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DISCUSSION PAPER SERIES

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ISSN: 2365-9793

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ABSTRACT

Trade Liberalization and Local Labor Markets in Morocco*

Morocco's trade liberalization policies have promoted economic progress over the past two decades. However, effects on Morocco's local labor market outcomes vary. By combining three complementary approaches and modeling techniques, this paper estimates: (i) how trade agreements have increased trade flows, (ii) the relationship between trade exposure and mixed local labor market outcomes, and (iii) the relationship between firm employment and exports. Our results show that trade policy has increased trade flows, but this has led to mixed results for workers: increased trade has decreased informality but has failed to improve female labor force participation (FLFP). This appears to be due to a shift from female labor-intensive industries, such as apparel and textile sectors, to capital-intensive sectors that are predominantly male-intensive. Our firm level analysis confirms these results by showing that increase in employment from exports has occurred mainly in male, labor-intensive sectors.

JEL Classification: F13, F16, O14, O19

Keywords: trade policy, trade flows, labor market outcomes, firm dynamics

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* We thank Claudia Berg and multiple participants of World Bank seminars for their helpful comments. This paper served as background research to produce the World Bank's report "Exports to Improve Labor Markets in the Middle East and North Africa." Financial support from the World Bank is gratefully acknowledged. The views expressed herein are those of the authors and do not necessarily reflect the views of the World Bank.

1. Introduction

Literature about globalization in the past two decades has associated trade openness with reduction in poverty and inequality and increasing economic growth across developing countries. Frankel and Romer (1999) have demonstrated a positive correlation between trade and growth, accompanied by a significant increase in labor demand, as reported by Robertson et al (2009) and Lopez-Acevedo et al (2016). These trends have also been closely linked to a decline in poverty rates, as observed by Harrison (2007). Moreover, recent studies assessing the trade effects have shown that local labor markets can benefit from increased trade flows (Artuc et al 2019, Robertson et al 2020, and Robertson et al 2021) by generating jobs and improving labor market outcomes, such as increased wages, lower informality rates, and greater female labor force participation (FLFP).

In the case of Morocco, economic progress —in part fueled by trade liberalization and resulting increase in trade flows— has been significant in the last two decades. Between 2000 and 2019 living standards have considerably improved; while per capita income almost doubled, the overall poverty rate fell to almost one-third its 2000 level. Both literacy rates and health outcomes improved, as well as access to basic utilities such as water and electricity. The working-age population is expanding, representing a potential "demographic window" to support a jobs-led growth policy for the next two decades (Lopez-Acevedo et al 2021a).

However, this economic growth has not created enough jobs to offset the increase in population, nor to improve some important labor market outcomes. The Moroccan informality rate, despite decreasing, is still among the highest in the Middle East and North Africa (MENA) region. Job loss in agriculture in rural areas has not been completely absorbed by industrial and services sectors in Moroccan cities—representing a so-called "premature deindustrialization" situation. At the same time, FLFP is now lower than two decades ago (Lopez-Acevedo et al 2021b), with a persistent 50 percentage point gender gap in participation. Moreover, the business environment in Morocco is seen as "unpredictable and bureaucratic" (World Bank, 2018). This constraints investment within the country despite several efforts to promote efficiency. Judiciary shortcomings and regulatory ambiguity—as well as poor competition, concentration issues, and corruption—represent strong impediments to doing business in Morocco.

In this paper, we expand on the literature of the distributional effects of trade by studying Morocco, a country for which there is scarce research on this topic. We explore the effect of trade policy on trade flows and effects on local labor market outcomes by addressing the following questions:

- First, has trade liberalization policy successfully boosted trade flows in Morocco? For this, we present gravity model estimates that show that most of Morocco's trade agreements have yielded better results and have been more productive than the average agreement.

- Second, do increasing exports improve local labor market outcomes? To answer this question, we use a "shift-share" analysis (following Bartik, 1991) to assess the distributional effects of trade at the district level on informality and FLFP. Our mixed results show that increasing exports has helped reduce informality but deterred FLFP.
- Finally, could firms' behavior in Morocco's local labor markets help explain the unexpected outcome that higher exports reduce informality but worsen FLFP? Our results show that while employment correlates with a firm's export sales, this positive result has concentrated in male labor-intensive rather than female labor-intensive firms.

We find in Morocco an example of a "divergent" economy; despite economic growth arising from trade liberalization, increased trade has had diverse effects on labor market outcomes. On the one hand, the informality rate decreased following an increase in exports. However, this increase in exports, in combination with both international conditions and local economic policies, has shifted the workforce from labor intensive towards capital intensive industries. This shift has deterred FLFP, creating an example in which local and external economic circumstances combined with trade openness do not necessarily translate into improving all labor market outcomes.

This paper is organized as follows. Section 2 provides a snapshot of Morocco's trade patterns and labor market outcomes to highlight its main challenges. Section 3 presents the gravity model employed to assess how trade policies affected trade flows. In section 4, we estimate how increasing exports affected local labor markets through our Bartik (1991) estimates. Section 5 builds from section 4 and presents a heterogeneous firm model analysis to explain the role that firm dynamics play in our mixed results from the shift-share analysis. Finally, section 6 concludes and provides some policy implications from our findings.

2. Trade Patterns and Labor Market Outcomes in Morocco

Trade Patterns

Morocco has signed nine trade agreements from 1988 to date (Table 2.1). The most important agreement is with the European Union—signed in 1996 and entered into force in 2000—accounting for nearly 70 percent of Morocco's total exports. After entry into force of this agreement, trade as a percentage of Moroccan GDP increased from 59.1 percent (26.8 percent from exports and 32.3 from imports) in 2000 to 87.1 percent (39.1 percent from exports and 48 percent from imports) (WITS, 2022).

Table 2.1: Several trade agreements have been signed in the recent decades.

Agreement Name	Coverage	Signature	Entry into force	Partners

Global System of Trade Preferences among Developing Countries (GSTP)	Goods	13/04/1988	19/04/1989	Several countries
Pan-Arab Free Trade Area (PAFTA)	Goods	19/02/1997	01/01/1998	MENA
EFTA Agreement	Goods	19/06/1997	01/12/1999	Iceland, Liechtenstein, Norway, Switzerland, Morocco
EU-Morocco	Goods	26/02/1996	01/03/2000	EU, Morocco
Morocco - United Arab Emirates	Goods	25/05/2001	09/07/2003	Morocco, United Arab Emirates
Turkey-Morocco	Goods	07/04/2004	01/01/2006	Morocco, Turkey
Unites States - Morocco	Goods	15/06/2004	01/01/2006	Morocco, United States of America
Agadir Agreement	Goods	25/02/2004	27/03/2007	Egypt, Jordan, Morocco, Tunisia
United Kingdom - Morocco	Goods	26/10/2019	01/01/2021	Morocco, United Kingdom

Source: World Trade Organization
(https://www.wto.org/english/thewto_e/countries_e/morocco_e.htm)

Following signing of these trade agreements, tariff rates fell considerably while trade openness increased. The mean tariff rate[2] in Morocco decreased from 45.4 percent in 1993 to 3.61 in 2020 (Figure 2.1). At the same time, trade openness (measured as the sum of imports and exports as a percentage of GDP) has almost doubled from 52.10 percent in 1993 to 87.14 percent in 2019, following a constant increasing trend except for the period after the 2008 crisis (Figure 2).

Figure 2.1. Tariff rates considerably declined

Moroccan tariff rate of all products in percentage

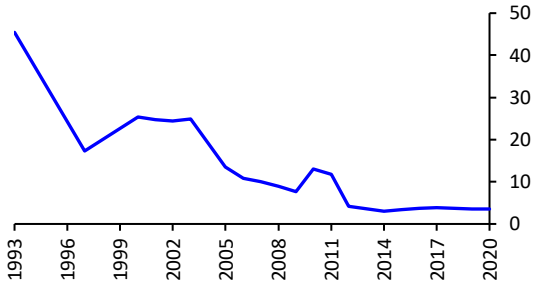
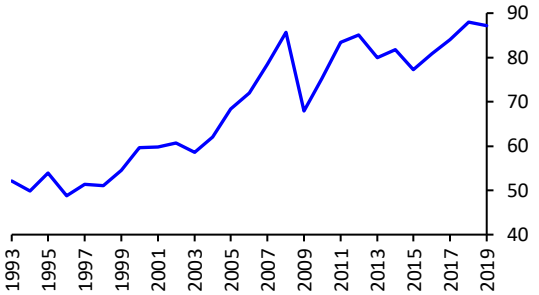


Figure 2.2. Trade openness almost doubled

Total trade as percentage of GDP



[2] Weighted mean applied tariff is the average of effectively applied rates weighted by the product import shares corresponding to each partner country.

Source: Authors' elaboration using data from Our World in Data (https://ourworldindata.org/)

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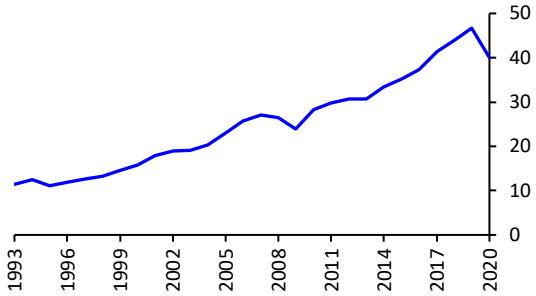
The Moroccan exporting sector has benefited from trade liberalization. Total exports increased 307 percent from 1993, with a decrease in 2020 due to the COVID-19 pandemic shocks (Figure 2.3). In the same time, the country's trade balance (exports minus imports) has remained negative and decreasing (Figure 4), in part reflecting high dependence on fossil fuels imports.

Figure 2.3. Exports benefited from openness

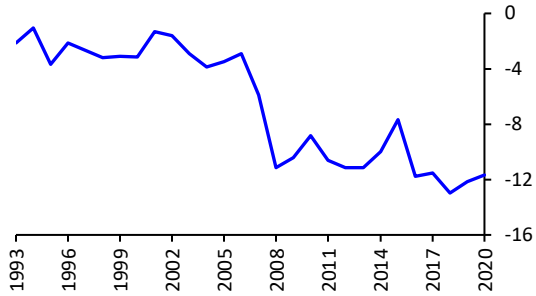
Exports of goods and services, billions 2015 US$



Source: Authors' elaboration using data from the World Development Indicators.

Figure 2.4. Trade balance remained negative

Trade balance, billions 2015 US$

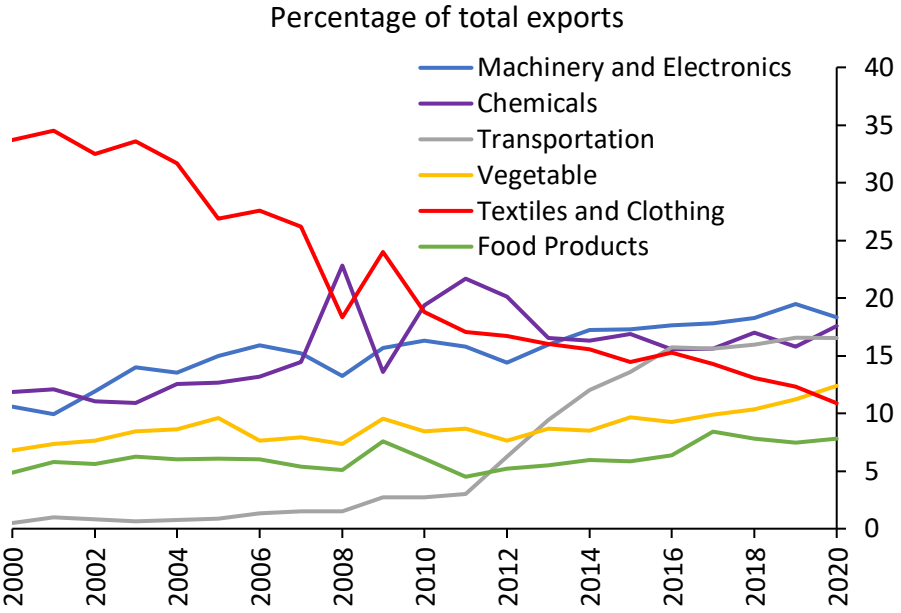


Source: Authors' elaboration using data from the World Development Indicators.

Morocco's trade basket remains undiversified both in terms of partners and products. In 2018, nearly 70 percent of Moroccan exports went to high-income countries. Its two main partners are France and Spain, accounting for 22 and 24 percent of total exports respectively. Between 2001 and 2019, Morocco increased the number of products it exported from 2,704 to 3,133 (WITS, 2022).

At the same time, trade patterns shifted from female labor-intensive to male capital-intensive industries in the past two decades. In 2000, Morocco was a textile and apparel sector exporting country—a sector typically characterized by a female workforce. Today, machinery and electronics, transportation, and chemicals have surpassed textiles in terms of share of total exports (Figure 2.5). This shift means typically labor-intensive and female-dominated industries lost share relative to other sectors that are mainly capital-intensive and employ male workers.

Figure 2.5: Share in total exports shifted from labor-intensive to capital-intensive industries



Source: Authors' elaboration using data from the World Integrated Trade Solutions (WITS).
Note: Product groups appear as reported by WITS.

Along with trade agreements, domestic industrial and economic policies and China's positioning as an export competitor to other developing economies have combined to change Morocco's composition of exports. First, the EU-Morocco trade agreement committed Morocco to reduce tariffs on imports of EU manufactured goods to zero, harming national production by creating incentives to import light manufactures. Moreover, the emergence of China as an export power, followed by the end of the multi-fiber agreement (MFA), meant greater competition in the European market, the most important destination for Moroccan exports, especially in textiles and apparel (Lopez-Acevedo & Robertson, 2012). This sector represented nearly 40 percent of Moroccan exports in 2000 but fell to 10.8 percent in 2020. At the same time, internal Moroccan policies incentivized foreign direct investment in specific capital-intensive sectors, such as transportation, machinery and electronics, which are predominantly male-intensive.

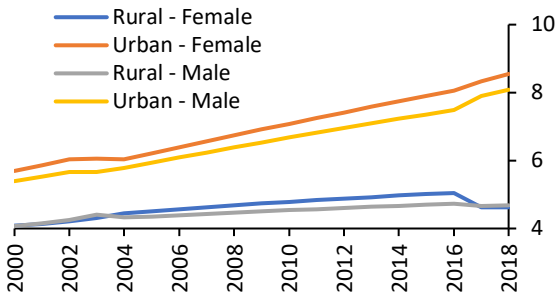
Labor Market Outcomes

Growth in Morocco's working age population[3] has not been offset by sufficient job creation. While the rural working age population increased 14.2 percent from 2000 to 2018 the urban working age population increased 49.9 percent, following the same trend for both genders (Figure 2.6). In terms of employment, rural employment has just increased in 1.9 percent, while urban employment has grown in 45.8 percent, mainly driven by jobs for men (Figure

[3] Defined as the population aged 15-99 years old.

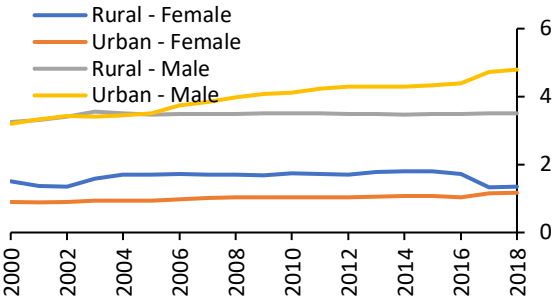
2.7). More drastically, while working age women increased 3.4 million, just 117,800 new jobs were created, increasing the gap between male and female employment.

Figure 2.6: Working age population has increased, especially in urban areas.
Millions of persons



Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

Figure 2.7: Employment growth has not kept the same growth pace
Millions of workers



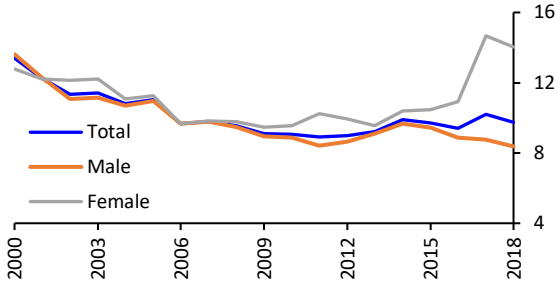
Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

At the same time, the labor market has failed bring to create new opportunities for a large number of women and youth to enter the workforce. Women constitute the majority of the inactive population along with unemployment is high, which hints that inactivity might be due to women being discouraged from working. Domestic duties and childcare are among the main reasons women report for not working (Lopez-Acevedo et al 2021b). For the youth aged 15-24, both inactivity and unemployment are high in comparison with other age groups. The not in education, employment or training (NEET) rate has remained among the highest in MENA, and those who were NEET in 2010 were still NEET even after 10 years (Alfani et al 2020).

Unemployment slightly decreased, especially among men before the COVID-19 pandemic.[4] Reaching an all-time low in 2011 of 8.91 percent, the unemployment rate declined from 13.4 percent in 2000 to 9.75 percent in 2018 (Figure 2.8). This decrease was driven mainly because of male unemployment rate, in contrast to the increase in female unemployment rate which reached a turning point in 2009 and has increased since then. Labor force participation rate is of special concern, especially among female population. Decreasing from 28 percent in 2000 to 22 percent in 2018, FLFP rate reflects this absence of urban job creation to absorb women, and thus the discouragement phenomenon previously mentioned (Figure 9)

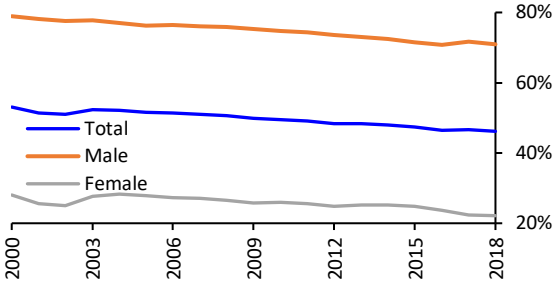
[4] Data from the Labor Force Survey is available from 2000 to 2018.

Figure 2.8: Unemployment rate has decreased for men, not for women
Percentage of the active population



Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

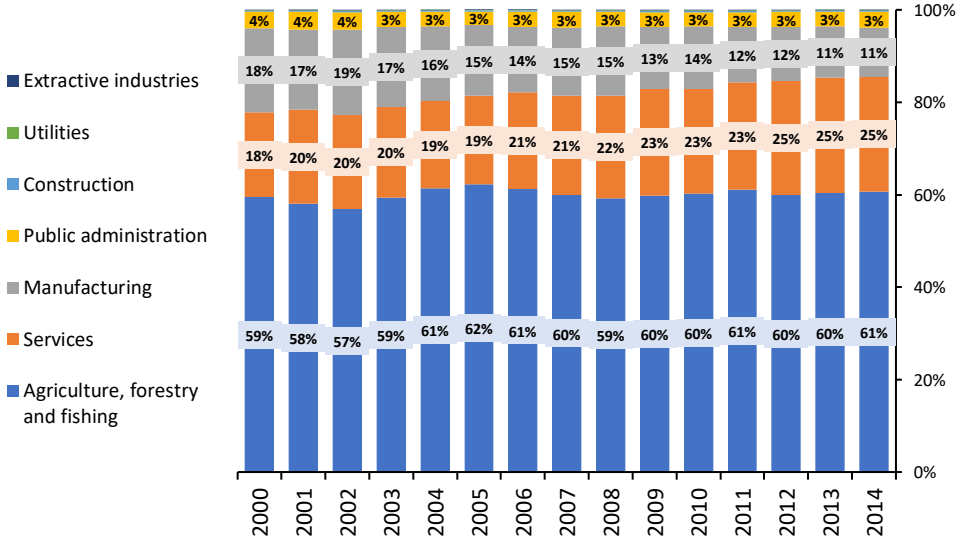
Figure 2.9: Labor force participation rates
Percentage of the working age population



Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

The sectorial distribution of female employment explains the declining FLFP rate. While in 2000, the manufacturing sector represented 18 percent of total female employment, in 2014 it accounted for just 11 percent (Figure 2.10), mainly a result of women losing jobs in the textiles and apparel sectors. This is atypical and contrary to economic theory in the sense that increases in trade should promote manufacturing (Artuc et al, 2019). For Morocco, female employment in agriculture remained about the same, while the share of women in the service sector overtook manufacturing. This reinforces the idea of premature deindustrialization in which urban job creation has not been enough to offset rural migration and increasing working age population. This has discouraged women from working while promoting male employment in just a few capital-intensive sectors.

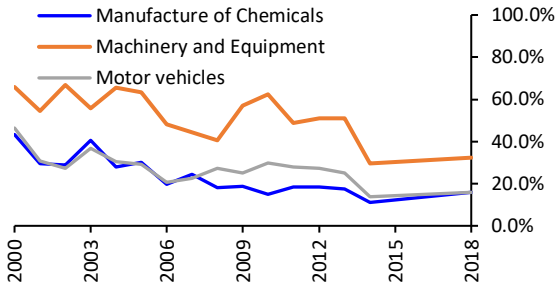
Figure 2.10: Share of manufacturing in female employment considerably decreased, while agriculture remained steady and services gained share
Percentage of female employment



Source: Estimates based on the Enquête Nationale sur l'Emploi (ENE; Labor Force Survey)

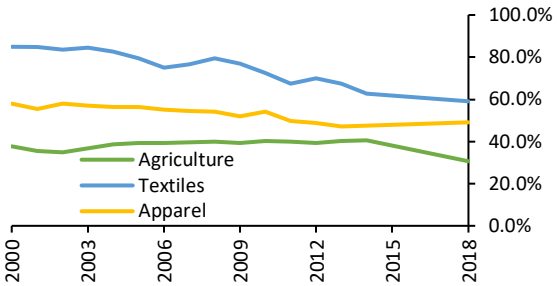
Labor market outcomes in Morocco reflect a unique circumstance in which trade shocks decrease FLFP[5] while helping lower informality.[6] For the past 15 years, both female and male labor force participation in Morocco decreased, in contrast to trends elsewhere following trade growth. At the same time, informality rates for both men and women decreased. These trends result in part from policies promoting formalization but deterring female participation in specific sectors. Informality rates in top exporting sectors (Figure 2.11) are relatively low compared to the overall informality rate of 74 percent in 2018. At the same time, the female share of employment is higher in industries losing the most jobs (Figure 2.12) compared to the 23 percent female share of employment in 2018.

Figure 2.11: Top exporting sectors have relatively lower informality rates
Percentage of workers



Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

Figure 2.12: Female share of employment in top job losing industries is relatively higher
Percentage of workers



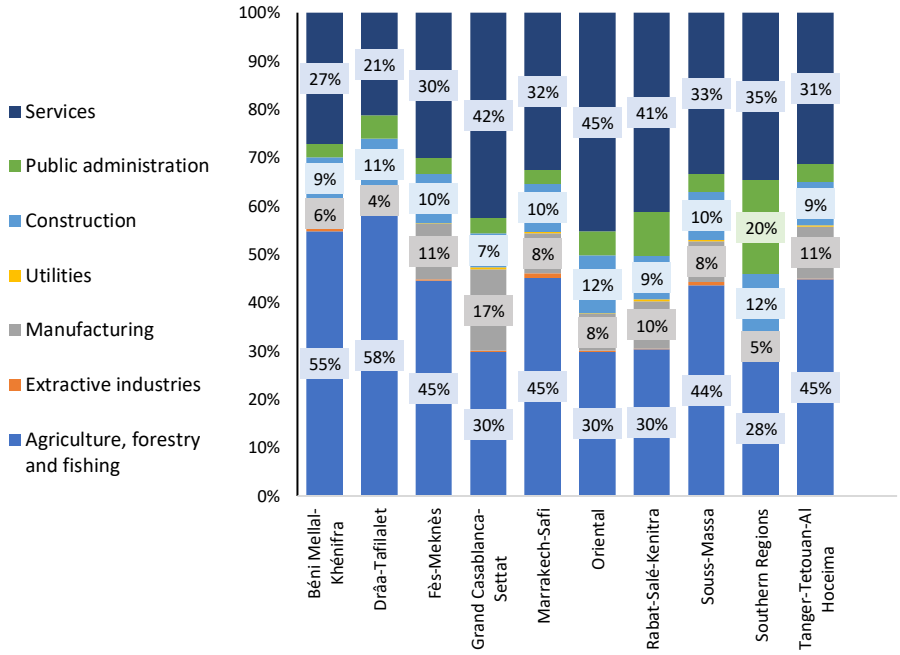
Source: Estimates based on the *Enquête Nationale sur l'Emploi* (ENE; Labor Force Survey)

Labor market variables differ depending on geography. Employment distribution varies across regions. For example, 58 percent of employment in Drâa-Tafilalet was in agricultural jobs in 2014, while in the Oriental region this share was just 30 percent while 45 percent was in services (Figure 2.13). At the same time, those regions with the highest shares in agricultural jobs (Béni Mellal-Khénifra, Drâa-Tafilalet, and Marrakech-Safi) have the lowest unemployment rates. The regions with the lowest female labor participation rates are also those with the highest unemployment (Oriental and Southern regions). The informality rate also varies across regions, with the southern regions having the lowest driven by its high employment share in public administration. It is not surprising that the informality rate in Drâa-Tafilalet is highest since most jobs there are in agriculture.

[5] Defined as the active population (employed and unemployed women) divided by the working age female population.
[6] Defined as the percentage of workers with access to social security.

Figure 2.13: Employment distribution varies across regions.

Percentage of total employment



Source: Estimates based on the Enquête Nationale sur l'Emploi (ENE; Labor Force Survey)

3. Gravity Analysis

Overview of the Approach

The gravity model of international trade is the most used empirical tool used by economists to estimate the contribution of various factors to bilateral international trade flows. Tinbergen (1962) proposed this model to illustrate the asymmetry of global trade flows. Trade flows between two countries are modeled as functions of each country's size (GDP or GDP per capita), the distance between them, and trade costs. Trade costs might include a wide range of variables, including bilateral, multilateral, and regional trade agreements. Comparing change in trade after a particular trade agreement while controlling for other variables often found in gravity models is one way to estimate either the effectiveness of trade agreements or the relative importance of policies and trade costs not included in an agreement (Chaney, 2018).

The most common method in gravity model estimation for many years applied Ordinary Least Squares (OLS) to a log-linearized form of the gravity model. More recently, academic discussion around possible biases in OLS parameters and the presence of heteroskedasticity, as well as the fact that many country pairs do not trade at all, have raised concerns around this method. To tackle these issues, newer gravity models have integrated the Poisson Pseudo Maximum Likelihood (PPML) estimator, which effectively handles heteroskedasticity when there are numerous zero values in the dependent variable. Scholars, such as Silva and Tenreyro (2011) comparing the Poisson Pseudo

Maximum Likelihood (PPML) and Gamma Pseudo Maximum Likelihood (GPML) methods have found that the PPML estimator is generally reliable even in scenarios where the dependent variable contains a significant number of zeros.

For this paper, we follow the Poisson Pseudo Maximum Likelihood with High-Dimensional Fixed Effects (PPMLHDFE) methodology proposed by Correa, Guimarães, and Zylkin (2020). The estimator proposed in their methodology is robust to statistical separation and convergence issues and corrects potential biases arising from country specific time trends and other parameters included in the model.

The following equation represents the model used in this paper:

$$y_{i,j,t} = \beta_{RTA}^{k} RTA_{i,j,k,t} + \beta_{RTA}^{l} RTA_{i,j,l,\,t} + \mu_{i,j} + \tau_{i,t} + \delta_{j,t} + \epsilon_{i,j,t} \qquad (1)$$

In equation (1):

$y_{i,j,t}$ = Pairwise trade between country i and county j in time t

$\beta_{RTA}^{k} RTA_{i,j,k,t}$ = Agreement specific effect on total trade

$\beta_{RTA}^{l} RTA_{i,j,l,\,t}$ = Average effect of all other RTAs, excluding the specific agreement

The rest of the variables are comprised of country specific time trends and other parameters employed in the estimation for purposes of model calibration.

Data

Our analysis uses data that combines bilateral trade flows, distance, trade facilitation measures, cultural proximity, and macro indicators from the UN Comtrade database, the World Integrated Trade Solutions (WITS), and the World trade Organization (WTO), following Robertson and Abreha (2023). In total, this data comprises:

- 232 exporters
- 179 importers
- 262 Regional Trade Agreements
- Over 1 million observations

This dataset is merged with the Handbook of Deep Trade Agreements by Matoo, Rocha, and Ruta (2020) database, which presents detailed data on the content of policy areas frequently covered in Preferential Trade Agreements covering objectives, commitments, procedures, enforcement and provisions.

For this specific paper, the results reported are for only those of the seven RTAs in which Morocco is a partner and the data described is available.

Results

Table 3.1 below contains the baseline gravity model results. Each row represents a single trade agreement. The β^k coefficients represents the effect on trade flows of the specific agreement and β^l coefficients represent the average effect of all other RTAS in total trade flows excluding the one stated on each row respectively.

Table 3.1 Baseline Gravity Estimates (Total Trade)

Trade Agreement	Coefficients		Bias corrected[1/]	
	β^k	β^l	β^k	β^l
Agadir Agreement	0.365	0.150	0.361	0.144
	(0.211)	(0.053)	(0.243)	(0.058)
EFTA - Morocco	0.161	0.150	0.169	0.144
	(0.28)	(0.053)	(0.361)	(0.058)
EU - Morocco	0.164	0.150	0.182	0.144
	(0.147)	(0.053)	(0.272)	(0.058)
Pan-Arab Free Trade Area (PAFTA)	0.342	0.150	0.333	0.144
	(0.116)	(0.053)	(0.143)	(0.058)
Turkey - Morocco	0.471	0.150	0.487	0.144
	(0.254)	(0.053)	(0.371)	(0.058)
United States - Morocco	0.100	0.150	0.137	0.144
	(0.152)	(0.053)	(0.231)	(0.058)
Global System of Trade Preferences among Developing Countries (GSTP)	-0.090	0.144	-0.105	0.138
	(0.075)	(0.054)	(0.092)	(0.059)

1/ This estimator from Correia, Guimaraes and Zylkin (2019) adds robustness by correcting the potential biases arising from country specific time trends and other parameters in the model.
Note: Standard errors in parenthesis.

As observed in most cases, the specific trade agreement coefficient β^k is larger than the one of the average trade agreement β^l. This can be interpreted as meaning that Moroccan trade agreements are more productive than the average agreement in terms of increasing trade flows. At the same time, all β^l coefficients lie in a range between 10 and 20 percent, consistent with the literature.

Notably, the results for the Global System of Trade Preferences among Developing Countries (GSTP) are negative, meaning a decrease of around 9 percent in trade flows after entry into force. It is good news that the trade agreement between the European Union, which accounts for most of Moroccan exports share, is positive and has a positive effect of around 18 percent in trade flows, larger than the average effect of around 14 percent for all other agreements. It is also important that those trade agreements whose members are geographically closest to Morocco have doubled (Agadir Agreement and PAFTA) and even

tripled (Turkey – Morocco) the results of the average trade agreement in terms of increasing trade flows.

Table 3.2 shows the baseline gravity model results for trade in apparel. These results are similar in direction, with the GSTP the only RTA with a negative coefficient, but very different in magnitude to those of total trade. The Moroccan apparel sector has greatly benefitted from RTAs such as with the EFTA, the Agadir Agreement, and with Turkey, each with increases of more than 1,000 percent after entry into force. These results are surprising given that apparel sector has lost the most participation in total exports share in the period of study for this paper.

Table 3.2 Baseline Gravity Estimates (Trade in apparel)

Trade Agreement	Coefficients		Bias corrected[1/]	
	β^k	β^l	β^k	β^l
Agadir Agreement	1.413	0.067	1.537	0.069
	(0.347)	(0.137)	(0.442)	(0.14)
EFTA - Morocco	2.176	0.067	2.201	0.069
	(0.345)	(0.137)	(0.58)	(0.14)
EU - Morocco	0.252	0.060	0.223	0.064
	(0.28)	(0.142)	(0.451)	(0.142)
Pan-Arab Free Trade Area (PAFTA)	0.462	0.066	0.215	0.069
	(0.201)	(0.137)	(0.385)	(0.141)
Turkey - Morocco	1.724	0.066	1.786	0.069
	(0.301)	(0.137)	(0.599)	(0.141)
United States - Morocco	0.275	0.067	0.322	0.069
	(0.19)	(0.137)	(0.374)	(0.14)
Global System of Trade Preferences among Developing Countries (GSTP)	-0.439	0.056	-0.527	0.057
	(0.264)	(0.139)	(0.454)	(0.139)

1/ This estimator from Correia, Guimaraes and Zylkin (2019) adds robustness by correcting the potential biases arising from country specific time trends and other parameters in the model. Cells in blank were not able to be computed by the model

Note: Standard errors in parenthesis.

Finally, Table 3.3 shows the coefficients for the model considering trade in the furniture sector. This provides a benchmark to compare trade effects on two different sectors. The coefficients of this model show mixed results: only the trade agreements with the European Union and the Pan-Arab Free Trade Area show consistently greater than average effects on trade flows. Others, such as the agreement with the U.S. and the Agadir Agreement, have decreased trade in the furniture sector.

Table 3.3: Baseline Gravity Estimates (Trade in furniture)

Trade Agreement	Coefficients		Bias corrected[1/]	
	β^k	β^l	β^k	β^l
Agadir Agreement	-0.601	0.249	-0.670	0.206
	(0.59)	(0.132)	(0.818)	(0.125)
EFTA - Morocco	0.082	0.249	-0.035	0.206
	(0.416)	(0.132)	(0.695)	(0.125)
EU - Morocco	0.352	0.249	0.400	0.206
	(0.283)	(0.133)	(1.013)	(0.126)
Pan-Arab Free Trade Area (PAFTA)	0.718	0.248	0.692	0.204
	(0.184)	(0.133)	(0.305)	(0.126)
Turkey - Morocco	0.251	0.249	0.460	0.206
	(0.239)	(0.132)	(0.723)	(0.125)
United States - Morocco	-1.544	0.249	-1.383	0.207
	(0.347)	(0.132)	(0.593)	(0.125)
Global System of Trade Preferences among Developing Countries (GSTP)	0.099	0.099	0.140	0.209
	(0.124)	(0.134)	(0.18)	(0.127)

1/ This estimator from Correia, Guimaraes and Zylkin (2019) adds robustness by correcting the potential biases arising from country specific time trends and other parameters in the model.
Note: Standard errors in parenthesis.

The main takeaway of these results is that trade agreements in Morocco have accomplished the goal of boosting trade flows. While sector-specific results vary, most of RTAs in Morocco have increased total trade between countries, as theory predicts, and that these effects have been greater than the average trade agreement. The next section builds on these results by exploring how the increase in trade flows affected local labor market outcomes.

4. Shift-Share (Bartik) Analysis

Overview of the Approach

In this paper, we use a shift-share model that assesses the effect of trade on Morocco's local labor market outcomes. Following Bartik (1991) approach, we estimate how increases in exports per worker (trade exposure index) affects informality and female labor participation rates at the province level.

We estimate the following equation:

$$y_{t+n}^d - y_t^d = \beta_0 + \beta_1 x_{t,t+n}^d + X_c{}'\beta_c + \epsilon_d, \quad (2)$$

In equation (2):

$y_{t+n}^d - y_t^d$ is the change in the dependent variable (informality and FLFP rates)
$x_{t,t+n}^d$ is the change in the export exposure index (change in exports from Morocco to the OECD weighted by sectoral employment)

X_c: control variables (y_t^d to control for trends)

We instrument the trade exposure index following the following assumption from Artuc (2019):

Local market conditions in a district of Morocco do not affect total OECD imports from other countries (excluding Morocco). Thus, if exports of a given district in Morocco show a correlation to total OECD imports, we attribute it to a shock originating from OECD countries—which account for more than 75 percent of Moroccan exports—rather than a shock from the given district.

Given this, the trade exposure index is instrumented as follows:

$$x_{t,t+n}^d = \pi_0 + \pi_1 z_{t,t+n}^d + X_c{}'\pi_c + e_d, \quad (3)$$

In equation (3):

$z_{t,t+n}^d$ are predicted values from time-series regressions of Morocco's exports to the OECD on the OECD GDP by industry, as a proxy for Moroccan exports to the OECD purely solely explained by external aggregate demand.

Data

The Bartik analysis draws on labor market indicators from the *Enquête Nationale sur l'Emploi* (Labor Force Survey, LFS) and on trade flows from the United Nations UN COMTRADE database. The LFS, a nationally representative survey conducted by the *Haut Commisariat au Plan*, includes detailed information on the active population's main demographic and professional characteristics, enabling the study of Moroccan labor market trends. It provides employment, formality, and participation data from 2000 to 2018.

The lack of homogeneous regional variables over time constraints some analysis from the LFS. Only 10 regions can be homogenized across the entire 2000-2018 period, a low number of observations for econometric analysis. LFS's "province" variable for the period between 2000 and 2009 contains 60 consistent observations, and so our analysis relies on these (excluding 2009 because of post-crisis shocks). The LFS also lacks industry codes for 2015-2017 and has a different classification system in 2018.

Annual bilateral trade flows data from 2000 to 2018 come from the UN Comtrade database. This analysis focuses on Moroccan exports, or its analogous world imports of the rest of the world from Morocco. We merge this trade data with labor market indicators using the concordance between ISIC rev 3.1 (from the LFS) and HS0 – 1988/92 trade classification (used by UN COMTRADE).

Results

Informality

An increase in exports per worker in Morocco decreases informality**.** Results show that increasing exports reduced informality rates from 2000 to 2004, a correlation that dissipates somewhat from 2000 to 2008. An increase of US$100 in exports per worker led to a decrease of 0.9 percentage points in informality in the first period and 0.6 percentage points in the second period in provinces with higher exposure to trade. These results are statistically significant and apply for all kind of workers (Table 5).

Table 4.1: Estimated effect on informality rate from a US$ 100 increase in exports per worker in Morocco

Type of worker		Exports	
		2000-2004	2000-2008
All	Coefficient	-0.009**	-0.006**
	Z-statistic	(-2.16)	(-2.31)
	N	60	60
Males	Coefficient	-0.007**	-0.005***
	Z-statistic	(-2.05)	(-2.90)
	N	60	60
Females	Coefficient	-0.016**	-0.007
	Z-statistic	(-2.14)	(-1.46)
	N	59	58
Low Skill	Coefficient	-0.010***	-0.005***
	Z-statistic	(-2.59)	(-2602)
	N	60	60
High Skill	Coefficient	-0.010	-0.007***
	Z-statistic	(-1.60)	(-3.49)
	N	45	45
Young	Coefficient	-0.014***	-0.006***
	Z-statistic	(-2.86)	(-2.62)
	N	60	59
Old	Coefficient	-0.006	-0.005**
	Z-statistic	(-1.44)	(-2.07)
	N	60	60
Rural	Coefficient	-0.005	-0.003**
	Z-statistic	(-1.48)	(-2.39)
	N	53	53
Urban	Coefficient	-0.010***	-0.007***
	Z-statistic	(-3.48)	(-2.90)
	N	58	58

***p < 0.01 **p < 0.05 *p < 0.10

Female Labor Force Participation (FLFP)

An increase in exports per worker decreases the FLFP rate. An increase in US$100 exports per worker decreased FLFP by 0.32 percentage points from 2000 to 2004 and 0.27 percent in 2000-2008 in provinces more exposed to trade. Although unexpected given the standard belief that trade promotes FLFP, these findings are consistent with trade and labor market patterns of decreasing participation due to specialization of capital and male-intensive industries in Morocco presented on previous sections (Table 4.2).

Table 4.2: Estimated effect on the FLFP rate of a US$ 100 increase in exports per worker in Morocco

Type of worker		Exports	
		2000-2004	2000-2008
All	Coefficient	-0.0032*	-0.0027***
	Z-statistic	(-1.91)	(-2.90)
	N	60	60
Low Skill	Coefficient	-0.0032*	-0.0027***
	Z-statistic	(-1.88)	(-2.88)
	N	60	60
High Skill	Coefficient	-0.0031**	-0.0017**
	Z-statistic	(-2.11)	(-2.66)
	N	57	56
Young	Coefficient	-0.0033*	-0.0027***
	Z-statistic	(-1.87)	(-2.83)
	N	60	60
Old	Coefficient	-0.0031**	-0.0027***
	Z-statistic	(-1.97)	(-3.01)
	N	60	60
Rural	Coefficient	-0.0038	-0.0020
	Z-statistic	(-0.74)	(-1.42)
	N	53	53
Urban	Coefficient	-0.0025	-0.0019***
	Z-statistic	(-1.63)	(-2.75)
	N	58	58

***p < 0.01 **p < 0.05 *p < 0.10

In sum, the increase in trade due to trade policies over the last decade has led to various results terms of local labor market outcomes. On one hand, while increasing exports per worker increased formalization, as expected, this did not increase the FLFP rate. This is due to a combination of local and external conditions. These findings, in contrast to what economic trade theory suggests, reflects the trade and labor market trends presented at the beginning part of this paper.

5. Heterogenous Firm Model

Overview of the Approach

To complement the shift-share analysis, this section estimates the relationship between exports and firm-level labor market outcomes. The relationship between exports and employment might depend on differences in firms. For instance, simple models comparing firm heterogeneity with exports suggest that changes in employment concentrate along the extensive margin—that is, because of new firms entering export markets. We therefore draw upon the rich firm-level data available to complement our analysis.

The rationale is the following: For exports to increase FLFP, female-intensive firms need to either enter the export market or increase production. Two-sector trade models with heterogeneous firms and differences in factor intensity across sectors (Bernard et al. 2011) predict that rising export demand in one sector will increase demand for the workers intensively employed in that sector throughout the economy. While most manufacturing exports tend to be male-intensive, exports from female-intensive sectors could increase demand for women and expand female employment.

For exports to contribute to rising FLFP, however, exports must increase demand for women's labor more than demand for men's, which implies that exports of female-intensive goods will only increase FLFP if rising exports represent an increase in labor demand and are a significant fraction of economic activity. In Morocco, however, male-intensive exports have increased relative to female-intensive sectors due to a combination of internal and external factors, such as higher international prices for capital-intensive goods, incentives to promote capital-intensive industries, and rising competition in the female-intensive apparel sector.

We draw upon the simplified general equilibrium by Melitz (2003) used in Berg et al (2022), which considers:

A "reserve" sector a, where firms are homogeneous and produce using only labor with decreasing returns-to-scale technology:

$$l_a = f(\kappa, \lambda, w) \tag{4}$$

The parameters κ and λ characterize the labor demand function, and firms are assumed to be small and take the market wage *w* as given.

An "exporting" sector which is heterogeneous and firms are differentiated by a firm-specific productivity parameter φ.

After entry into the market, the firm-specific productivity parameter φ is first revealed (thus it is unknown prior to entry). The ex-ante productivity parameter distribution is described by $g(\bar{\varphi}, \sigma_{\varphi}^2)$. In practice, we assume that the productivity parameter is drawn from an exponential distribution.[7] For simplicity, assume that production is a function of labor l_j and can be represented as $Q = \gamma l_j^{\alpha}$, in which $j \in (a, b)$ indicates the subsector, γ represents total factor productivity (TFP), and α (restricted to be a positive value less than 1) ensures decreasing marginal productivity of labor.

If firms are small, as we assume for the first sector that they can affect neither the wage paid to labor *w* nor the domestic market price P_d. Any production (for either the domestic or export market) requires a fixed cost F_d.[8] By allowing the productivity parameter to enter the cost function, we can represent ex ante profits with the simple profit function:

$$\pi = P_d Q - \frac{wl}{\varphi} - F_d \tag{5}$$

Note that the profit-maximizing level of *l* is uniquely defined by P_d, φ, *w*, γ, and α. Perhaps trivially, the output price, TFP, and the individual-specific productivity parameter are positively correlated with firm-level labor demand. Using the asterisk to represent the optimal solution to the profit-maximization problem implied in equation (5), optimal labor demand is represented as:

$$l_j^* = \left(\frac{w}{P_d \alpha \gamma \varphi}\right)^{\frac{1}{\alpha - 1}} \tag{6}$$

Note that equation (6) shows that more-productive firms (higher values of φ) will be larger in the sense of having higher employment, production, and profits.

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[7] Note that the exponential distribution is closely related to the Pareto distribution. For example, if *x* follows a Pareto distribution with a minimum of *a*, then *y* = log(*x*/*a*) (Halliday, Lederman, and Robertson 2018).

[8] In other models, Bernard, Jensen, and Schott (2009) for example, the fixed cost becomes part of labor demand. Our model simplifies this by assuming fixed costs to be a pure loss. This implies that the economy's equilibrium is characterized by a small but constant trade surplus that covers its fixed costs. The conclusions of the model would not be affected if the fixed costs were instead distributed among all the workers (Halliday, Lederman, and Robertson 2007).

Equation (5) also shows that profits must be at least as large as F_d for the firm to produce a positive amount of output. Otherwise, the firm will shut down and produce nothing. Since profits are higher for higher values of φ, the model generates a cutoff value for φ that separates firms that produce from those that do not. When firms leave the market, average productivity levels increase because the lowest-productivity firms chose to exit the market.

In addition to producing, firms in the heterogeneous sector also have the opportunity to export. Exporting, however, requires an additional fixed cost, F_x. That is, to consider exporting, firms must first be viable domestic producers because international transportation is costly. A common assumption is that $Q\tau$ (τ>1) goods must be exported for the quantity Q to arrive Under these conditions, exporting firms sell their goods for a higher price abroad than they would receive in the domestic market. In practice, the export price (P_x) is represented as a fixed markup over the domestic price. Specifically, $P_x = \tau P_d$.

The markup is related to foreign tariffs as well (τ = premium/tariff). Foreign tariffs are negatively related to the price exporters receive, and as tariffs increase, exports fall. Trade agreements decrease foreign tariffs and therefore increase the price exporters receive. As a result, we model the effects of trade agreements by raising the export price in the model. Under these conditions, firms will choose to export if:

$$P_x Q - \frac{wl}{\varphi} - F_d - F_x > P_d Q - \frac{wl}{\varphi} - F_d > 0 \tag{7}$$

A key result of the model is that exporters will be more productive, larger, and have higher profits than firms in the heterogeneous sector that produce for the domestic market.

In this model, general equilibrium means that wages, which are exogenous to individual firms, are determined by labor demand in the two sectors. Without social insurance, the economy is assumed to be characterized by full employment, meaning that all workers have to find work somewhere—that is, in either of our two sectors—or they will have no income. Assuming no labor market adjustment costs, workers move freely between sectors to earn the highest wages. Free mobility between sectors implies that, in equilibrium, (base) wages will equalize between sectors. As in the Melitz (2003) model, total labor supply (L) is perfectly inelastic. Because our focus is mainly on trade agreements, and because the first sector is the reserve sector, we represent employment in the reserve sector to be total employment minus employment in the heterogeneous export sector:

$$l_a = L - l_b \tag{8}$$

Total employment in each sector is equal to the sum of each firm's employment. Because each firm in the export sector is unique (owing to a unique productivity parameter), each

firm has a different level of employment. In the reserve sector, all firms are identical and total employment is simply the sum across all firms.

Formally:

$$l_j = \Sigma_i l_{ij} \tag{9}$$

in which $j \in (a,b)$ and individual firms are indexed with *i.* Because firms are homogeneous in the reserve sector, aggregate labor demand can be represented by a single labor demand function and all workers receive the same labor income. Given small heterogeneous firms in the export sector; small, homogenous firms in the second sector; and perfect mobility between plants and sectors, aggregate labor market determines wages, which equalize across sectors.

Data

We use the World Bank Enterprise Surveys (ES) to evaluate the link between exports and employment at the firm level. The ES are representative samples of an economy's private-sector firms based on interviews with business owners and top managers about several topics, including trade and employment. In Morocco, ESs conducted in 2007, 2013, and 2019[9] cover businesses from manufacturing, construction, motor vehicle sales and repair, wholesale, retail, hotels and restaurants, storage, transportation, communications, and IT sectors. They only consider firms with more than five workers, and a minimum of 1 percent of private ownership.[10]

The ES reflect significant firm-level heterogeneity in Morocco. From the 1,096 interviewed firms in 2019, 28 percent were large (307 firms), 35 percent medium (384 firms), and 37 percent small (405 firms). By sector, 11 percent operate in the food sector, 16 percent in garments, 16 percent in other manufacturing, 17 percent in retail, and 41 percent in other services. In fact, 63 percent of firms have been in operation less than 20 years. Regarding international trade, only 20 percent of firms export more than 10 percent of their sales directly, compared with the MENA average of only 17 percent. While the proportion of firms that use foreign inputs for production is 42 percent, it is considerably lower than the average 64 percent for the MENA region.

Results

Results (Appendix A) show that there is significant variation across firms – both exporters and those that sell only to the domestic market in terms of sales and employees. The model

[9] For the evolution of the same firms (panel) we analyze the trends from 2013 to 2019.

[10] They exclude firms from agriculture, fishing, mining, public utilities, financial intermediation, public administration, education, health, and social work. They do not consider either business with less than five workers, informal firms, and 100% state-owned firms.

suggests that firm-level productivity differences explain these results. Many factors correlate with firm-level productivity. To understand differences across firms, we first estimate the firm´s probability of being an exporter conditional on several variables: the value of assets, technology, global integration, female intensity, innovation, age, and formality. We then estimate the conditional relationship (holding these factors constant) between exporter status, export sales, and employment.

The probability of being an exporter increases with firm age, innovation, formality status (being in the formal or informal sector), and global integration (foreign participation, foreign technology usage, and using imported inputs). We apply a probit model to measure factors that determine the probability of being an exporter. The probit model has a binary dependent variable that takes the value "1" when the firm is an exporter and zero otherwise. For independent variables, we constructed proxies for several factors commonly mentioned in the literature using the ES information.

Column 1 of Table 5.1 presents a model for the probability of being an exporter, considering only the dummies for female intensity, region, and years. We focus specifically on female intensity to establish a benchmark for later analysis. As illustrated, the association between female-intensive firms and exports tends to be negative, although not statistically significant. The results from column 2 show that the probability of exporting is higher among firms that have foreign participation in assets and use imported inputs—factors associated with firm-level productivity. A firm is also more likely to export if it started in the formal sector, which might indicate a lower fixed cost of exporting if formality comes with any government support (for instance, technical assistance). Results also show that the probability of exporting is higher for older firms, possibly due to market and production experience. Once controlling for other factors related to global integration, value of assets, foreign technology, and others, being female labor-intensive becomes positive and statistically significant at a 99 percent confidence level. This might mean that female-labor intensive firms would be more eager to export if they have similar characteristics in terms of experience, capital, and foreign participation.

Table 5.1: Probit: Marginal Effect of Extensive Margin

Dependent Variable: Exporter (yes =1)		
	(1)	(2)
VARIABLES		
New products (yes=1)		-0.042
		(-0.14)
Value of machinery[1/]		-0.015
		(-0.67)
Cost per worker[1/]		0.083
		(0.96)
Firms' age[1/]		0.493**
		(2.24)
Foreign ownership (yes=1)		0.866***
		(2.96)

Registered at the beginning (yes=1)		1.749***
		(2.67)
Foreign technology (yes=1)		0.088
		(0.25)
Imported inputs (yes=1)		1.572***
		(5.50)
Female labor intensity (yes=1)	-0.185	0.777***
	(-0.86)	(2.88)
Year dummies	Yes	Yes
Sector dummies	No	Yes
Region dummies	Yes	Yes
Constant	-0.308	-4.408***
	(-1.36)	(-3.01)
Observations	240	236

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Column 1 include only dummies for female-intensity, year, sector, and region.

To contrast the relationship between exporting and employment between the cross-section and the time-series, we apply two models using the panel dataset. Table 5.2 shows the results. The dependent variable in both models is total employment, while the independent variables are the same as above.

Column 1 (the "cross-section" results) shows that exporters, older firms, and firms that use foreign technology tend to be larger in the cross-section. Female-intensive firms tend to the smaller, holding all else constant. In column 2, we focus on the "time-series" firm results, which show the firm characteristics associated with employment growth over time. Column 2 shows that exporters tend to grow slightly more in terms of employment than non-exporters. More capital and lower labor costs are also associated with employment growth, which is not surprising. None of the other explanatory variables seem to be significantly related with employment growth because they explain exporter status in the cross-section.

Table 5.2: Estimated Results of Employment and Export Status

Dependent Variable: Total Employment [1/]

VARIABLES	(1) Cross Section	(2) Time Series
Exporter (yes=1)	1.026**	0.222*
	(2.30)	(1.66)
Value of machinery [1/]	0.045	0.040***
	(1.43)	(3.16)
Cost per worker [1/]	-0.029	-0.084**
	(-0.25)	(-2.14)
Firms' age [1/]	0.567**	-0.135
	(2.28)	(-1.36)
Foreign ownership (yes=1)	0.232	0.192
	(0.52)	(1.13)
Registered at the beginning (yes=1)	-0.061	-0.086
	(-0.10)	(-0.44)
Foreign technology (yes=1)	0.998**	0.025
	(2.37)	(0.13)
Imported inputs (yes=1)	-0.108	-0.210
	(-0.25)	(-1.27)
Female intensity (yes=1)	-1.067***	0.037
	(-2.68)	(0.36)
Constant	1.127	4.886***
	(0.72)	(8.34)
Year Dummies	No	Yes
Region Dummies	Yes	No
Sector Dummies	Yes	No
Observations	252	252
R-squared	0.480	0.148
Number of panelid	126	126

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: FE refers to Fixed Effects.

[1/]Measured in logarithms.

We apply two other models to measure the relationship between the amount of export sales on firm employment. The models in Table 5.3 are similar to Table 5.2, but include real export sales instead of the exporter dummy. As we would expect, results show a positive correlation between export sales and employment given that firms that export most are generally the largest.

Column 2 shows that exporters have a limited employment response to increases in exports, which is also consistent with the model presented in Appendix Figure A.2. As in Table 5.2, the other explanatory variables associated with firm-level technology correlate with exports in the cross-section, but not in the time-series. This is because technology determines export status more than exporters adjust employment in response to rising exports.

Table 5.3: Estimated Results of Employment and Export Sales

Dependent Variable: Total Employment [1/]		
	(1)	(2)
VARIABLES	Cross-section	Time-series
Export sales[1/]	0.083***	0.017*
	(3.15)	(1.87)
Value of machinery[1/]	0.043	0.040***
	(1.40)	(3.18)
Cost per worker[1/]	-0.036	-0.088**
	(-0.32)	(-2.19)
Firms' age[1/]	0.502**	-0.133
	(2.04)	(-1.36)
Foreign ownership (yes=1)	0.129	0.181
	(0.29)	(1.07)
Registered at the beginning (yes=1)	-0.021	-0.096
	(-0.04)	(-0.50)
Foreign technology (yes=1)	0.896**	0.023
	(2.16)	(0.12)
Imported inputs (yes=1)	-0.190	-0.214
	(-0.46)	(-1.30)
Female intensity (yes=1)	-1.057***	0.034
	(-2.74)	(0.33)
Constant		-0.015
		(-0.16)
Year Dummies	No	Yes
Region Dummies	Yes	No
Sector Dummies	Yes	No
Observations	(0.87)	(8.38)
R-squared		
Number of panelid	252	252

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: FE refers to Fixed Effects.
[1/]Measured in logarithms.

The main takeaway from the results from this model is that while employment positively correlates with a firm's exports sales, increasing employment from exports has concentrated in male labor-intensive rather than female labor-intensive firms.

6. Conclusions

Global literature over the past two decades associates trade openness with reduced poverty and inequality and increased economic growth across developing countries. In the case of Morocco, economic progress—in part fueled by trade liberalization and resulting increase in trade— has been significant in the last two decades. However, this economic growth has not created enough jobs to offset the increase in population, nor to improve some important labor market outcomes.

We expand on the literature about distributional repercussions of trade by studying a data-constrained country for which scarce research has been conducted. We analyzed Morocco's case from three complementary perspectives to answer the following questions:

- Has trade liberalization policy boosted trade flows in Morocco?
- Does an increase in exports produce better local labor market outcomes?
- Could differences in Morocco's firms help explain an unexpected outcome—that higher exports reduce informality but decrease the FLFP rate?

Our results show that Morocco's trade agreements have mostly yielded better results than the average trade agreement. However, increases in trade flows have led to mixed results in the local labor market: informality rates decrease as exports increase, but FLFP decreases. Our firm analysis confirms these results by showing that employment correlates with a firm's exports sales, but increasing employment from exports concentrates in male labor-intensive rather than female labor-intensive firms.

Morocco is an example of an economy where both internal factors, such as industrial policies, and external factors, such as trade agreements and export competition, have boosted trade flows. But Morocco is a case where light manufacturing, such as the apparel and textiles sectors, have been left in behind, unlike the well-documented cases of countries where trade promoted apparel, and hence, female labor participation. This provides important lessons for policy makers to consider when promoting capital-intensive sectors in developing countries without also supporting female-intensive industries.

Labor-abundant countries might want to provide incentives to labor-intensive industries rather than only supporting capital-intensive ones—especially in industries where women typically perform the labor-intensive jobs. It is important to note that we focus mainly on the labor demand side. Policies related to the supply side should also be weighed to create incentives for females to join the labor force, such as policies adressing social norms, regulation, and barriers to job mobility.

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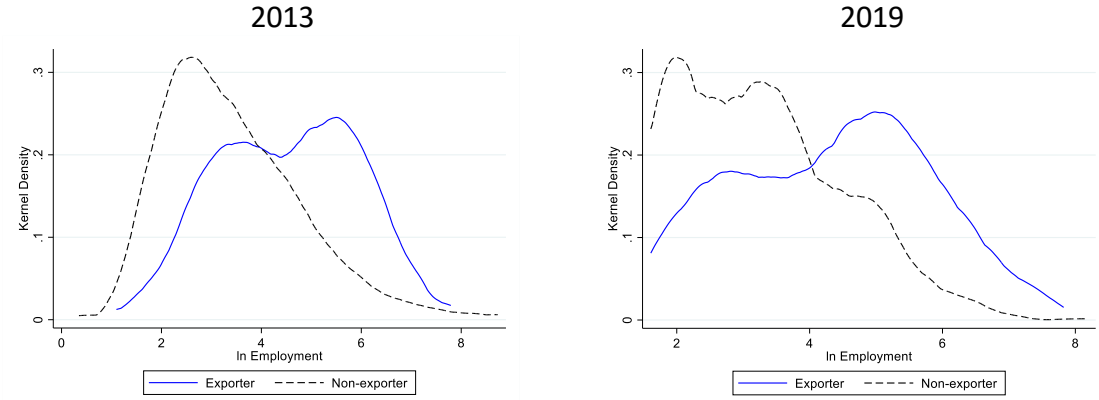
Appendix A.

Exporters are, in general, the largest firms. The model in section 5 of this paper suggests that more productivity firms will be larger and more likely to export. This result is not novel: in many countries, exporting firms tend to be larger, more productive, more skill and capital-intensive than those that only sell in the domestic market (Bernard et al. 2009). Morocco is no exception. Larger firms in Morocco are more likely to export than medium and smaller firms (Figure A.1). The fact that the ES show a similar pattern in Morocco suggests that they are reliable.

Figure A.1: Exporting firms are larger in terms of employment.

Kernel density functions

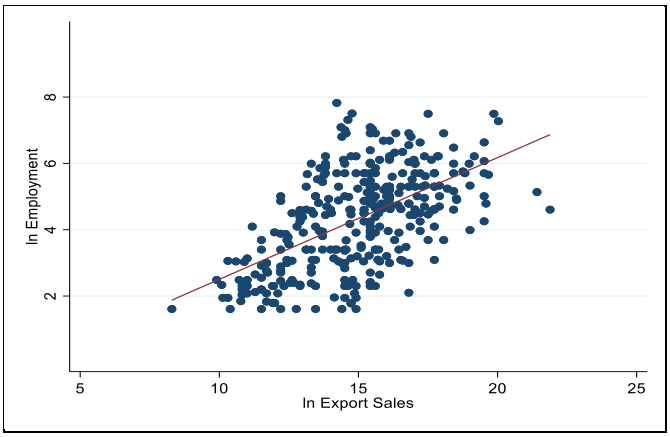


Source: Staff elaboration using Enterprise Survey data.

All else being equal *(ceteris paribus),* export sales are higher amongst larger firms. Everything else help constant, we observe a positive correlation between total employment and the amount of export sales (Figure A.2). Larger firms could export more due to productivity differences, economies of scale, or other factors affecting employment.

A.2: Larger firms export more

2019

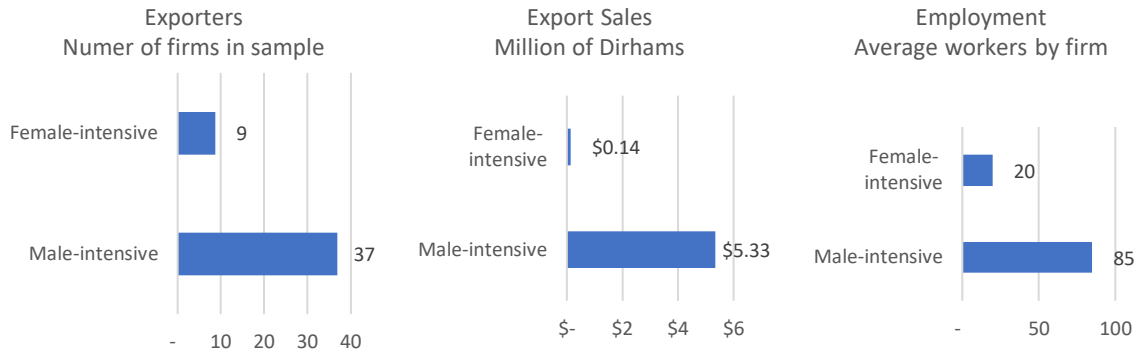


Source: Staff elaboration using Enterprise Survey data.

Note: Considers firms that export directly or indirectly at least 10% of sales.

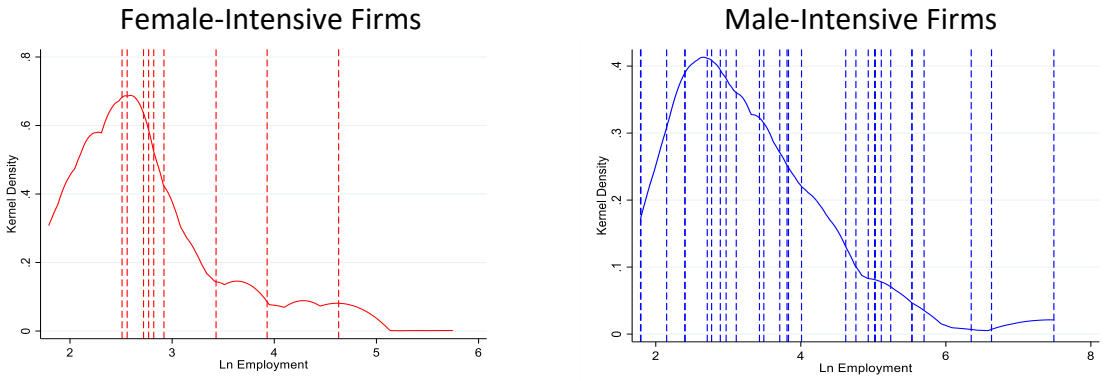
Exporting firms tend to be male-intensive. We define female-intensive firms as those with a higher share of female workers than the average. The number of exporting firms is lower among female-intensive firms than between male-intensive firms (Figure A.3). Moreover, the average export sales amount is considerably higher for male-intensive than for female-intensive firms. Male-intensive firms, on average, also employ more workers than female-intensive firms. This is also evident with the distribution of firms. As figure A.4 shows, exporters (dash lines) are in general in the left side of the distribution of female labor-intensive firms, showing that these firms employ a lower number of workers. Meanwhile, exporters have a more homogeneous distribution amongst male labor-intensive firms.

A.3 Employment and Exports Indicators in Female -Intensive and Male-Intensive Firms.
(2019)



Source: Staff elaboration using Enterprise Survey data.
Note: Considers firms that export directly or indirectly at least 10% of sales.

Figure A.4 Employment Kernel Density Functions by Female and Male Labor Intensity (2019)



Source: Staff elaboration using Enterprise Survey data.
Note: The dash lines represent exporters.