0.061	0.003	-0.195	0.070	-0.030	-0.139	-0.022	-0.087	-0.018	0.037	0.045	0.032	-0.021	-0.465	1.000
(17) Services	-0.089	0.001	-0.010	-0.111	0.041	-0.077	-0.226	-0.028	-0.100	-0.036	-0.045	-0.005	0.090	0.051	-0.757	-0.224

Figure A1. Variation in the coefficient on exporting status, export intensity and export experience over the conditional quantiles in the services sector.
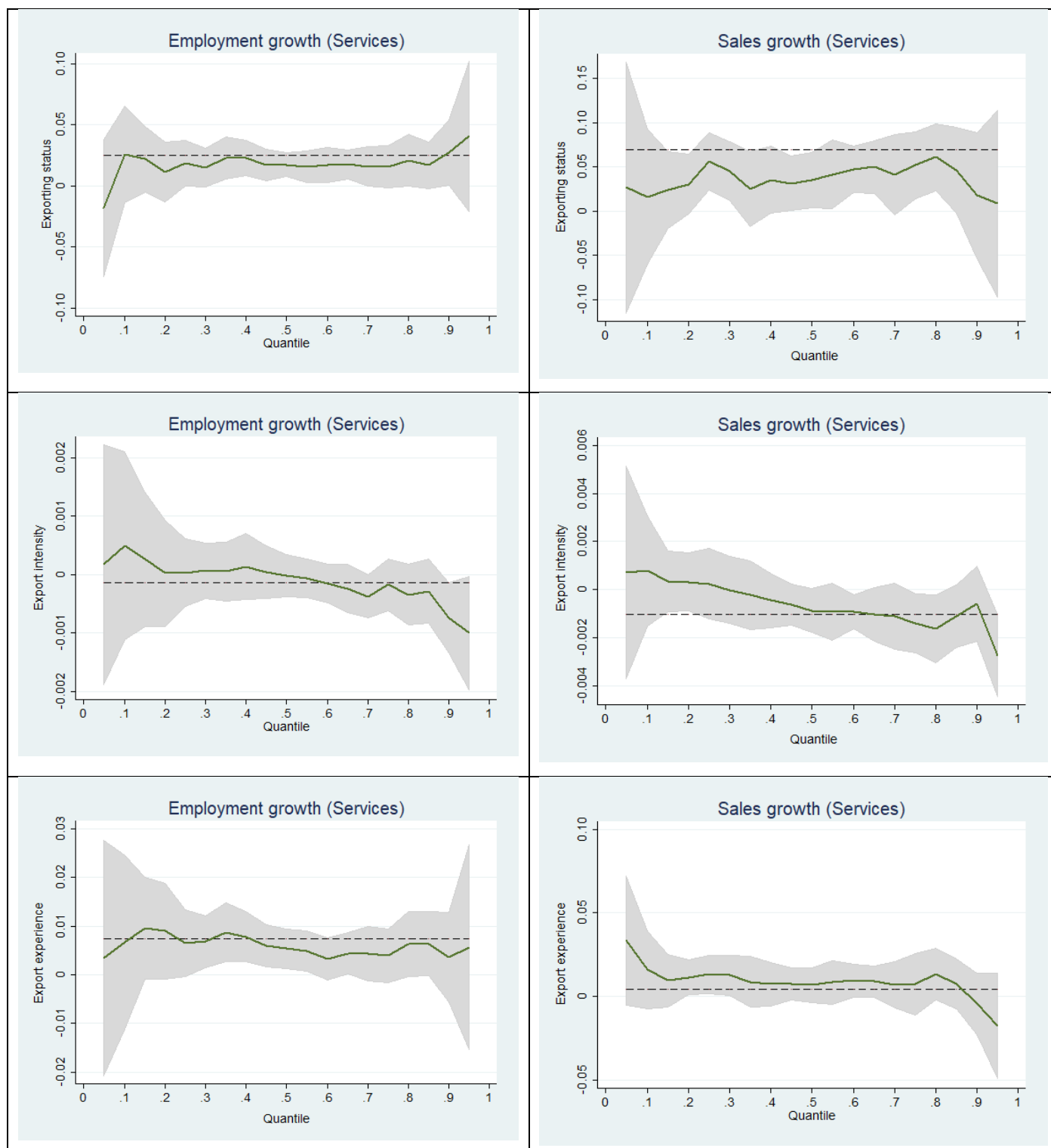
Notes: The continuous line is the estimated coefficients over the conditional quantiles. The confidence interval of quantile regression is in grey. Horizontal dashed lines represent OLS. The estimated effect of the two-way trade is not displayed because we did not find any firm exports and imports at the same time in the Services sector.

Figure A2. Variation in the coefficient on exporting status, export intensity and export experience over the conditional quantiles in the retail sector.
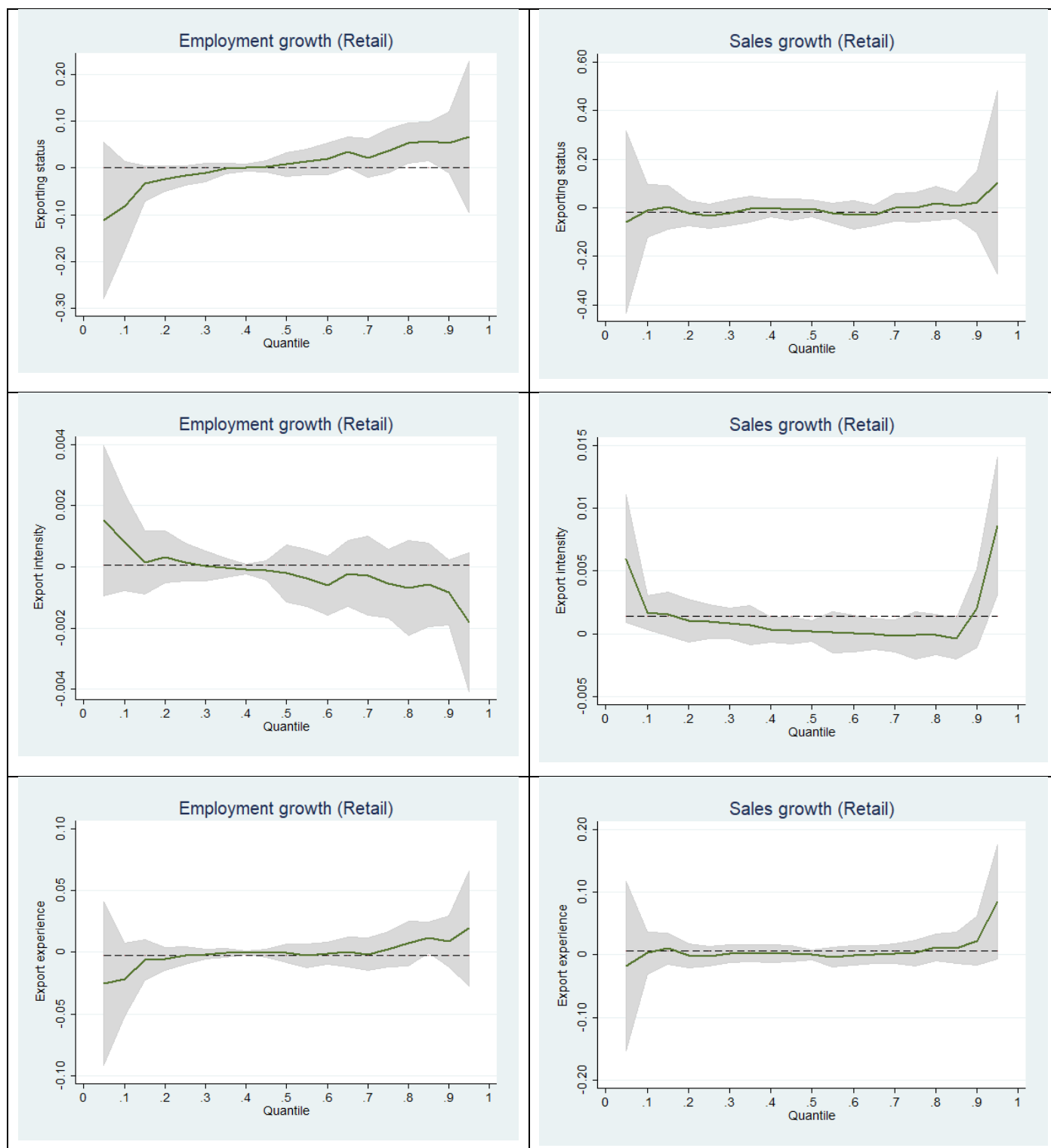
Notes: The continuous line is the estimated coefficients over the conditional quantiles. The confidence interval of quantile regression is in grey. Horizontal dashed lines represent OLS. The estimated effect of the two-way trade is not displayed because we did not find any firm exports and imports at the same time in the Retail sector.