DISENTANGLING THE IMPACT OF TRADE BARRIERS ON WAGES: EVIDENCE FROM THE MENA REGION

By:

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Introduction

- Trade liberalization can affect wage disparities through different channels: industry wage premiums, skill premiums, gender wage disparities and regional disparities.

- Liberalization increases competition with foreign suppliers of imported goods, lowering domestic prices and, hence, **lowering** wages of specific industry labor. Conversely, it could boost industry-level productivity, thus, **raising** specific industry wages.

- Liberalization generates a bias towards skilled labor in some sectors aiming at resisting foreign competition and increasing productivity. In this case, skill wage premiums and eventual wage disparities would **increase**.

Introduction

■ Liberalization has an **ambiguous** effect on gender wage disparities. On one hand, it increases efficient labor allocation and reduces wage gaps between men and women. On the other hand, increased competition and the resulting skill bias interact with lower demand for female workers (who are generally less skilled), exacerbating wage disparities.

■ Wages are affected **differently** in local labor markets, where tariff and non-tariff dismantlement threatens **exposed** sectors and reduces relative wages, especially for less-skilled labor.

Contribution

- The paper proposes a comprehensive assessment of the effect of different trade barriers (tariffs, non-tariff measures and services restrictions) on wages in the Middle East and North Africa (MENA) region.

- Wage disparities are studied in four dimensions: wage premiums, qualification (skilled versus unskilled), gender (males versus females), and regional (urban versus rural workers).

- The paper is unique in providing an *integral* view of wage disparities in the region; as it explores the effect of *three* types of trade barriers (tariffs, non-tariff measures (NTMs) and an ad-valorem equivalent (AVE) of trade in services used in the production process) on *four* dimensions of wage disparities.

- Three datasets are used: the Egyptian Labor Market Panel Survey (2012), the Jordanian Labor Market Panel Survey (2010) and the Tunisian Labor Market Panel Survey (2014).

Literature Review

- **Trade and Industry Wage Premiums**

Mixed results: tariff reductions are associated with declining industry wages in Mexico and Colombia (Revenga, 1997; Attanasio et al., 2004), conversely lead to increasing industry wages due to competition-induced increases in productivity in India (Mishra and Kumar, 2005), and have no significant effect on relative wages in Morocco and Brazil (Currie and Harrison, 1997; Blom et al., 2004).

Fewer studies on NTMs: more recently Porto (2018) found that NTM liberalization in a specific sector (F&B) decreases the wage paid to this sector workers, with the effect mitigated over time as labor moves away from such sector.

For services liberalization: Ample evidence on their association with productivity (and hence wage) gains (Zhang, Tang and Findlay , 2010; Beverelli, Fiorini and Hoekman , 2017)

- **Trade and Skill Premium**

Most studies found a positive effect of trade liberalization on skill premium. This can be attributed to an increased demand for skilled labor due to higher foreign competition and complementarity between skills and liberalized foreign inputs (Attanasio et al., 2004; Chen et al.,2017). Other studies reported a negative liberalization effect on skill premium through employment shifts from skilled to unskilled intensive sectors (Gonzaga et al., 2006).

Literature Review

- **Trade and Gender Inequality**

Inconclusive results: on one hand, tariff reductions expand typically female (unskilled) labor-intensive sectors (such as clothing), thus raising women's relative wages (Aguayo-Tellez et al., 2012). On the other hand, increased import competition could increase the gender wage gap by reducing both women's relative wages and employment (AlAzzawi, 2011).

- **Trade and Regional Inequality**

Trade effects tend to be concentrated in local labor markets due to imperfect labor mobility between regions. Studies generally found that regions with larger exposure to tariff cuts are worse off; as they experience larger wage declines and lower poverty reductions (Topalova, 2010; Kovak, 2013).

Stylized Facts

- **First: Trade Policy in the MENA region**

Egypt and Tunisia joined the WTO in 1995, with Jordan following in 2000. The three are members of the Association Agreements (AA) with the EU, the Agadir Agreement signed in 2004 and the Pan Arab Free Trade Agreement in 1998.
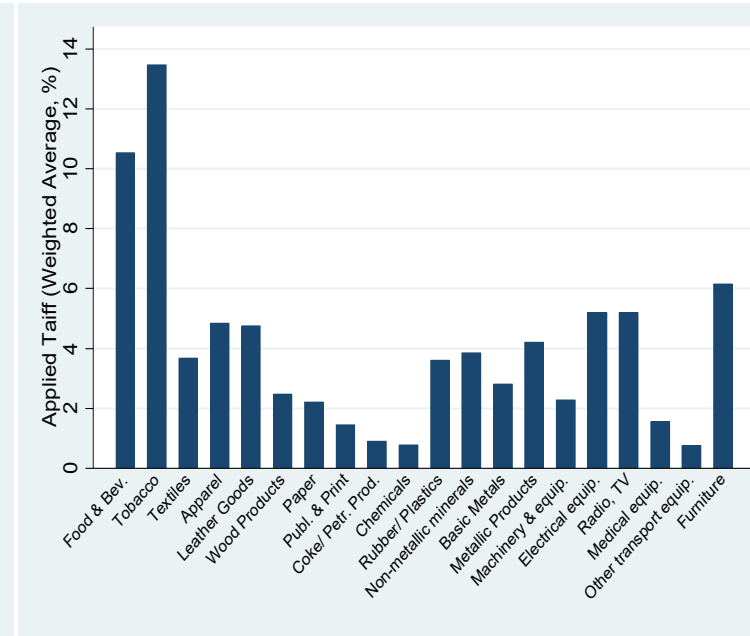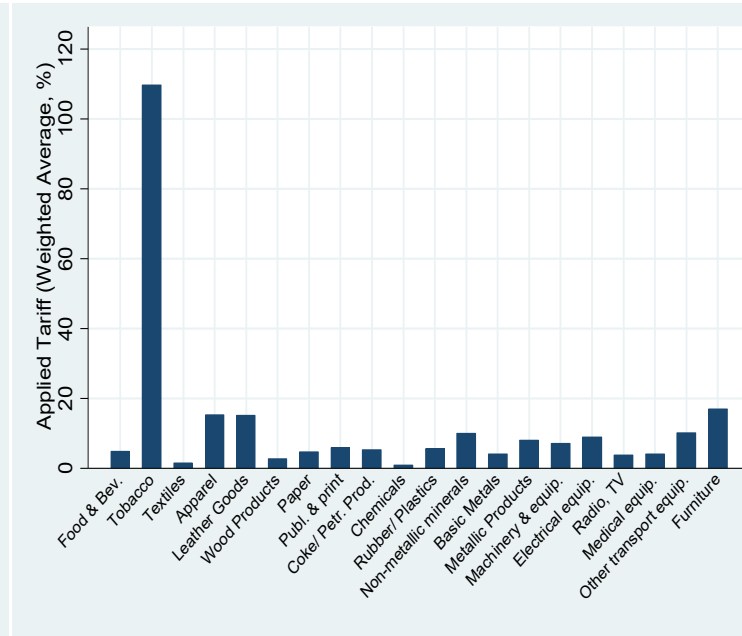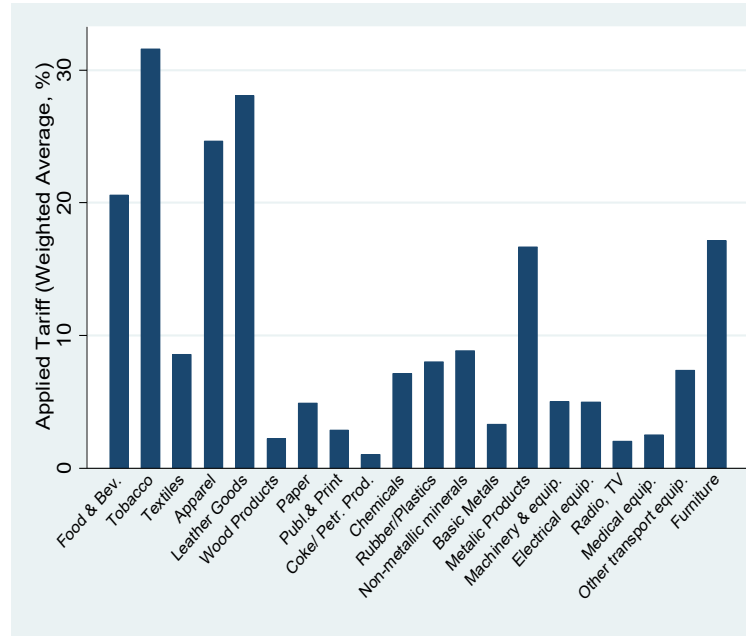
- **Applied Tariff Rate (2002-2016) (%) in Egypt, Jordan, Tunisia**
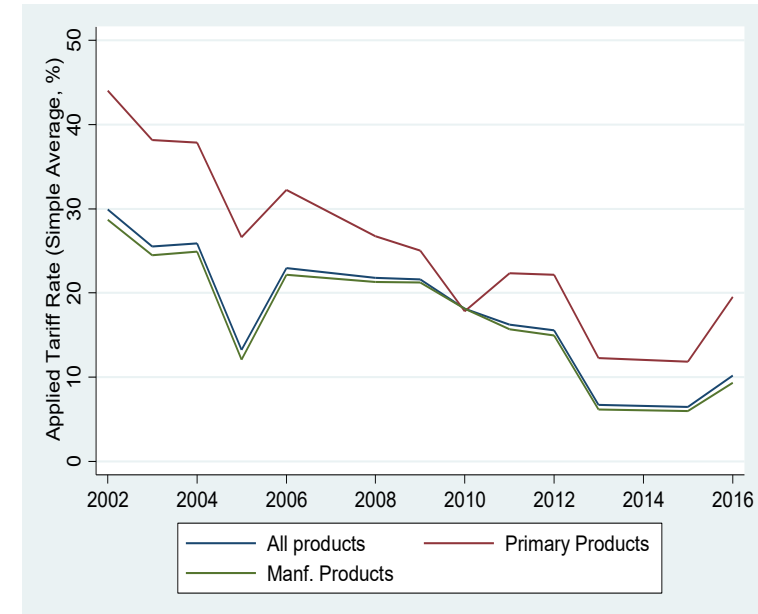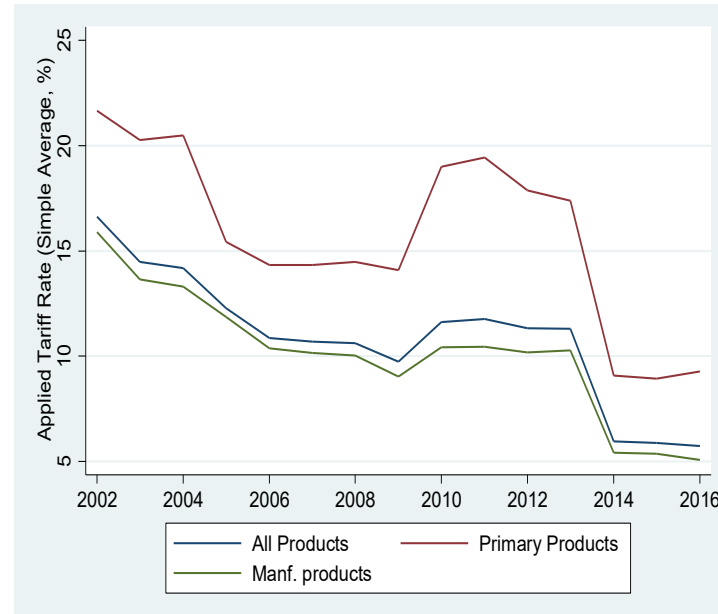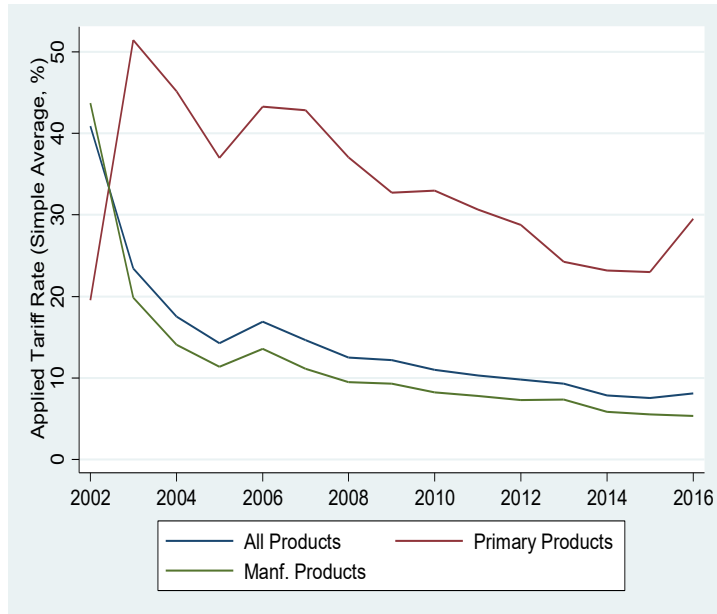
- There is a general declining trend in applied tariff rates for the three countries. Protection is on the rise in Egypt and Tunisia since 2015.

Stylized Facts

■ Applied Tariff Rate by Sector (%) – Egypt (2011), Jordan (2009), Tunisia (2013)

■ Tobacco, furniture, metallic products, apparel, leather goods and food and beverages are highly protected sectors in Egypt.

■ Tobacco has the highest applied tariffs in Jordan (110%). Furniture, apparel and leather goods are the next most protected.

■ Tobacco, food and beverages, and furniture are highly protected sectors in Tunisia.

Stylized Facts

- Despite significant liberalization efforts in the form of tariff dismantlement, MENA countries tend to protect their local markets by imposing **non-tariff measures (NTMs).**

- **NTMs by type and sector -Egypt (2011)), Jordan (2009), Tunisia (2013)**
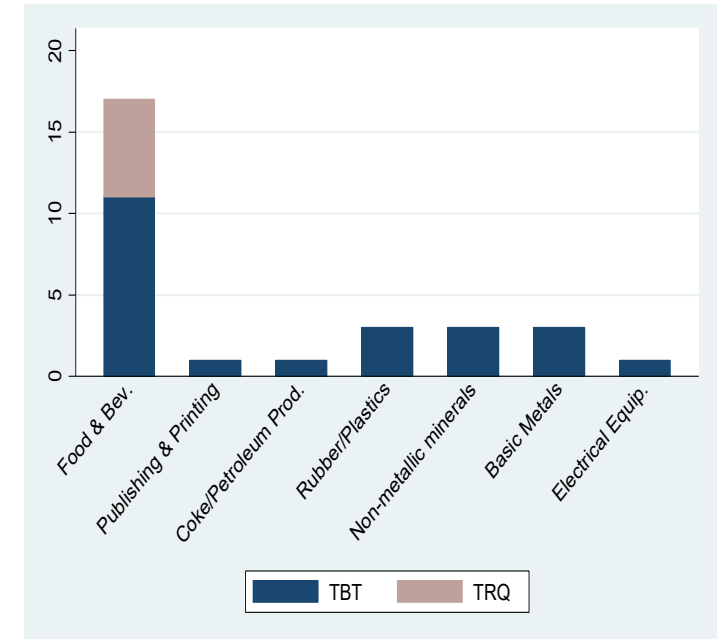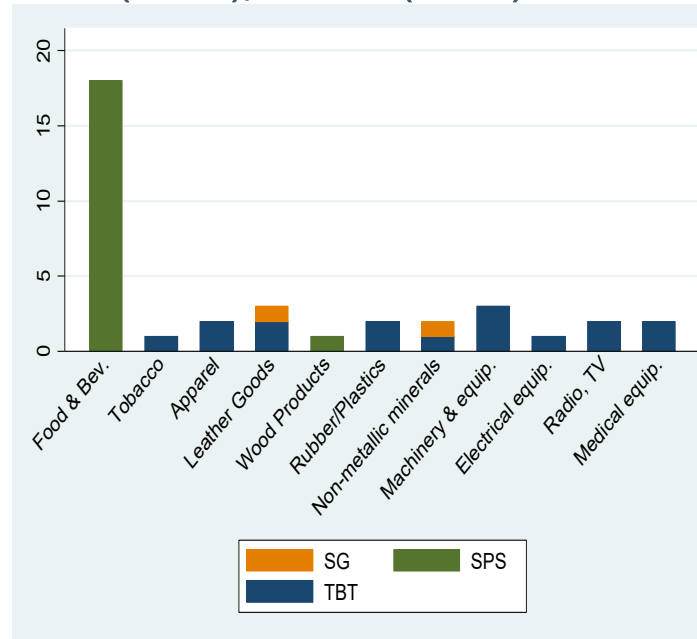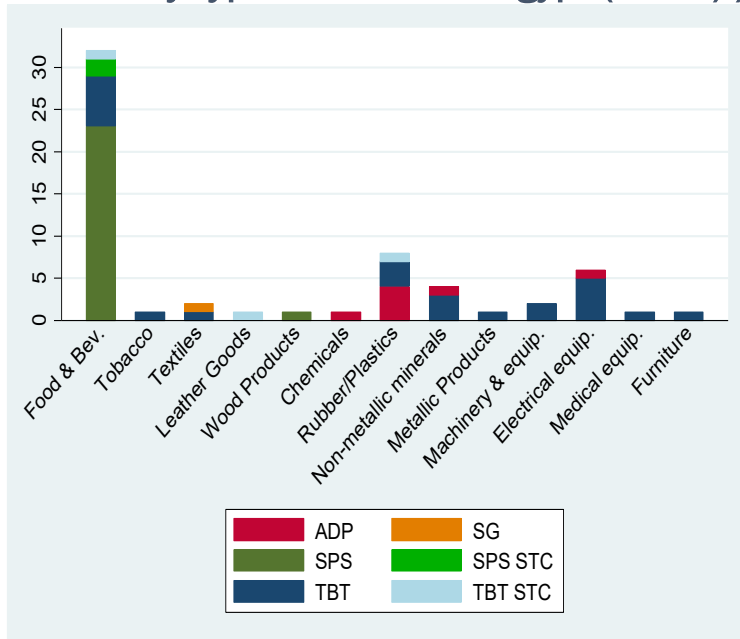
- Egypt has the highest number of NTMs among the three countries (93 measures). Food and Beverages is the mostly affected sector, particularly by SPS measures and TBT, followed by Rubber and Plastics, and Electrical Equipment, which are subject to TBTs and antidumping measures.

- The number of NTMs recorded 30 measures in Jordan (2009). While SPS measures mostly apply to the Food and Beverages sector, TBT are relatively distributed across sectors.

- The number of NTMs recorded 39 measures in Tunisia (2013). TBTs are, as in Egypt and Jordan, distributed across sectors, but highest for Food and Beverages sector which is also subject to tariff-rate quotas.

Stylized Facts

■ **Services** remain relatively protected in MENA region when compared to other developing regions such as Latin America and the Caribbean and Sub-Saharan Africa.

■ **Ad-Valorem Equivalent of Services by Country, by Sector**
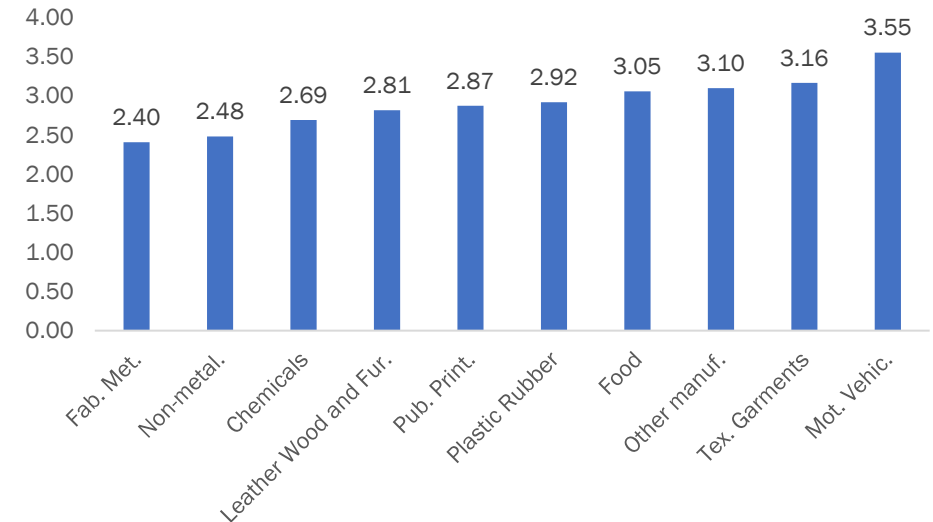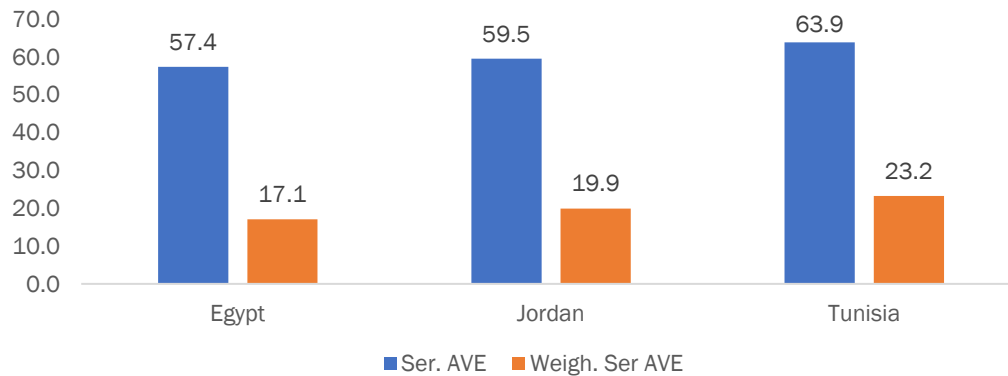

Note: AVE of services are weighted by their contribution into the manufacturing sector using input-output tables.

■ Egypt is the least protective, followed by Jordan, then Tunisia being the most restrictive.

■ At the sectoral level, vehicles, textile and garments, and food- since they rely more on services and trade logistics- have a higher weighted AVE of services.

Stylized Facts

- Second: Wage Inequality in the MENA Region

- Average Wage by Skill and Country, by Gender and Country, by Region and Country
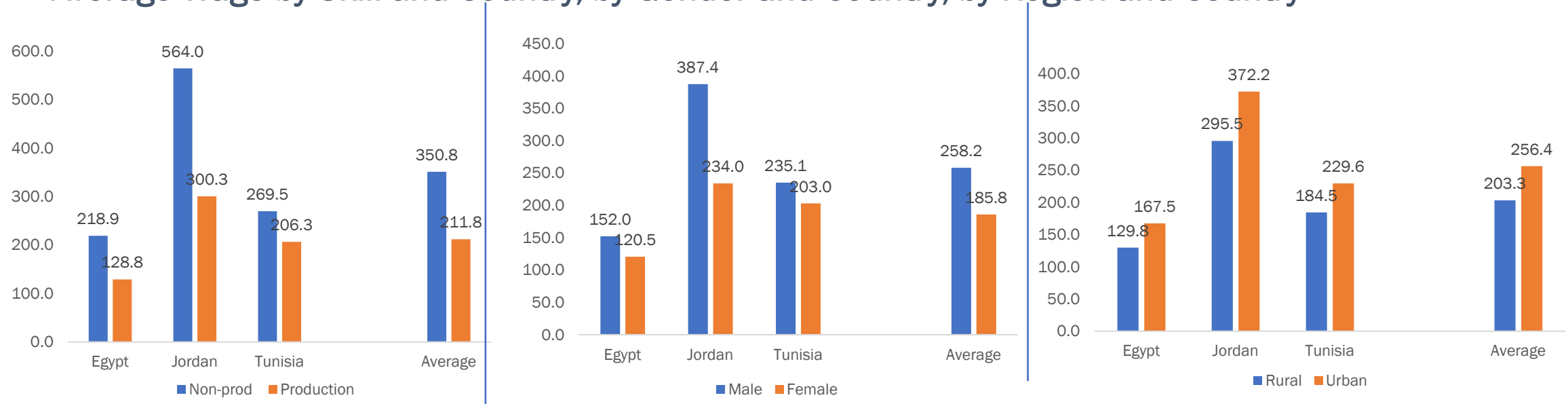
Note: Figures represent real monthly wage in constant USD (2010).

- Skill premium exists in the three countries. Wage inequalities between skilled and unskilled labor are lowest in Tunisia, followed by Egypt, and highest in Jordan.

- Gender wage gap exists in the three countries, with the gap narrowest in Tunisia, followed by Egypt, and widest in Jordan.

- Regional wage inequality exists in the three countries. Wage inequalities between urban and rural areas are the lowest in Tunisia, followed by Jordan, and are the highest in Egypt.

Stylized Facts

- Third: Interaction between Trade Policy and Wage Inequality in the MENA region

- Wages and Tariffs, Wages and NTMs, Wages and AVE of Services
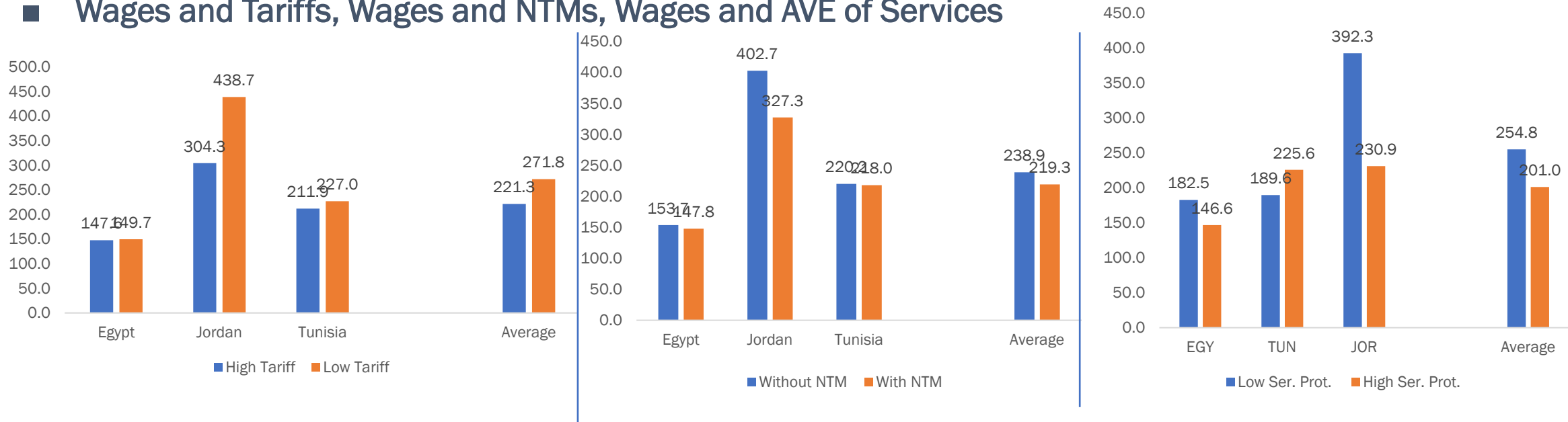
Note: *High tariff* means a sector with a tariff greater than the median, *With NTM* means that there is a least one non-tariff measure imposed on the sector, *High Ser Prot.* means a sector with an AVE of services greater than the median.

- On average, real wages in less protected sectors (low tariffs) are 1.2 times higher than those in highly protected ones (liberalization-induced productivity gains and skill bias). This is highly observable in Jordan.

- Average real wages in sectors that are not subject to NTMs are only 1.08 times higher than those in sectors with NTMs. This is again observable in Jordan and negligible in Egypt and Tunisia.

- While sectors with a higher service protection have lower wages in Egypt and Jordan, this is reversed in Tunisia.

Methodology

- **A One-Step Analysis: The Human Capital Model**

- To directly assess the effect of trade policy on wage inequality, we use the human capital model (Mincer, 1974) to which different trade barriers are added.

- $$Log(w_{igs}) = \beta_{1i} + \beta_{2i}.X_i + \beta_{3i}.f_i + \beta_{3i}.f_g + \gamma \ Z_s + \alpha_{is}wp_s + \varepsilon_{igs} \qquad (1)$$

- Where the dependent variable $\boldsymbol{Log(w_{igs})}$ is the natural logarithm of real hourly wage of individual i living in region g and working in sector s. It is regressed on a vector X_i of individual characteristics (*education attainment and age*), other dummies capturing some specific individual characteristics f_i (*membership in a trade union, working in the public sector or being a production worker*) and regional characteristics f_g, and a vector of different trade policy variables $\boldsymbol{Z_s}$ (*tariffs, non-tariff measures and the ad-valorem equivalent of services*).

- The model also includes industry indicators that allow for non-observable industry characteristics α_{is}. The coefficient on the industry dummy, *the wage premium*, captures the part of the variation in wages that cannot be explained by worker characteristics, but by the workers' industry affiliation.

Methodology

- **A Two-Step Analysis: The Wage Premiums**

- we first run the previous model *without* including trade barriers, then retrieve the industry effects to be explained by trade barriers at a later stage.

- The first step is as follows:

- $Log(w_{igs}) = \beta_{1i} + \beta_{2i}.X_i + \beta_{3i}.f_i + \beta_{3i}.f_g + \alpha_{is}wp_s + \varepsilon_{igs}$ (2)

- In the second step, industry wage premiums wp_s -obtained by filtering out the effects of observable worker characteristics- are regressed on a vector of trade policy variables, namely tariffs *Tar$_s$*, non-tariff measures *NTM$_s$*, and ad-valorem equivalents of services (SER$_s$) as follows:

- $(wp_s) = \eta_s + \eta_{tar}Tar_s + \eta_{ntm}NTM_s + \eta_{SER}SER_s + \varepsilon_s$ (3)

- Hence, it is possible to determine the effect of each barrier on the inter-industry wage premium.

Methodology

■ We first estimate the one-step model. Then we interact each trade policy variable with each labor segment (production workers, female workers, urban workers) for a deeper insight into the link between trade policy and wage disparities on these three levels.

■ Next, we estimate the two-step model which is believed to be more robust.

■ Hypothesis: Heavily protected industries (with high tariffs, non-tariff measures and AVEs of services) are less productive and employ less productive workers who would be earning lower wages.

Empirical Findings

	Ln(RHW)	Ln(RHW)	Ln(RHW)	Ln(RHW)
Public	0.0575	0.0344	0.00588	0.0516
	(0.0506)	(0.0432)	(0.0538)	(0.0481)
Ln(Age)	5.167***	5.131***	3.153**	5.085***
	(0.833)	(0.842)	(1.273)	(0.905)
Ln(Age sq.)	-0.674***	-0.668***	-0.391**	-0.662***
	(0.117)	(0.119)	(0.179)	(0.128)
Ln(Year School)	-0.0233	-0.0307	0.0432	-0.0291
	(0.0425)	(0.0391)	(0.0473)	(0.0388)
Trade Union	0.375***	0.372***	0.342***	0.372***
	(0.116)	(0.115)	(0.0916)	(0.115)
Urban	-0.0409	-0.0646	-0.00120	-0.0390
	(0.0672)	(0.0707)	(0.0619)	(0.0689)
Female	-0.255***	-0.249***	-0.227***	-0.247***
	(0.0804)	(0.0810)	(0.0589)	(0.0749)
Production	-0.490***	-0.496***	-0.436***	-0.490***
	(0.0760)	(0.0764)	(0.0766)	(0.0748)
Tariff	-0.00468*			-0.00397
	(0.00243)			(0.00254)
NTM		-0.00638		-0.00326
		(0.00548)		(0.00452)
AVE Ser.			-0.0775*	-0.0454
			(0.0384)	(0.0436)
Constant	-4.317***	-4.264***	-0.822	-4.035**
	(1.455)	(1.462)	(2.215)	(1.664)
Country. Dum.	YES	YES	YES	YES
Observations	2,484	2,484	2,989	2,484
R-squared	0.366	0.363	0.315	0.367

Effect of Trade Barriers on Wages – All countries – One Step Analysis

- The effect of age on wages is positive and non-linear.

- Membership of a trade union has a significantly positive effect.

- Being a female or a production worker is negative and significant (wage disparities exist at the gender and the skill level but not the regional one).

- Tariffs and AVE of services – when introduced in isolation - are negative and significant. Otherwise they are insignificant.

- NTMs are insignificant.

Notes: (i) Robust standard errors clustered by sector in parentheses.
(ii) *** p<0.01, ** p<0.05, * p<0.1.

	Ln(RHW)			Ln(RHW)			Ln(RHW)
Public	0.0213		Public	0.0523		Public	0.0523
	(0.0377)			(0.0478)			(0.0483)
Ln(Age)	5.083***		Ln(Age)	4.974***		Ln(Age)	5.271***
	(0.896)			(0.891)			(0.849)
Ln(Age sq.)	-0.660***		Ln(Age sq.)	-0.646***		Ln(Age sq.)	-0.688***
	(0.127)			(0.125)			(0.120)
Ln(Year School)	-0.0223		Ln(Year School)	-0.0276		Ln(Year School)	-0.0246
	(0.0362)			(0.0395)			(0.0394)
Trade Union	0.365***		Trade Union	0.367***		Trade Union	0.376***
	(0.109)			(0.111)			(0.115)
Urban	-0.0372		Urban	-0.0291		Urban	-0.155
	(0.0660)			(0.0664)			(0.391)
Female	-0.220**		Female	-1.216		Female	-0.241***
	(0.0801)			(0.850)			(0.0730)
Production	-1.219***		Production	-0.497***		Production	-0.480***
	(0.356)			(0.0744)			(0.0708)
Tariff	0.00413		Tariff	-0.00434		Tariff	-0.00576*
	(0.00405)			(0.00262)			(0.00297)
Tariff*Prod.	-0.0102*		Tariff*Fem.	0.0108		Tariff*Urb.	0.00242
	(0.00526)			(0.00647)			(0.00439)
NTM	-0.0301***		NTM	-0.00197		NTM	-0.0142
	(0.00540)			(0.00480)			(0.0101)
NTM*Prod.	0.0332***		NTM*Fem.	-0.0216*		NTM*Urb.	0.0139
	(0.00812)			(0.0115)			(0.0110)
AVE Ser.	-0.201**		AVE Ser.	-0.0931		AVE Ser.	-0.0534
	(0.0895)			(0.0554)			(0.0730)
AVE Ser.*Prod.	0.267**		AVE Ser.*Fem.	0.294		AVE Ser.*Urb.	0.0178
	(0.119)			(0.285)			(0.125)
Constant	-3.657**		Constant	-3.709**		Constant	-4.314***
	(1.632)			(1.620)			(1.452)
Country. Dum.	YES		Country. Dum.	YES		Country. Dum.	YES
Observations	2,484		Observations	2,484		Observations	2,484
R-squared	0.376		R-squared	0.370		R-squared	0.369

Effect of Trade Barriers on Wages – All countries – One Step Analysis – By Segment

- At the skill level, the effect of *tariffs* is stronger for production workers than for non-production workers, whereas NTMs and services have less impact on real wages for this category.

- At the gender level, *NTMs* exert a more negative effect on women than men.

- At the regional level, no interaction term is significant.

Notes: (i) Robust standard errors clustered by sector in parentheses.
(ii) *** p<0.01, ** p<0.05, * p<0.1

(a) First stage

	Egypt	Tunisia	Jordan
	Ln(RHW)	Ln(RHW)	Ln(RHW)
Public	-0.0929*	-0.118	0.0924
	-0.0523	-0.225	-0.232
Ln(Age)	1.793*	10.89***	4.602**
	-0.916	-3.36	-1.852
Ln(Age sq.)	-0.198	-1.463***	-0.608**
	-0.131	-0.483	-0.266
Ln(Year School)	0.0851***	0.172*	0.232***
	-0.0279	-0.103	-0.0741
Trade Union	0.336***	0.209	0.149
	-0.0509	-0.238	-0.143
Urban	0.145***	0.0574	0.0958
	-0.0354	-0.11	-0.105
Production	-0.243***	-0.0904	-0.410***
	-0.0455	-0.115	-0.0767
Female	-0.216***	-0.0937	-0.448***
	-0.063	-0.119	-0.103
Constant	0.95	-15.17***	-3.092
	-1.58	-5.776	-3.195
Sector dum.	YES	YES	YES
Observations	1,432	213	539
R-squared	0.262	0.264	0.315

(a) Second Stage

	Industry Premium	Industry Premium	Industry Premium	Industry Premium
Tariff	-0.00262			-0.00176*
	(0.00165)			(0.000954)
NTM		-0.00836*		-0.00676**
		(0.00417)		(0.00311)
AVE Ser.			-0.423*	-0.510*
			(0.242)	(0.276)
Constant	0.124***	0.109***	1.336*	1.648*
	(0.0415)	(0.0343)	(0.729)	(0.840)
Observations	52	52	58	52
R-squared	0.034	0.038	0.092	0.178

Effect of Trade Barriers on Industry Wage Premium –Two Step Analysis

- The first step indicates that wage inequalities are pronounced in Egypt at the regional, skill, and gender levels; at the skill and gender levels in Jordan; while they are absent in Tunisia (in line with presented Tunisian statistics).

- The second step indicates that when each type of barriers is regressed alone, tariffs are insignificant, whilst NTMs and services AVEs are negatively significant at the 90% level.

- When the three trade policy categories are included together in one regression, their impact is negative and significant (Industries with higher protection levels are associated with lower productivity, hence lower real wages for workers). The values of coefficients show that the effect of both NTMs and AVEs of services is **stronger** than that of tariffs.

Conclusion

- In general, the effect of services restrictions and non-tariff measures is much stronger than that of tariffs on industry wage premium.

- Females are more affected by non-tariff measures than their male counterparts.

- Production workers are less affected by both non-tariff measures and by services restrictions than non-production workers, but are more affected by tariffs.

- All trade barriers do not have a differential effect on urban vs. rural workers.

- MENA countries should go beyond traditional tariff liberalization and make more efforts in rationalizing the use of NTMs and eventual dismantlement of excessive measures; since they cause market distortions and lower productivity, leading to lower wages. From a gender perspective, this may lead to increased demand for female labor and reduced wage disparities at this level.

- A better and more efficient provision of services necessary for the manufacturing sector is likely to increase industry productivity and wages in the MENA region.

- At the skill level, trade liberalization could be associated with increased specialization according to comparative advantage. This may trigger employment shifts from highly skill-intensive sectors to ones intensive in production (less-skilled) workers, reducing wage disparities between skilled and unskilled labor.

Thank You