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Disentangling the Impact of Trade Barriers on Wages: Evidence from the MENA Region

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Disentangling the Impact of Trade Barriers on Wages: Evidence from the MENA Region

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Abstract

This 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. These disparities are studied in four dimensions: wage premiums, gender (males versus females), qualification (skilled versus unskilled), and regional (urban versus rural workers). We use three datasets, which are the Egyptian Labour Market Panel Survey (2012), the Jordanian Labour Market Panel Survey (2010) and the Tunisian Labour Market Panel Survey (2014). Following Goldberg and Pavnick (2004) and Zaki (2013), we directly assess the effect of trade policy on wage disparity using the human capital model (Mincer, 1974) to which different trade barriers are added. Our results suggest that, in general, the effect of services restrictions and non-tariff measures are much stronger than that of tariffs on wage premium. When we look at different segments, we find that females are more affected by non-tariff measures than their male counterparts. At the skill level, and given the abundance of blue collar workers in the MENA region, production workers are less affected by both non-tariff measures and by services restrictions than non-production workers, but are more affected by tariffs. Finally, all trade barriers do not have a differential effect on urban vs. rural workers.

J.E.L. classification : F10, F12.

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1. Introduction

There is a large body of literature on the impact of trade liberalisation and trade policy reform on wage disparities in both developed and developing countries. The channels through which trade liberalisation affects wage disparities are industry wage premiums, skill premiums, gender wage disparities and regional disparities. Liberalisation increases competition with foreign suppliers of imported goods, lowering domestic prices and, hence, wages of specific industry labour. In sectors where this labour is mostly unskilled and wage premiums are the lowest, liberalisation may lead to increased wage disparities through the further decline in real wages. Liberalisation also leads to increased competition which, in some sectors, generates a bias towards skilled labour resisting foreign competition and increasing productivity. In this case, skill wage premiums and eventual wage disparities also increase. The dismantlement of tariff and non-tariff barriers is also associated with the mixed effect on gender-based wage disparities. From a neoclassical approach, liberalisation increases efficient labour allocation and reduces wage gaps between men and women. On the one hand, increased competition from liberalisation and the resulting skill bias interact with lower demand (hence lower relative wages) for female workers, and exacerbate wage disparities. Finally, liberalisation affects wages differently in local labour markets, where tariff and non-tariff dismantlement threatens exposed sectors and reduces relative wages, especially for less-skilled labour.

Thus, this 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. These disparities are studied in four dimensions: wage premiums, gender (males versus females), qualification (skilled versus unskilled), and regional (urban versus rural workers). We use three datasets, which are the Egyptian Labour Market Panel Survey (2012), the Jordanian Labour Market Panel Survey (2010) and the Tunisian Labour Market Panel Survey (2014). We follow the methodology of Goldberg and Pavnick (2004) and Zaki (2013). We begin with a one-step analysis, where we directly assess the effect of trade policy on wage disparity using the human capital model (Mincer, 1974) augmented by different trade barriers. Second, we use a two-step analysis in order to determine the impact of trade barriers on wage premiums. To do so, we run the previous model without including trade barriers in a first step, and, in a second step, retrieve the industry effects to be explained by these trade barriers. The paper is interesting for two reasons: first, we explore inequalities within the four dimensions mentioned above, hereby providing an integral view of wage disparities in the region. Second, we include 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. This contribution, we argue, is innovative compared to other studies.

Our results suggest that, in general, the effect of services restrictions and non-tariff measures is much stronger than that of tariffs on wage premium. When we look at different segments, we find that females are more affected by non-tariff measures than their male counterparts. At the skill level, and given the abundance of blue collar workers in the MENA region, production workers are less affected by both non-tariff measures and by services restrictions than non-production workers but are more affected by tariffs. Finally, all trade barriers do not have a differential effect on urban vs. rural workers. This is important, given that MENA countries often use NTMs to protect domestic producers. They are also characterised by

several services restrictions. Thus, rationalisation of NTMs and liberalisation of services are likely to increase real wages.

The paper is prepared as follows: Section 2 provides a brief overview of the literature on trade liberalisation and wage inequality across four dimensions: industry, skill, region and gender. Section 3 analyses trade policy and the evolution of tariff and non-tariff barriers in Egypt, Jordan and Tunisia, in addition to the status of wage disparities across skill, gender and regional dimensions. Section 4 describes the methodology and data used for our empirical model. Section 5 presents the main findings. Finally, section 6 concludes and provides the main policy recommendations.

2. Literature Review

There is a large body of literature on trade and wage inequality. Generally speaking, trade policy affects wage inequality at four levels: industry wage premiums, skill premium, regional inequality and gender inequality. In what follows, we review the existing literature according to each dimension.

Trade and Industry Wage Premiums

Industry wage premiums are those parts of workers' wages that cannot be explained by observable workers' characteristics (such as education, experience, gender, or age) but, rather, are attributed to workers' industry affiliation (Goldberg and Pavcnik, 2007).

Studies examining the impact of trade policy on industry wage premiums mostly rely on the *specific factors model* framework (Viner, 1931) to explain differing wages for equivalent tasks across industries, due to imperfect labour mobility across these industries in response to trade policy shocks. According to the model predictions, sectors that experience higher than average tariff cuts will witness a decline in their wage premiums. The empirical literature is, however, not conclusive[4].

In line with model predictions, Revenga (1997) found that tariff reductions are strongly associated with declining industry wages in the Mexican manufacturing sector, whilst quota reductions were not. Using firm-level data, a reduction in the industry tariff from 50% to 10%, was found to reduce real industry wages by 6%–7%, with little effect on employment. Similarly, Attanasio, Goldberg and Pavcnik (2004) conclude that tariff reductions implemented in the 1980s and 1990s in Colombia increased wage premiums. Sectors with the largest tariff cuts (such as textiles and apparel-food processing) were initially characterised by the lowest wage premiums. Tariff reductions in these sectors led to a sharp decline in wage premiums, further increasing wage inequality between these sectors and others.

Another group of studies found a negative effect of tariff reductions on industry wage premiums, such as Mishra and Kumar (2005) in the case of India after the dramatic trade

[4] Whilst it has been difficult to always find evidence of a decline in wage premium due to tariff reductions, several studies reported a rather greater response of employment to trade policy shocks, especially in developed countries (Grossman (1986), Pierce and Schott (2016) and Trefler (2004)).

liberalisation in 1991. Their findings suggest liberalisation and competition-induced increases in productivity at firm level are passed on to workers, in the form of higher wages. Moreover, sectors with a higher share of unskilled workers witnessed the largest tariff reductions, which narrowed the wage gap between skilled and unskilled workers, suggesting a decrease in wage inequality in India. For Morocco, Currie and Harrison (1997) were unable to suggest changes in wages or employment following liberalisation. This can be attributed to the presence of imperfect product markets, where firms respond to trade reforms by cutting profit margins and increasing productivity, rather than reducing wages or employment. Similarly, Feliciano (2001) found that for Mexico, the decline in import license coverage reduced the relative wages of workers in liberalised industries by only 2%, with no effect on relative employment. Tariff reductions were found to have no statistically significant effect on relative wages and relative employment. Blom et al. (2004) applied a similar methodology to investigate the impact of the 1988-1994 trade liberalisation in Brazil. Their results revealed that, whilst industry affiliation influences worker earnings, the structure of industry wage premiums is relatively stable over time. Finally, AlAzzawi and Said (2009) examine wages and job quality outcomes in the Egyptian manufacturing sector during the period of rapid trade liberalisation (1998–2006), of which no significant effect was found. On the other hand, increased export orientation (exports/output) was found to have a strong positive impact on wages.

Trade and Skill Premium

The link between trade and skill premium can be understood in the frame of the Stolper–Samuelson theorem that assumes factor mobility across sectors. Developing countries are relatively abundant in unskilled labour and, according to the Heckscher-Ohlin model, specialise in exporting products that reflect this abundance and import skill-intensive products. As stipulated by the Stolper-Samuelson theorem, a decrease in the price of imported goods, due to trade liberalisation, will decrease the return on the factor used intensively in this sector (skilled labour) and increase the return on the factor used intensively in the export sector (unskilled labour). Hence, trade liberalisation in developing countries is expected to reduce skill premium by inducing distributional changes in favour of unskilled workers (Goldberg and Pavcnik, 2007).

Following the model assumptions, Hanson and Harrison (1999) examined the effect of trade liberalisation and exposure of Mexican firms to foreign competition on wage dispersion and found an increase in skill premium. Relative wages of unskilled workers decreased, since trade liberalisation mostly concerned low-skilled industries that were initially highly protected. Attanasio, Goldberg and Pavcnik (2004) suggest similar findings for Columbia. Yet, the main driver behind the wage gap in Columbia was a skill-biased technological change, increasing demand for skilled labour in sectors that experienced larger tariff reductions that were exposed to increased foreign competition. Chen, Yu and Yu (2017) used Chinese firm-level data to investigate the impact of input trade liberalisation on wage inequality. Their findings suggest a higher skill premium in skill-intensive plants that enjoyed tariff reductions on imported inputs. Due to the complementarity of skills and less expensive or newly accessible foreign inputs on the technological side, wages of skilled workers have increased. For Indian firms, Chakraborty and Raveh (2018) found that the decrease in input tariffs increases relative demand and average wages for managers. Raveh and Reshef (2016) explore liberalisation of capital goods and skill premium for developing countries. Reductions in trade barriers were greater for R&D intensive

capital that is complementary to skilled labour, as compared to R&D non-intensive capital that is complementary to unskilled labour. Hence, the composition of capital imports in developing countries shifts towards more skill-complementary capital, causing an increase in the skill premium.

Meanwhile, trade liberalisation was found to reduce skill premium in Brazil (Gonzaga, Filho and Terra, 2006) by inducing employment shifts from skilled to unskilled intensive sectors. Using a static multi-sector applied general equilibrium model for Slovenia, Cho and Díaz (2013) were able to conclude that trade liberalisation led to a fall in the skill premium of up to 4.5%. Trade-induced reallocation of resources across industries accounted for nearly 46% of the decline in skill premium observed in Slovenia after the year 2000.

Trade and Regional Inequality

Trade shocks are predicted to have unequal effects on wages in different local labour markets. This occurs because some regions within a country are more exposed to trade than others. For example, some regions have a high concentration of industries subject to import competition, or specialise in export-oriented industries. Trade effects are concentrated in local labour markets due to imperfect labour mobility between regions, especially in the short run after adverse trade shocks (Pavcnik, 2017). Therefore, a growing number of studies examine the effects of trade liberalisation on labour market outcomes at the regional rather than at the country level.

Topalova (2010) investigates rural poverty in India after the 1991 trade liberalisation. He found that despite the dramatic poverty reduction at the country level, less exposed rural areas enjoyed larger poverty reductions, as compared to rural areas with sectors exposed to liberalisation and tariff reductions. In Brazil, regions with larger exposure to tariff cuts were worse off (Kovak (2013). A region whose output faced a 10% larger liberalisation-induced price decline experienced a 4% larger wage decline than other regions. Costa, Garred and Pessoa (2016) found that Brazilian local labour markets exposed to Chinese import competition experienced slower growth in manufacturing wages over the period 2000-2010, whilst regions benefiting from rising Chinese export demand experienced faster growth of wages. For the U.S., Autor, Dorn and Hanson (2013) conclude that rising Chinese import competition over the period 1990-2007 is associated with higher unemployment, lower labour force participation and reduced wages in U.S. regions, with import-competing manufacturing industries. Leonardi and Meschi (2016) suggest that the increased use of non-tariff measures (NTMs) in protecting U.S. local regions against Chinese import competition mitigates the negative effect of import exposure on local employment, but has no effect on local wages. Another group of studies primarily focus on export shocks. In Vietnam, McCaig (2011) found that provinces that were more exposed to U.S. tariff cuts, due to the U.S-Vietnam bilateral trade agreement, experienced greater declines in poverty though increases in provincial wage premiums, faster labour reallocation into manufacturing, and faster firm job growth. Erten and Leight (2017) explored the effect of positive shocks to the export sector generated by China's WTO accession at country and regional levels. They found that countries exposed to greater tariff uncertainty, prior to WTO accession, witnessed expanding secondary sectors in terms of employment, GDP, and value added after accession, with some evidence of substitution away from agriculture.

Trade and Gender Inequality

There is no clear conclusion on the causality between trade liberalisation and the gender wage gap. From a neoclassical approach, trade liberalisation opens the economy to competition, which reduces gender discrimination and ensures efficient labour allocation. The gender wage gap is expected to narrow in unskilled labour-abundant countries that open to trade, according to the HO factor price equalisation effect of trade liberalisation. The rise in unskilled labour-intensive exports increases relative demand and wages for low-skilled labour, hence, benefiting women who are often employed in these sectors. By contrast, non-neoclassical theory suggests that, since trade liberalisation increases competition by reducing costs, firms will use wage disparities as a competition tool, by paying higher wages to skilled workers and compensate by paying lower wages to unskilled workers. The final effect is an increase in the gender wage gap, given that men in many developing countries are, on average, better educated and more skilled than women (UNCTAD, 2004; Korinek, 2005). Siddiqui (2009) investigates this for Pakistan, using a computable general equilibrium (CGE) model, where both female employment in unskilled jobs and their relative real wage income were found to increase due to liberalisation. In Mexico, Artecona and Cunningham (2002) found two gender effects of trade liberalisation: first, gender wage gaps in the manufacturing sector increased due to an increased premium for highly skilled workers (typically male). Second, liberalisation decreased the overall wage discrimination against women, due to greater competition brought by trade. Aguayo-Tellez et al. (2012) found a positive impact of NAFTA on women's relative wages in Mexico. Mexican tariff reductions helped to expand typically female labour-intensive sectors (such as clothing). Also, reductions of U.S. tariffs on Mexican exports increased the hiring of women in skilled blue-collar occupations. AlAzzawi (2011) found that increased import competition in Egypt increased the gender wage gap by reducing both women's relative wages and employment. Meanwhile, increased export intensity is associated with a lower gender wage gap. For India, Gupta's (2015) findings suggest that firms exposed to foreign competition reduced the share of female workers, partially because of their increasing need for skill upgrading. Hendy and Zaki (2013) also used a microsimulation analysis to examine the effect of trade policies on gender, regional and skill inequalities for Egypt.

In the sections to follow, we provide some stylised facts about the evolution of trade policy and wage inequality for Egypt, Jordan and Tunisia, before moving on to the empirical part of the paper.

3. Stylized Facts

3.1. Trade Policy in the MENA region

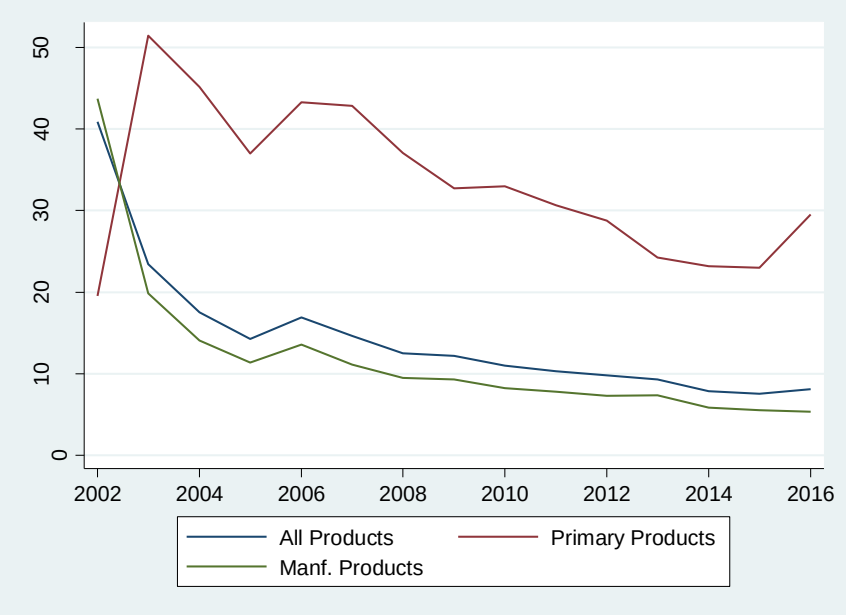
Trade policy reform in the MENA region began in the nineties, in line with domestic reform programmes opting for privatising and deregulating many sectors of the economy. Alongside these reforms, since its establishment, both Egypt and Tunisia joined the WTO in 1995, with Jordan following in 2000. The three MENA countries have committed to liberalisation and trade policy reform on both unilateral and preferential levels. These countries are also members of a number of Regional Trade agreements (RTA), such as the Association

Agreements (AA) with the EU (since 2004 for Egypt, 2002 for Jordan, and 1998 for Tunisia), the Agadir Agreement signed in 2004 and the Pan Arab Free Trade Agreement in 1998. Negotiations between Tunisia and the EU on the establishment of a DCFTA were also launched in 2015. In the sections to follow, we review the main trade policy developments in the three countries. We focus on tariff dismantlement, non-tariff barriers (NTMs) and provision of backbone services, necessary for the manufacturing sector.

Tariff measures

There is a decreasing trend in applied tariff rates for the three countries, with some periods of exception. In Egypt (Figure 1), MFN applied tariff rates witnessed a decrease from more than 40% in 2002 to less than 10% in 2016. Throughout this period, two increases have taken place. The first, in 2003, was driven by the increase in applied tariff rates on primary products, whilst the second took place in 2006 arising from increases in both applied tariffs on primary as well as manufactured products. It is also interesting to observe that tariff rates on primary products were initially lower than those on manufactured products (20% compared to 40%). After the sharp increase in tariffs on primary products between 2002 and 2003, these have been progressively, yet slowly, decreasing from as high as 50% to nearly 30%. Tariffs on primary products, however, picked up again since 2015, in response to the critically widening trade deficit. Meanwhile, tariffs on manufactured products reduced more rapidly, from over 40% in 2002 to nearly 6% in 2016.

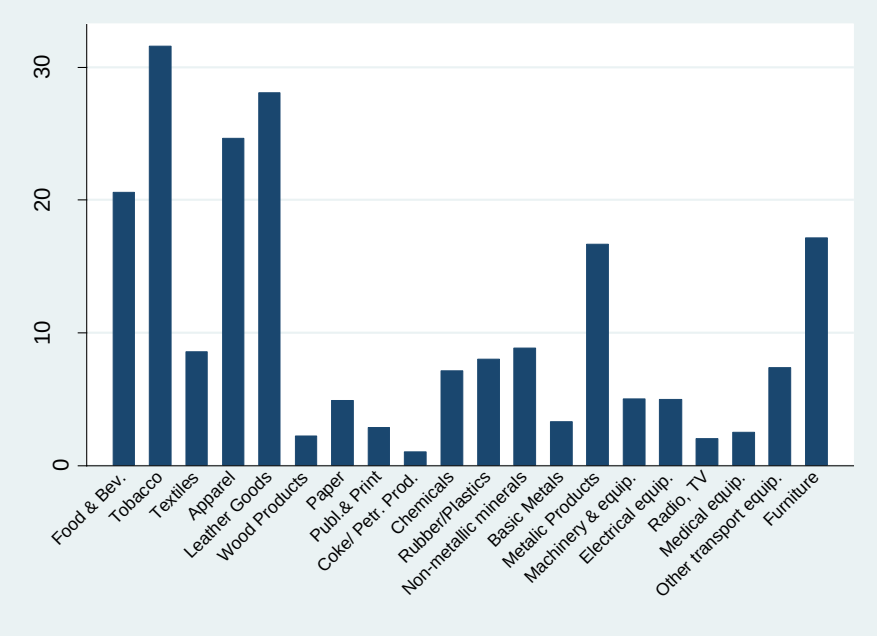
Figure 1: Applied Tariff Rate (2002-2016) (%) -Egypt



Source: World Development Indicators, World Bank

A closer look at the applied tariff rates by sector (Figure 2) shows that tobacco, furniture, metallic products, apparel, leather goods and food and beverages are highly protected sectors, with an applied tariff rate reaching as high as 32% on tobacco imports. Meanwhile, tariffs are lowest on imports of petroleum products, radio, TV & communication equipment, wood products, and medical equipment.

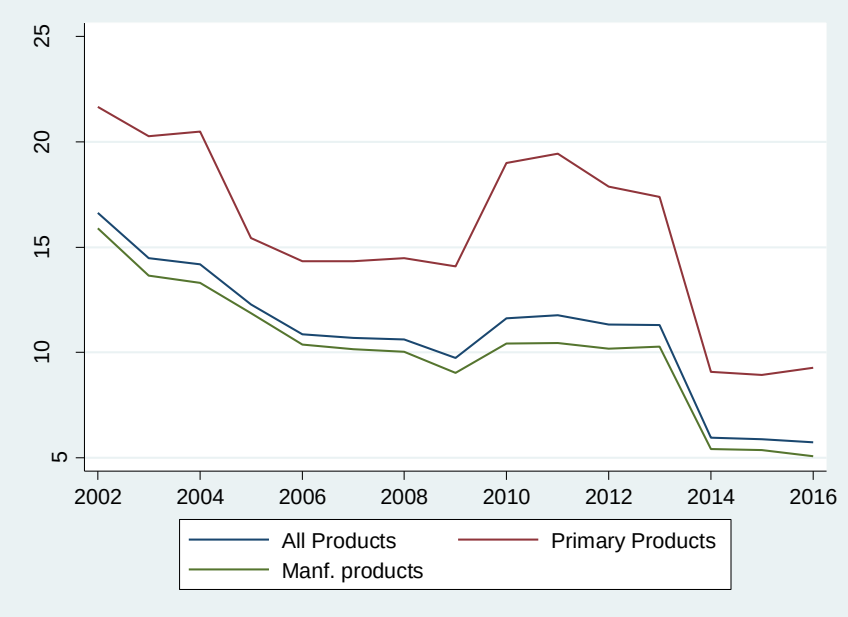
Figure 2: Applied Tariff Rate in 2011, by Sector (%) - Egypt



Source: WITS

Jordan has a relatively lower set of applied tariffs, as compared to Egypt between 2002 and 2016 (Figure 3). Starting with an overall applied tariff rate of 16%, it has dropped to nearly 6%. This is likely to go back to the early liberalisation efforts initiated since the late 1980s. Applied tariff rates on manufactured and primary products had a declining trend since the early 2000s, as a consequence of the signing of the Jordan-U.S. Free Trade Agreement in 2000 and WTO accession in the same year. In 2009, applied tariffs on primary products rose from 14% to more than 19% in 2011 and from 9% to 11% on manufactured products in the wake of the international financial crisis. After a slow decline, applied tariffs dropped in 2014 and remained relatively stable until 2016, reaching 9% for primary products and 5% for manufactured products.

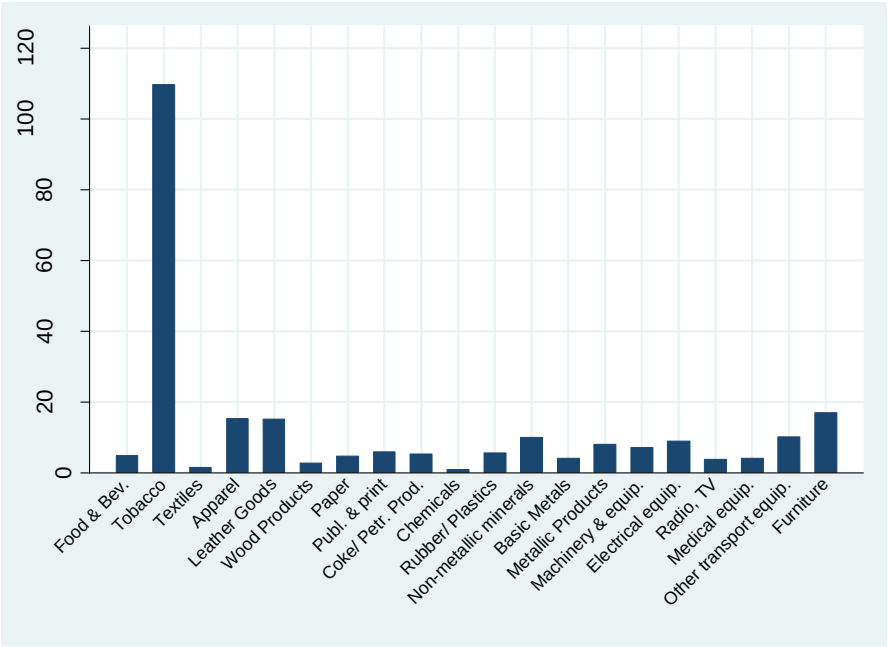
Figure 3: Applied Tariff Rate (2002-2016) (%) - Jordan



Source: World Development Indicators, World Bank.

From a sector perspective (Figure 4), Tobacco has the highest applied tariffs in 2009 (110%). Furniture, apparel and leather goods are the next most protected, yet with a much lower rate (below 20%). Meanwhile, the lowest tariffs concern textiles and chemicals (around 1%).

Figure 4: Applied Tariff Rate in 2009, by Sector (%) - Jordan

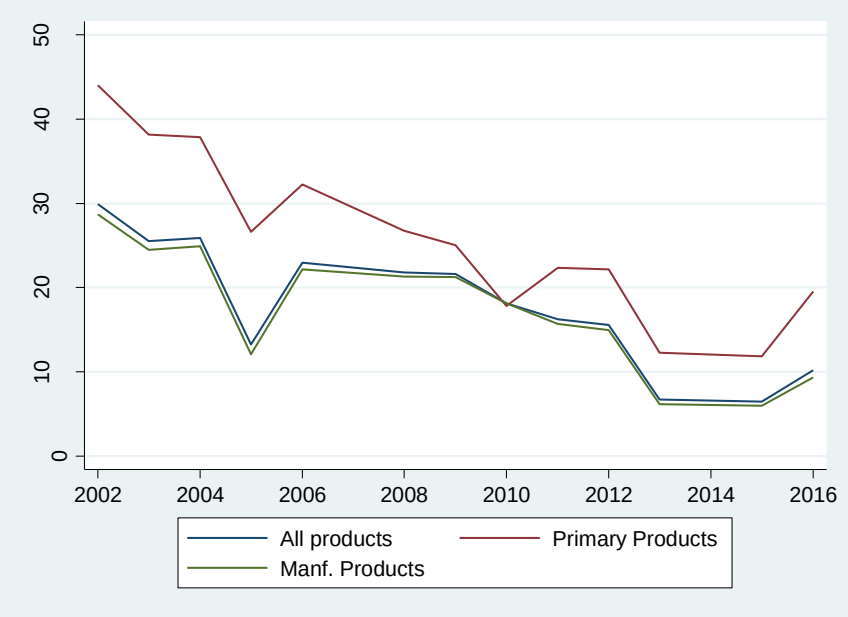


Source: WITS

Tunisia began its trade policy reform in the early 1990s and has further dismantled its tariff and non-tariff barriers with the conclusion of the Association Agreement in 1998. The

average applied tariff has dropped from 30% in 2002 to 10% in 2016 (Figure 5). However, Tunisia's trade policy remains restrictive as compared to other MENA countries, such as Egypt and Jordan. The agricultural sector is also highly protected. Starting with a tariff rate of 45%, primary products are now protected at a tariff of nearly 20%, whilst on manufacturing products, applied tariffs dropped from 20% to only 9% between 2002 and 2016. One sharp drop in applied tariffs interrupted the slow dismantlement of tariffs in 2005. As in the case of Egypt, protection is also on the rise in Tunisia since 2015.

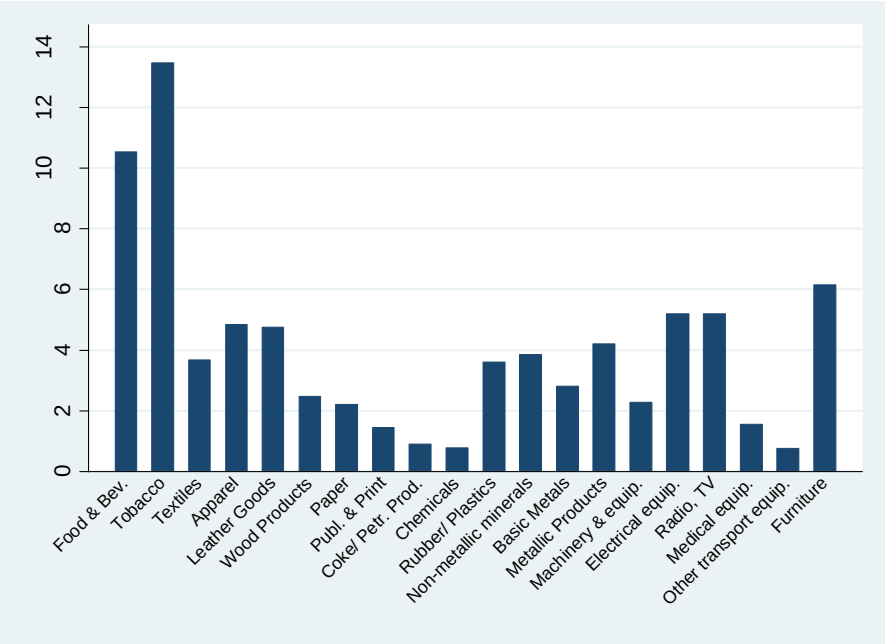
Figure 5: Applied Tariff Rate (2002-2016) (%) - Tunisia



Source: World Development Indicators, World Bank

Similar to the case of Egypt, sectors enjoying a high protection rate are tobacco (13%), food & beverages, and furniture; whereas transport equipment, chemicals, and coke & petroleum products have the lowest tariffs (less than 1%) (see Figure 6).

Figure 6: Applied Tariff Rate in 2013, by Sector (%) - Tunisia



Source: WITS

Non-tariff measures

Despite significant liberalisation efforts in the form of tariff dismantlement, MENA countries tend to protect their local markets by imposing non-tariff measures NTMs. Amongst the three countries in this study, Egypt appears to have the highest number of NTMs compared with Tunisia and Jordan. Studies on NTMs in MENA countries (such as Augier et al. (2012) and Péridy and Ghoneim (2013)), relying on the World Bank's NTM Data, suggest that NTM cover, on average, is about 40% of the products imported by MENA countries and 50% of the value of their imports. The highest concentration of NTMs in MENA countries exists in agricultural and processed food products. Ready-made garments and textile products are also subject to a large number of NTMs. Most NTMs are technical in nature (TBTs), which represent more than one-third of overall NTMs. They are followed by Sanitary and Phyto-sanitary measures (SPS). On the other hand, the incidence of command-and-control instruments, like quantitative restrictions, prohibitions and anticompetitive measures, has declined.

Ad-valorem equivalents (AVEs) of NTMs (price effects) estimated for a large set of countries by Kee et al. (2009) suggests a rate of 41% in Jordan, 40% in Egypt and 39% in Tunisia. AVE estimates, ranging from 30% to 40%, suggest a high protection level and an eventual use of NTMs to substitute declining tariff rates in the three MENA countries. According to the Overall Trade Restrictiveness Index (OTRI), which measures the restrictiveness level of trade policies (tariffs and NTMs as estimated by their AVEs), Egypt is more trade-restricting than Tunisia and Jordan; where OTRI values are 0.411, 0.368 and 0.255 respectively (Kee et al., 2009).

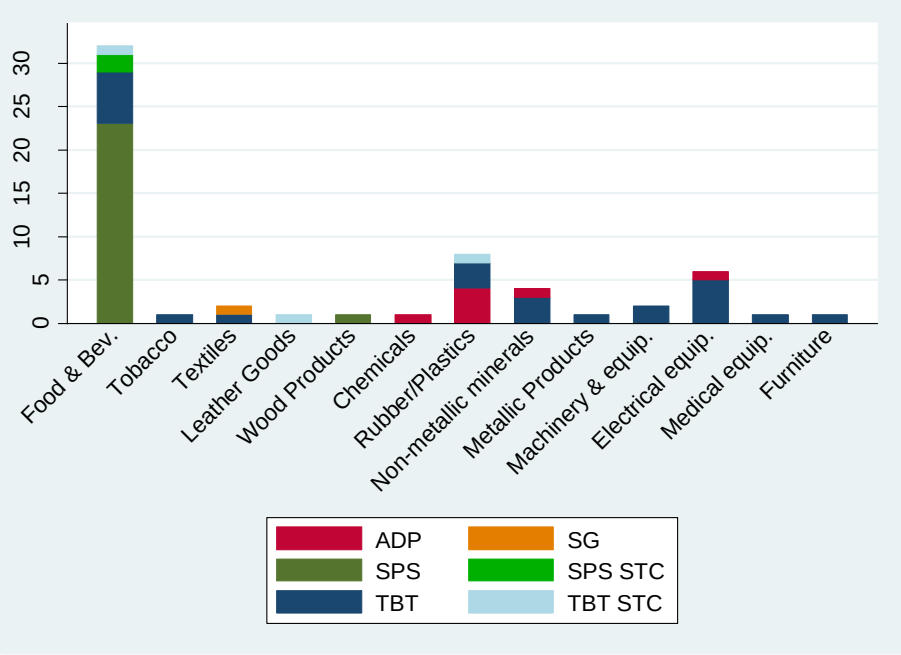
Several studies also documented the trade-reducing impact of NTMs in MENA countries. In Egypt, around two-thirds of imports by value are subject to one or more NTM (Chemingui et

al., 2016). Egypt shows the largest negative coefficient for the effect of NTMs on import values in an econometric investigation by Péridy and Ghoneim (2013). Similary, Ghali et al. (2013) show that NTMs have a deterrent effect on Egyptian imports: an increase of 1% in the proportion of products with at least one NTM lowers Egyptian imports by 0.016%, whilst their effects on Tunisian imports (except for TBTs) are insignificant. NTMs (especially TBTs) are also shown to negatively affect - though to a lesser extent - the extensive margin of Egyptian imports by reducing the range of imported goods.

Data based on private sector perceptions, such as surveys conducted by the ITC on businesses in Arab countries, also indicate that firms face NTM-related obstacles in their intra-Arab regional trade. SPS and TBT measures and associated conformity assessment procedures (such as testing, inspection and certification) are perceived as major challenges for exporting to other Arab countries. Conformity assessment requirements represent 38% (32%) of the burdensome NTMs applied by Arab partner countries on their imports of agricultural (manufacturing) products (ITC report, 2015). In what follows, we analyse the sectoral composition of NTMs in the three MENA countries.

Egypt has the highest number of NTMs amongst the three countries, reaching up to 93 measures. The sectoral distribution of NTMs for Egypt (Figure 7) shows that food and beverages is the most protected sector. The 47 SPS measures account for 51% of the total number of NTMs, whereas the 34 TBTs constitute about 37% of total NTMs. Food & Beverages is the most affected sector, particularly by SPS measures and TBT, followed by Rubber & Plastic products, and Electrical Equipment, which are subject to TBTs and antidumping measures.

Figure 7: NTMs by type and sector -Egypt (2011)

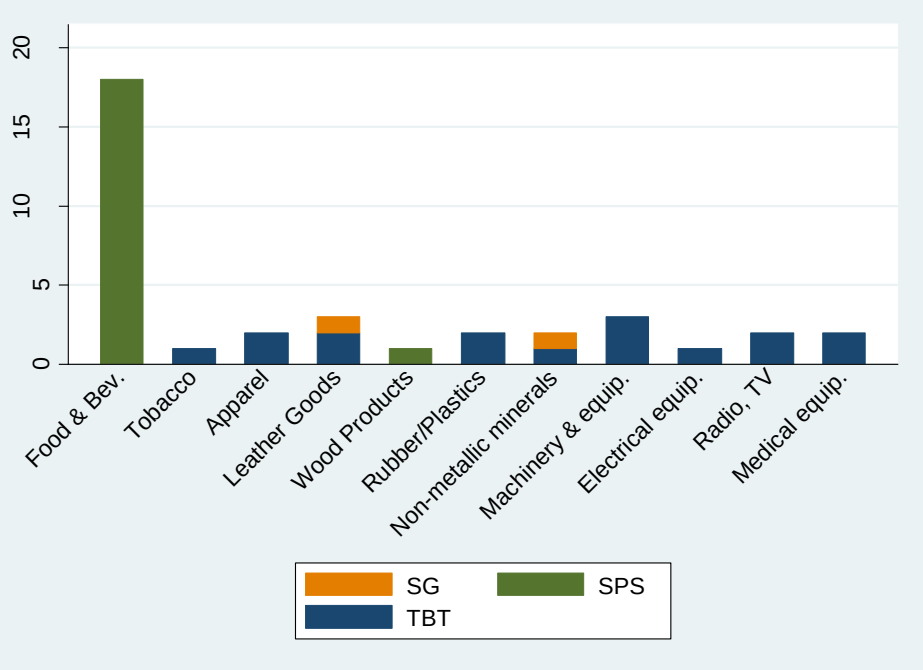


Source: WTO I-TIP

TBTs are also distributed across different sectors. The number of TBT measures is the highest for Food and Beverages, Electrical Equipment, Rubber/Plastic products and Non-metallic minerals. Specific Trade Concerns (STCs) were raised against Egypt for its imposed TBT measures on Food and Beverages (meat), Leather Goods (leather for footwear) and Rubber/Plastic products (tyres). Meanwhile, most Antidumping (ADP) measures apply to Rubber/Plastic products (3 ADP measures on tyres imported from China and India and 1 on Plastic containers imported from Italy). A safeguard tariff-increase measure was applied on Egyptian imports of textiles (cotton yarn).

As for Jordan, the total number of initiated and in force NTMs recorded 30 measures in 2009. These were composed of 21 SPS measures (70% of total NTMs), 7 TBTs (23% of total NTMs) and 2 safeguard tariff-increase measures. Whilst SPS measures mostly apply to the food and beverages sector, TBT are relatively distributed across sectors (with the number of TBT measures highest for Machinery and Equipment, including conformity assessment for product certification). Meanwhile, two safeguard measures (SG) apply to Jordanian imports of Leather Goods (footwear) and Non-metallic minerals (ceramic tiles).

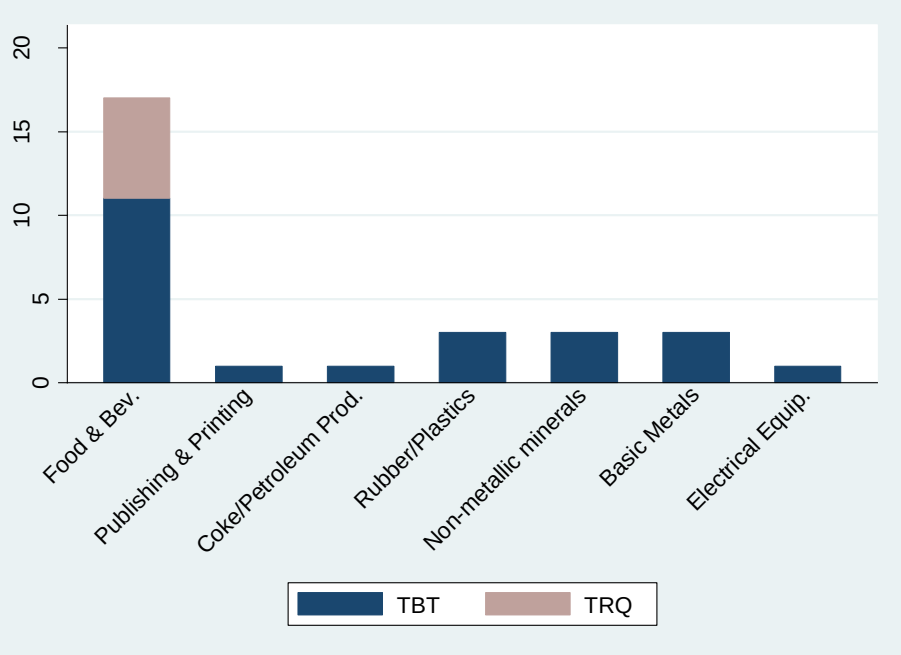
Figure 8: NTMs by type and sector –Jordan (2009)



Source: WTO I-TIP

In the case of Tunisia, the total number of initiated and in force NTMs recorded 39 measures, divided into 26 TBTs and 13 tariff-rate quotas (TRQ). TBTs are, as in the case of Egypt and Jordan, distributed across sectors, but highest for Food and Beverages. Unlike Egypt and Jordan, notified technical measures that affect Food and Beverages in Tunisia are all classified under TBTs rather than SPS measures. Food and Beverages are also subject to tariff-rate quotas (TRQ).

Figure 9: NTMs by type and sector –Tunisia (2013)



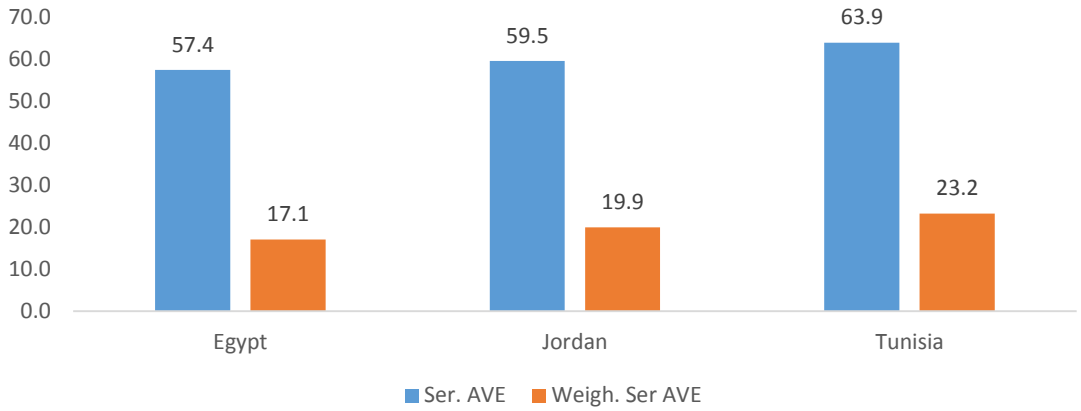
Source: WTO I-TIP.

Services Trade Policy

Whilst the MENA region has liberalised its tariff structure, services remain relatively protected when compared to other developing regions, such as Latin America and the Caribbean and Sub-Saharan Africa (Karam and Zaki, 2019). Figure 10 compares the Ad-Valorem Equivalent (AVE) of services restrictions (Fontagne et al, 2016) for our three countries of interest and shows that Egypt is the least protective, followed by Jordan, then Tunisia being the most restrictive. This is in line with the number of the commitments made by each country at the World Trade Organisation. Indeed, both Egypt and Jordan have more commitments than Tunisia, which guarantees that services are more liberalised (Karam and Zaki, 2013). Indeed, with a commitment, a government binds the specified level of market access and national treatment and cannot impose any new measures that would restrict entry to the operation of the service (see Table 1).

Yet, since the focus of this paper is the manufacturing sector, we followed Karam and Zaki (2019) who calculated the AVE of services weighted by their contribution into the manufacturing sector using input-output tables. Whilst the AVEs are lower (see Figure 10), Egypt remains the least restrictive followed by both Jordan and Tunisia. 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 (see Figure 11).

Figure 10: Ad-Valorem Equivalent of Services by Country



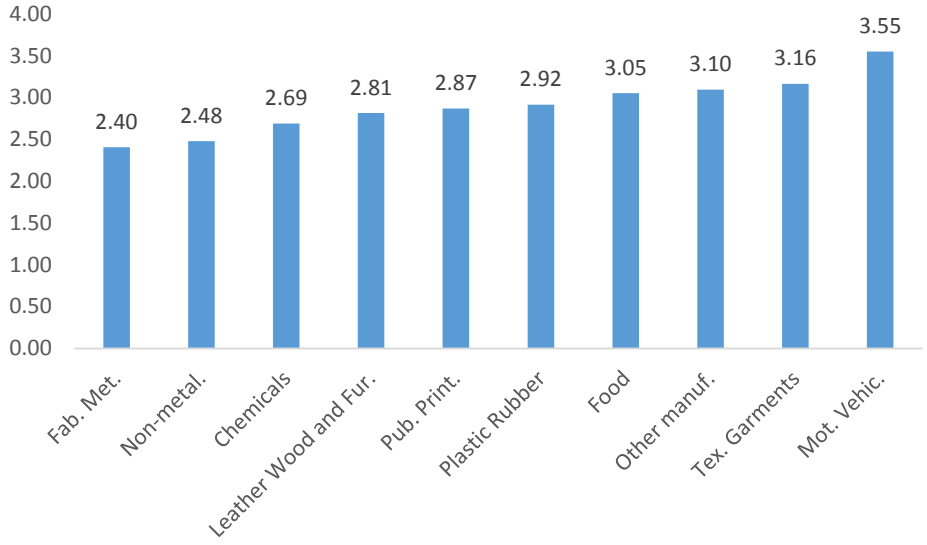
Source: Fontagne et al (2016) and Karam and Zaki (2019).
Note: (i) AVE values come from Fontagné et al. (2016) who use trade data for 2011 from the GTAP database to derive AVEs of restrictions on trade in services for 118 countries and 9 sectors: Communications, Construction, Other Business Services, Transport, Trade, Insurance, Other Financial Intermediation, Water and Transport, and Other Government Services. The AVEs are derived from a quantity method using a gravity model of trade. The econometric estimation is performed sector by sector and the reported AVEs are based on an assumption of common elasticity of substitution across sectors.
(ii) Karam and Zaki (2019) calculated weighted AVE of service by multiplying the AVE in service sectors *s* by the share of services s required in the manufacturing sector *k IO* coming from Input-Output tables as follows: $Ser.Prot._{jk} = \sum_s AVE_{sj} IO_{skj}$.

Table 1: Number of Commitments by Country and Sector

	Egypt	Jordan	Tunisia	Average MENA
Computer and information services	0	1	0	1
Other business services	0	5	0	3
Communications services	1	3	1	2
Construction services	3	5	0	5
Insurance services	1	1	1	1
Financial services	2	1	1	1
Government services, n.i.e.	0	8	0	6
Travel	4	2	2	2
Personal, cultural and recreational services	0	4	0	2
Transportation	1	7	0	4
Total	12	37	5	27

Source: Adapted from Karam and Zaki (2013).

Figure 11: Ad-Valorem Equivalent of Services by Sector



Source: Adapted from Karam and Zaki (2019).

3.2. Wage inequality in the MENA Region

Table 2 indicates average real monthly wages in Egypt, Jordan and Tunisia, in addition to real monthly wages across gender, region and skill specifications. A quick look at the table allows for two straightforward comments: First, at the country level, the average real monthly wage is highest for Jordan (332.7 USD), followed by Tunisia (216.5 USD) and lastly Egypt (138.4 USD), with an average real wage of only 41.6% of that in Jordan. Second, skill premium is naturally in line with both the theoretical and empirical literature. The sample (or 3-country) average real monthly wage is consistently higher for non-production workers than for production workers across both gender and regional dimensions.

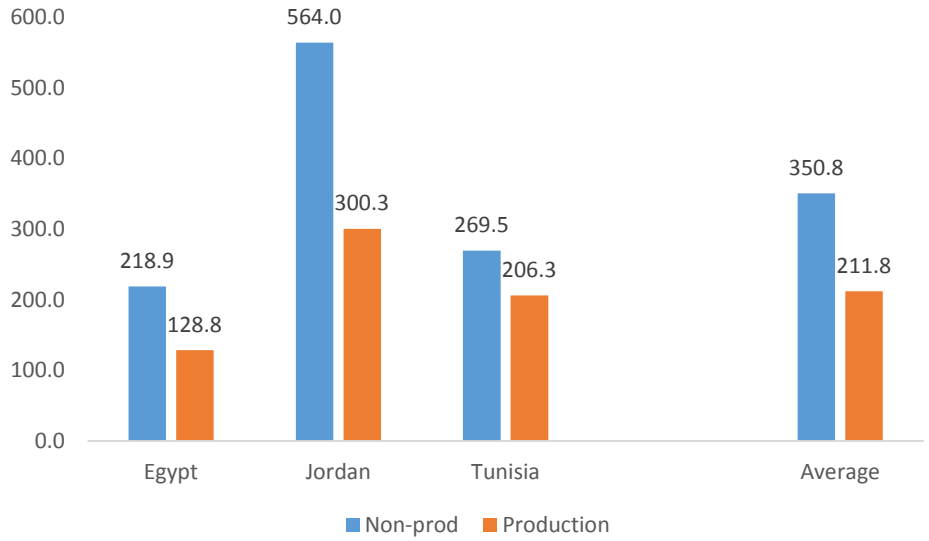
Table 2. Average Wage by Labour Segment and Country

			Egypt	Jordan	Tunisia	Average
Male	Rural	Non-prod	188.6	423.5	268.9	278.0
		Production	124.0	275.2	213.9	194.0
	Urban	Non-prod	239.2	643.0	293.0	355.8
		Production	143.1	324.4	213.4	214.8
Female	Rural	Non-prod	103.2	501.0	190.9	214.5
		Production	80.0	205.8	155.2	136.7
	Urban	Non-prod	204.4	346.0	203.8	243.4
		Production	99.8	173.0	222.1	156.5
Average			138.4	332.7	216.5	215.2

Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.

A further look into the data allows for several detailed observations. First of all, the skill premium for each country is also consistent with the literature. Figure 12 depicts average real monthly wages for production and non-production workers by country. Non-production workers' remunerations are highest in Jordan (564 USD), followed by Tunisia (269.5 USD) and Egypt (218.9 USD). Meanwhile the wage inequalities between skilled and unskilled labour are lowest in Tunisia, followed by Egypt, and highest in Jordan. In the latter, real wages of unskilled labour represents only 53.2% of skilled labour real wages, followed by a ratio of 58.8% for Egypt and 76.5% for Tunisia.

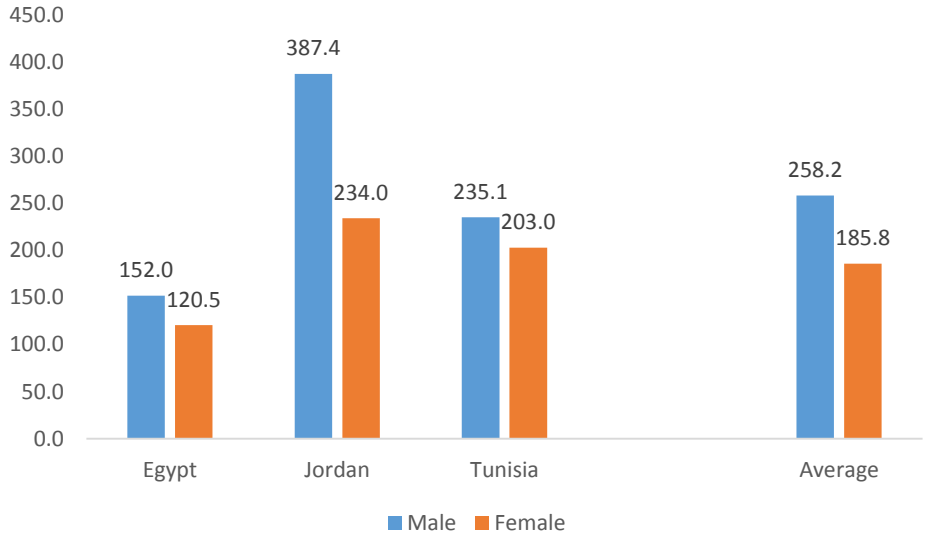
Figure 12. Average Wage by Skill and Country



Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.
(iii) Non production workers include managers, professionals, technicians and associate professionals, clerical support workers and service and sales workers,

Wage inequalities between male and female employees are also consistent with the literature. The three-country average wage (Figure 13) is 258.2 USD for male workers versus 185.8 USD for female workers, with a ratio of 1: 0.72. The figure also shows that – similar to skill-premium - the gender wage gap is narrowest in Tunisia, followed by Egypt and is widest in Jordan. In Tunisia, women earn 86.3% of men's salaries on average. In Egypt, this ratio is 79.3%, whilst in Jordan it is as low as 60.4%. These variances can be explained by differences in male and female education (especially higher education), labour market activity, employment, and job quality and related skill sets in each of the three countries. Also, a number of institutional and cultural reasons may lie behind these differences (Hendy, 2016 and Nazier et al, 2018).

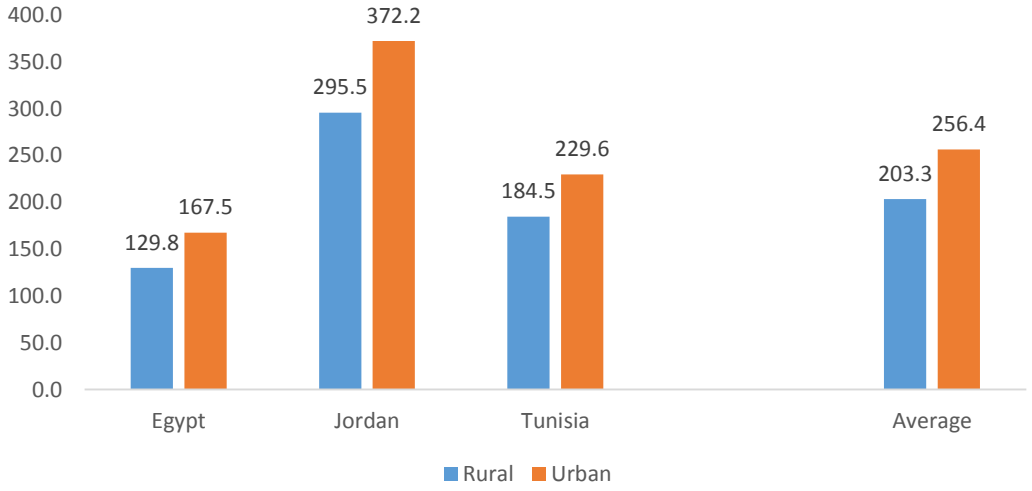
Figure 13. Average Wage by Gender and Country



Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.

In contrast to skill and gender dimensions, regional wage inequalities are close in the three countries (see Figure 14). On average, real monthly wages in rural areas account for 79.3% of those in urban areas. In line with the two previous specifications (skill and gender), wage inequalities between urban and rural areas are the lowest in Tunisia, where rural wages account for 80.4% of urban wages. Meanwhile, Egypt records the highest inequalities according to this dimension, where rural wages account for only 77.5% of urban wages. In Jordan, the ratio is 79.4%.

Figure 14. Average Wage by Region and Country

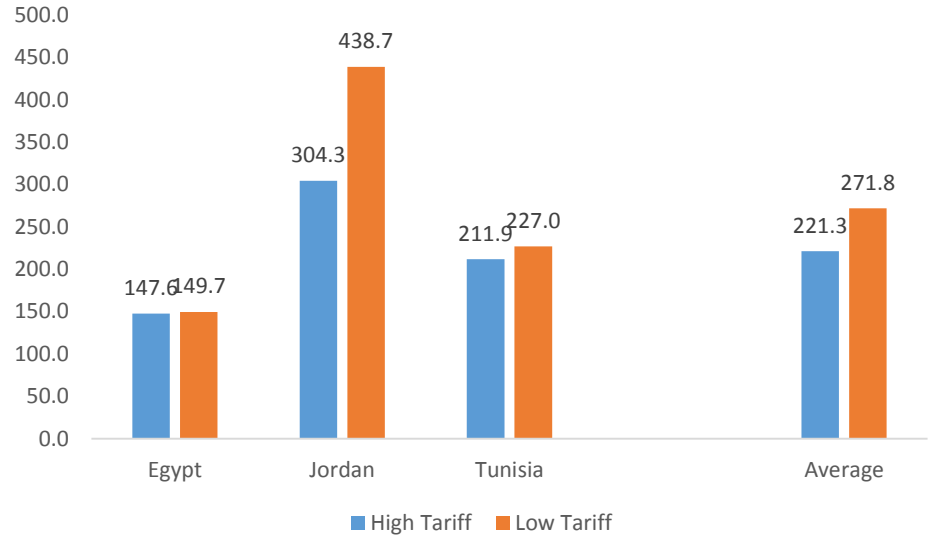


Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.

We now use the data to analyse the interaction between trade policy and wage inequality. Figure 15 contrasts real monthly wages in sectors with high tariffs to those in sectors with low tariffs. High tariffs are those above the median. On average, real wages in less protected sectors are 1.2 times higher than those in highly protected ones. This is in line with the theoretical and empirical literature on productivity gains and skill bias due to liberalisation. As discussed earlier, dismantlement of tariffs and increased exposure to competition from abroad in the import sector encourages firms to hire more skilled labour in order to resist competition. Aside from skill premium, industry premium and increased demand for female labour could also serve to partially explain these wage differentials. To verify this, more information is needed on the different industries with high and low tariffs, and on the gender component of these industries.

The nexus between protection and wage differentials (see Figure 15) is highly observable in Jordan, where wages in less protected sectors is 1.4 times higher than those paid in highly protected sectors. Wage differentials are less observable in Tunisia (1.07 to 1) and negligible in Egypt (1:1.01).

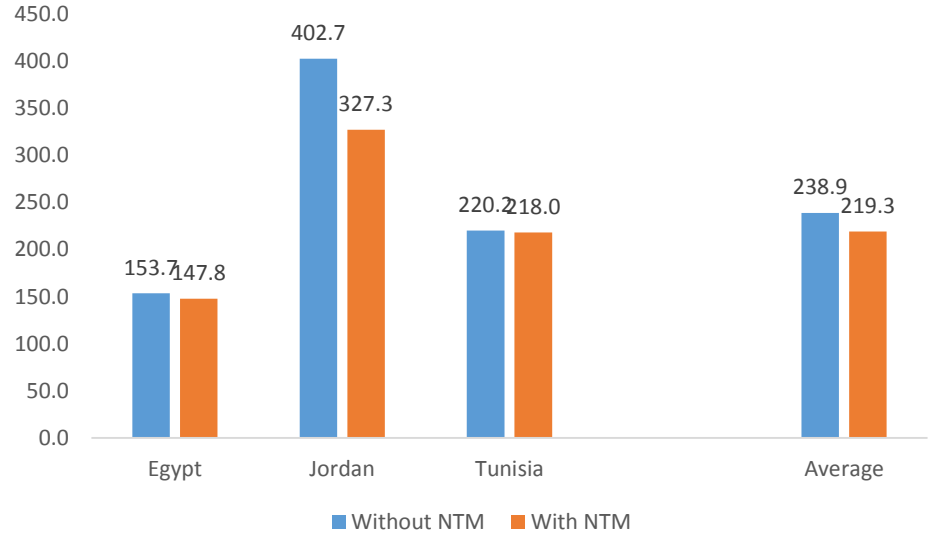
Figure 15. Wages and Tariffs



Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.
(iii) High tariff means a sector with a tariff greater than the median one.

The relation between NTMs and wage differentials, however, is less obvious than in the case of tariff barriers. Average real monthly wages paid in sectors that are not subject to NTMs are only 1.08 times higher than those paid in sectors with NTMs (Figure 16). The ratio of wages in open sectors versus wages in sectors with NTMs is - as in the case of tariffs - highest for Jordan (1.2 to 1), and negligible for Egypt and Tunisia.

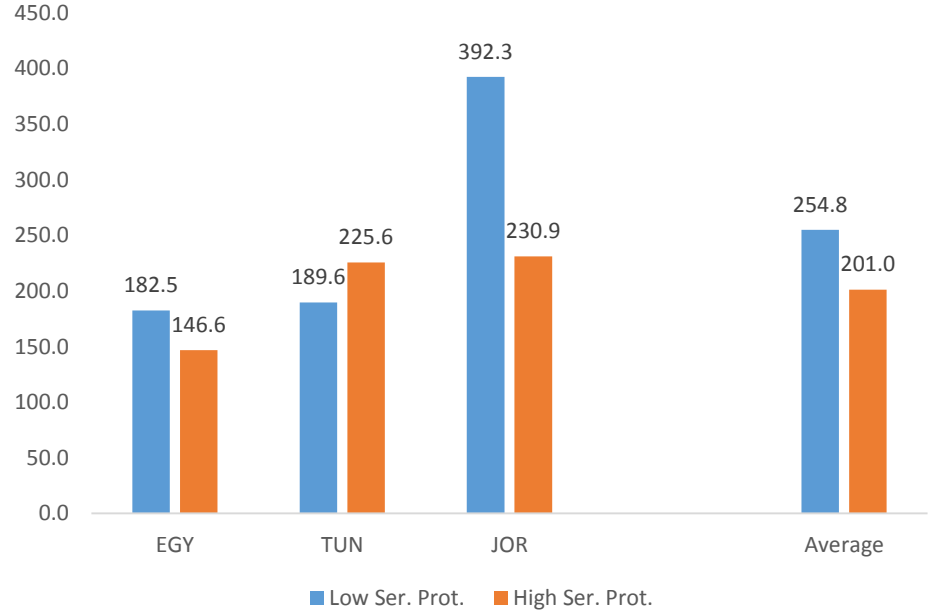
Figure 16. Wages and NTMs



Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.
(iii) With NTM means that there is a least one non-tariff measure imposed on this sector.

Figure 17 shows the relationship between wages and AVE of services. Whilst sectors that are more protected have a lower wage in Egypt and Jordan, this is reversed in Tunisia.

Figure 17. Wages and AVE of Services



Source: Constructed by the authors using different rounds of Labour Force Surveys.
Note: (i) Figures represent real monthly wage in constant USD (2010).
(ii) Variance scaled to handle strata with a single sampling unit.
(iii) *Low Ser Prot.* means a sector with an AVE of services greater than the median one

In the sections to follow, we empirically investigate the impact of trade policy on wage inequalities in the three countries using two different methods: a one-step analysis in the framework of the human capital model, and a two-step analysis relying on the logic of wage premiums.

4. Methodology and Data

4.1. 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. The natural logarithm of real hourly wage[5] $Log(w_{igs})$ of individual *i* living in region *g* and working in sector *s* 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 Z_s (tariffs, non-tariff measures and the ad-valorem equivalent of services). It is also important to include industry indicators that allow for non-observable industry characteristics α_{is}. The coefficient on the industry dummy, the wage premium, captures – as explained in the literature review - the part of the variation in wages that cannot be explained by worker characteristics, but is explained by the workers' industry affiliation.

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

with ε_{igs} as the discrepancy term.

4.2. A Two-Step Analysis: The Wage Premiums

In order to determine the impact of different trade barriers on wage premiums, we first have to run the previous model without including trade barriers, then retrieve the industry effects to be explained by trade barriers at a later stage. In other words, the first step will be as follows:

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

In a second step, following Attanasio et al. (2004),[6] industry wage premiums wp_s are obtained by filtering out the effects of observable worker characteristics. Therefore, they are regressed on a vector of trade policy variables, namely tariffs Tar_s, non-tariff measures NTM_s, and ad-valorem equivalents of specific services (SER) as follows:

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

[5]Hourly real wages are calculated as the sum of wages earned in the reference month from primary jobs, adjusted for average number of work days per month and average hours per day.

[6]For more details about the wage premium estimation, see Gaston and Trefler (1994), Attanasio et al (2004), Dutta (2007), and Said and El Azzawi (2009)

Hence, it is possible to determine the effect of each barrier on the inter-industry wage premium.[7] Our data comes from several sources. First, we use three Labour Market Panel Surveys for Egypt (2012), Jordan (2010) and Tunisia (2014) from the Economic Research Forum. Second, tariffs come from WITS dataset, while non-tariff measures come from UNCTAD. As per AVE of services, we use service trade restrictiveness weighted by the input-output technical coefficient of service sectors (Karam and Zaki, 2019).

Before presenting the results, it is worth mentioning that workers in an industry with high tariffs, non-tariff measures and AVEs of services are expected to be paid less than workers with identical characteristics in an industry with low tariffs and no NTMs. Heavily protected industries that are less productive, also employ less productive workers who should be earning lower wages. Thus, trade policy reform affects industry-level productivity which, in turn, boosts wages thanks to trade liberalisation or facilitation in these sectors.

5. Empirical Findings

In our one-step analysis (Table 3), our control variables have the expected sign, as highlighted by the literature. In fact, the effect of age is positive and statistically significant, but it is non-linear, since the squared term is negative in different regressions. The number of years of schooling, however, is insignificant. At the institutional level, whilst working in the public sector does not have a premium over the private sector, membership of a trade union has a positive and significant effect on wages especially in our sample in Tunisia, which has a strong civil society and active trade unions. Being a female or a non-production worker is negative and significant, pointing out how wage disparities do matter at the gender and the skill level in all regressions. Regional inequalities are less pronounced, since residing in an urban region is not significant in all the regressions. As for our variables of interest, tariffs – when introduced in isolation - are negative and significant (at the 90% level and the coefficient is relatively small), and otherwise insignificant when introduced in the same regression with NTMs and AVEs of services. Meanwhile, NTMs are found to be insignificant, whereas AVEs of services are negative and significant at the 90% level when introduced in isolation and insignificant in the regression, including all trade barriers.

We interact each of our trade policy variables (tariffs, NTMs and AVEs of services) with each labour segment (production workers, female workers, urban workers) for a deeper insight into the link between trade policy and wage disparities on these three different levels (Table 4). Again, our control variables have the expected signs. At the skill level, the effect of tariffs is

[7] To remedy the sensitivity of the estimated wage premiums with respect to the omitted industry dummy, we follow Haisken-DeNew and Schmidt (1997) who calculated the wage premiums as deviations from an employment weighted mean as follows:

$$(wp_s^*) = [I - W]wp_s \qquad (4)$$

where wp_s^* is the normalised wage differentials, I is an identity matrix and W is a matrix of industry employment weights with each element $w_s = \frac{n_s}{\sum_s n_s}$, where n is the number of workers in industry s. Thus, equation 3 is estimated using the normalised wage differentials not the estimated ones.

stronger for production workers than for non-production workers, whereas NTMs and services appear to have less impact on real wages for this category. The results are interesting since they reflect the significance of tariffs and imply the importance of tariff dismantlement on increasing productivity (and real wages) for this category. At the gender dimension, except for the interaction term including NTMs, all trade policy variables and their interaction terms are not significant. Indeed, NTMs appear to exert a more negative effect on women compared to men. Finally, at the regional level, except for tariff measures that have a significantly negative effect, all other trade policy variables and all interaction terms are not significant.

Yet, we believe that the two-step analysis is more robust, since the individual characteristics are filtered-out in the first stage and the effect of trade policy variable on wage premiums is examined in at a second stage. Hence, we first run the regressions without trade policy variables (Table 5a). After having retrieved the industry wage premium, we explain it by trade policy variables in the second step (Table 5b). Our findings for the two-step analysis are more interesting. Again, our control variables have the expected signs, but are not always significant for the three countries. As for the segments (region, gender, skill), the signs are also expected; the coefficient for urban areas is positive, yet significant only in the case of Egypt. This is in line with the literature on the economies of agglomeration, where inequality is likely to increase in the periphery as compared to core (urban) regions. Also, the fact of being a production worker or a female worker is negative and significant for Egypt and Jordan, and negative but insignificant for Tunisia. Inequalities appear to be more pronounced in Egypt for the three dimensions, at the skill and gender level in Jordan, and absent in the case of Tunisia. The results are in line with the statistics, where inequalities were the lowest in the Tunisian case.

In the second step, we regress the industry wage premium on the three categories of trade policy: tariffs, NTMs and services AVEs. When each type of barriers is regressed alone, tariffs are insignificant, whilst NTMs and services AVEs are negative and significant at the 90% level. When the three trade policy categories are included together in one regression, we observe that their impact is negative and significant (at the 90% level for tariffs and services AVEs and the 95% level for NTMs). The results are in line with the literature; where industries with higher protection levels are associated with lower productivity, hence lower real wages for workers. The results are more significant for NTMs, highlighting the importance of going beyond traditional tariff liberalisation and considering reduction or removal of excessive measures. Also, a better and more efficient provision of services necessary for the manufacturing sector are likely to increase productivity and wages. Interestingly, the values of the coefficients in Table 4b show that the effect of both NTMs and AVEs of services is stronger than that of tariffs, showing how the former matter more than the latter at the microeconomic level.

Table 3: Effect of Trade Barriers on Wages – All countries – One Step Analysis

	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

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

Table 4: Effect of Trade Barriers on Wages – All countries – One Step Analysis – By Segment

	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

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

Table 5: Effect of Trade Barriers on Wages – Two Step Analysis

(a) First stage

	Egypt Ln(RHW)	Tunisia Ln(RHW)	Jordan 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

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

(b) 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

Notes: (i) Standard errors in parentheses.
(ii) *** p<0.01, ** p<0.05, * p<0.1
(iii) To remedy the sensitivity of the estimated wage premiums with respect to the omitted industry dummy, we follow Haisken-DeNew and Schmidt (1997), who calculated the wage premiums as deviations from an employment weighted mean.

6. Conclusion and Policy Implications

This 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. These disparities are studied in four dimensions: wage premiums, gender (males versus females), qualification (skilled versus unskilled), and regional (urban versus rural workers). We use three datasets, which are the Egyptian Labour Market Panel Survey (2012), the Jordanian Labour Market Panel Survey (2010) and the Tunisian Labour Market Panel Survey (2014). Following Goldberg and Pavnick (2004) and Zaki (2013), we directly assess the effect of trade policy on wage disparity, using the human capital model (Mincer, 1974) to which different trade barriers are added. Our results suggest that, in general, the effect of services restrictions and non-tariff measures is much stronger than that of tariffs on wage premium. When we look at different segments, we found that females are more affected by non-tariff measures than their male counterparts. At the skill level, and given the abundance of blue collar workers in the MENA region, production workers are less affected by both non-tariff measures and by services restrictions than non-production workers but are more affected by tariffs. Finally, all trade barriers do not have a differential effect on urban vs. rural workers.

Our findings are interesting for two reasons: first of all, MENA countries have carried out significant tariff dismantlement efforts since the 1990s, whilst this has not always been the case for NTMs. NTM dismantlement is also not as straightforward as tariff dismantlement, since NTMs (such as SPS measures or TBT) are usually applied for "legitimate" objectives. However, they may sometimes be used to protect domestic producers from foreign competition for socio-political reasons. The presence of NTMs causes market distortions and lowers productivity within protected sectors, leading to lower wages. Hence, exposure to liberalisation and increased competition with foreign firms producing imported goods, encourages firms to be more productive. These productivity gains are, therefore, associated with higher real wages.

Second, NTMs and associated low wages in developing countries may particularly affect female workers who are concentrated in low-skilled activities. Liberalisation, in the form of rationalising the use of NTMs and eventual dismantlement of excessive measures, is therefore expected to trigger a more efficient allocation of production factors. From a gender perspective, this may lead to increased demand for female labour, increased wages, and reduced wage disparities at this level. At the skill premium level, trade liberalisation and increased competition with foreign firms could be associated with increased specialisation according to comparative advantage. This may trigger employment shifts from highly skill-intensive sectors to sectors that are intensive in production (less-skilled) workers, reducing wage disparities between skilled and unskilled labour.

References

[1] Aguayo-Tellez, E., Airola, J., Juhn, C., and Villegas-Sanchez, C. (2012). *Did Trade Liberalisation Help Women? The Case of Mexico in the 1990s*. National Bureau of Economic Research.

[2] Aguayo-Tellez, E., Airola, J., and Juhn, C. (2010) "Did Trade Liberalisation Help Women? The Case of Mexico in the 1990s," *NBER Working Paper* No. 16195, July.

[3] Araújo, B., Bogliacino, F., and Vivarelli, M. (2009) "The Role of Skill Enhancing Trade in Brazil: Some Evidence from Microdata," IZA Discussion Paper No. 4213, June.

[4] Artecona, R. and Cunningham, W. (2002) "Effects of Trade Liberalisation on the Gender Wage Gap in Mexico," The World Bank, May.

[5] AlAzzawi, S. and Said, M. (2009). *Trade liberalisation, inter-industry wage differentials and job quality in Egyptian manufacturing*. Gender and Work in the MENA Region Working Paper.

[6] AlAzzawi, S. (2011). *Did Trade Liberalisation Benefit Female Workers? Evidence on Wage and Employment Effects from Egypt*. The Gender Economic Research and Policy Analysis.

[7] Assaad, R. (2007) "Labour supply, employment and unemployment in the Egyptian economy: 1988–2006." Population Council Working Paper 0701.

[8] Attanasio, O., Goldberg, P., and Pavcnik, N. (2004). Trade Reforms and Wage Inequality in Colombia, *Journal of Development Economics*, 74, 331–366.

[9] Augier, P. and Péridy, N.,2010. *The Inventory of NTMs in MENA Countries*. The World Bank.

[10] Augier, P., Cadot, O., Gourdon, J., and Malouche, M, 2012. *Non-tariff measures in the MENA region: Improving Governance for Competitiveness.*

[11] Autor, D., Dorn, D., and Hanson, G. (2013). The China Syndrome: Local Labour Market Effects of Import Competition in the United States. *American Economic Review*, 103(6), 2121–2168.

[12] Blom, A., Goldberg, P., Pavnick, N., and and Schady, N. (2004) "Trade Policy and Industry Wage Structure: Evidence from Brazil," *World Bank Economic Review* 18(3), pages 319-344, December.

[13] Bantout, O. and Jean, S. (1998) Sensibilité des salaires relatifs aux chocs exogènes de commerce international et de progrès technique : une évaluation d'équilibre général", *CEPII Working Paper*, No 1998 – 09 Septembre.

[14] Barssoum, G. (2007) "Egypt labour market panel survey 2006: Report on methodology and data collection." Economic Research Forum (ERF) Working Paper 0704.

[15] Becker, G. (1971) *The Economics of Discrimination*, 1st ed. (Chicago: University of Chicago Press).

[16] Chakrabort, P., and Raveh, O. (2018). Input-trade liberalisation and the demand for managers: Evidence from India. *Journal of International Economics*, 111, 159-176.

[17] Chemingui, M., Feki, K. and Sloan, J., 2016. *Quantifying the Trade and Economic Effects of Non-Tariff Measures in the Arab Region.*

[18] Chen, B., Yu, M., and Yu, Z. (2017). Measured skill premiums and input trade liberalisation: Evidence from Chinese firms. *Journal of International Economics*, 109, 31-42.

[19] Cho, S. and Díaz, J. (2013). Trade Integration and the Skill Premium: Evidence from a Transition Economy. *Journal of Comparative Economics*, 41(2), 601-620.

[20] Costa, F., Garred, J., and Pessoa, J. (2016). *Winners and Losers from a Commodities-for-Manufactures Trade Boom*. Available at: http://socialsciences.uottawa.ca/economics/sites/socialsciences.uottawa.ca.economics/files/1603e.pdf

[21] Currie, J. and Harrison, A. (1997). Sharing the Costs: The impact of Trade Reform on Capital and Labour in Morocco, *Journal of Labour Economics*, 15(3), S44–S71.

[22] Cagatay, N. (2001) "Trade, Gender and Poverty," *United Nations Development Programme*.

[23] Dutta, P. (2007) "Trade Protection and Industry Wages in India," *Industrial and Labour Relations Review* 60 (2): 268–86.

[24] Egypt - Labour Market Panel Survey, ELMPS 2012: OAMDI, 2016. Labour Market Panel Surveys (LMPS), http://erf.org.eg/data-portal/. Version 2.2 of Licensed Data Files; ELMPS 2012. Egypt: Economic Research Forum (ERF).

[25] El-Hamidi, F. (2008) "Trade liberalisation, gender segmentation, and Wage Discrimination: Evidence from Egypt," Economic Research Forum Working Paper 414.

[26] Erten, B., and Leight, J. (2017). *Exporting out of Agriculture: The Impact of WTO Accession on Structural Transformation in China*. Mimeo.

[27] Feenstra, R. and Hanson, G. (2001) "Global Production Sharing and Rising Inequality: A Survey of Trade and Wages," NBER Working Paper 8372, July.

[28] Fontagne, L, Mitaritonna, C. and Signoret, J. (2016), "Estimated Tariff Equivalents of Services NTMs", CEPII Working Paper 2016-20, CEPII, Paris.

[29] Gaston, N. and Trefler, D. (1994) "Protection, Trade, and Wages: Evidence from U.S. Manufacturing," *Industrial and Labour Relations Review* 47 (4) (July): 574–93.

[30] Ghali, S., Zitouna, H., Karray, Z., and Driss, S., 2013. *Effects of NTMs on the Extensive and Intensive Margins to Trade: The Case of Tunisia and Egypt*. The Economic Research Forum.

[31] Goh, C. and Javorcik, B. (2005) "Trade Protection and Industry Wage Structure in Poland," *NBER Working Papers* 11143, National Bureau of Economic Research.

[32] Goldberg, P. and Pavnick, N. (2007a) "The Effects of the Colombian Trade Liberalisation on Urban Poverty," in Harrison, A. (ed) *Globalisation and Poverty*, NBER and University Chicago Press 2007. pages 241–290.

[33] Goldberg, P. and Pavnick, N. (2007b) Distributional Effects of Globalisation in Developing Countries," *Journal of Economic Literature*, 45(1), pages 39–82, March.

[34] Goldberg, P. and Pavcnik, N. (2004) Trade, Inequality, and Poverty: What Do We Know? Evidence from Recent Trade Liberalisation Episodes in Developing Countries." Evidence from Recent Trade Liberalisation Episodes in Developing Countries. Paper prepared for the 2004 Brookings Trade Forum on "Globalisation, Poverty and Inequality: What Do We Know? Where Are We Going?" Washington DC, May, 2004.

[35] Gonzaga, G., Filho, N., and Terra, C. (2006). Trade liberalisation and the evolution of skill earnings differentials in Brazil. *Journal of International Economics*, 68(2), 345-367.

[36] Grossman, G. (1986). Imports as a cause of injury: The case of the U.S. steel industry. *Journal of International Economics*, 20(3-4), 201-223.

[37] Gupta, A. (2015). *Effect of Trade Liberalisation on Gender Inequality: Empirical Evidence from India*. Ph.D. Thesis, University of Houston.

[38] Haisken-DeNew, J. and Schmidt, C. (1997) "Inter-Industry and Inter-Region Differentials: Mechanics and Interpretation," *Review of Economics and Statistics*, 79 (3), pages 516–21.

[39] Hendy, R., & Zaki, C. (2013). Assessing the effects of trade liberalisation on wage inequalities in Egypt: a microsimulation analysis. *The International Trade Journal*, 27(1), 63-104.

[40] Jordan-Labour Market Panel Survey, JLMPS 2010: OAMDI, 2018. Labour Market Panel Surveys (LMPS), http://erf.org.eg/data-portal/. Version 3.4 of Licensed Data Files; JLMPS 2010. Egypt: Economic Research Forum (ERF).

[41] Karam, F., & Zaki, C. (2019). A new dawn for MENA firms: service trade liberalisation for more competitive exports. *Applied Economics*, 1-17.

[42] Karam, F., & Zaki, C. (2013). On the determinants of trade in services: Evidence from the MENA region. *Applied Economics*, 45(33), 4662-4676.

[43] Kee, H., Nicita, A. and Olarreaga, M. (2009) "Estimating Trade Restrictiveness Indices," *Economic Journal*, Royal Economic Society, vol. 119(534), pages 172–199, 01.

[44] Klein, C., Moser, C., and Urban, D. (2010) "The Contribution of Trade to Wage Inequality: the Role of Skill, Gender and Nationality," NBER Working Paper Series, No. 15985, May.

[45] Krugman, P. and Livas-Elizondo, R. (1996) "Trade Policy and the Third World Metropolis," Journal of Development Economics, Vol. 49, pages 137–150.

[46] Korinek, J. (2005). *Trade and Gender: Issues and Interactions*. OECD Trade Policy Working Paper No. 24.

[47] Kovak, B. (2013). Regional Effects of Trade Reform: What Is the Correct Measure of Liberalisation? *American Economic Review*, 103(5), 1960–1976.

[48] Leonardi, M. and Meschi, E. (2016). *Do Non-Tariff barriers to trade save jobs and wages? In:* "Untapped Potential for Growth and Employment Reducing the Cost of Non-Tariff Measures in Goods, Services and Investment" Vienna Pronto conference.

[49] Meschi, E., Taymaz, E. and Vivarelli, M. (2009) "Trade, Technology and Skills: Evidence from Turkish Microdata," Jena Economic Research Papers, No. 2009097, November.

[50] Milanovic, B and Squire, L. (2007) "Does Tariff Liberalisation Increase Wage Inequality? Some Empirical Evidence," in "*Globalisation and Poverty*." Edited by Ann Harrison, University of Chicago Press: Chicago, pages 143–182.

[51] Mincer, J. (1974) *Schooling, Experience and Earnings*. Columbia University Press: New York.

[52] Moenius, J. (2004) "Information versus Product Adaptation: The Role of Standards in Trade", International Business and Markets Research Centre Working Paper, Kellogg School of Management, Northwestern University.

[53] McCaig, B. (2011). Exporting Out of Poverty: Provincial Poverty in Vietnam and U.S. Market Access. *Journal of International Economics*, 85(1), 102–113.

[54] Mishra, P. and Kumar, U. (2005). *Trade Liberalisation and Wage Inequality: Evidence from India*. IMF Working Paper.

[55] Nicita, A. (2004) "Who benefitted from trade liberalisation in Mexico? Measuring the effects on household welfare," *Policy Research Working Paper Series* 3265, The World Bank.

[56] Paluzie, E. (2001) "Trade Policy and Regional Inequalities," *Papers in Regional Sciences*, No 80, pages 67–85.

[57] Pavcnik, N. (2017). *The Impact of Trade on Inequality in Developing Countries*. *In:* "Fostering a Dynamic Global Economy" symposium, Wyoming, August 24-26, 2017.

[58] Péridy, N. and Ghoneim A., 2013. Middle East and North African Integration: through the lens of Non-Tariff Measures, *Journal of Economic Integration*, 28(4), pp.580-609.

[59] Pierce, J. and Schott, P. (2016). The Surprisingly Swift Decline of US Manufacturing Employment, *American Economic Review*, 106(7), 1632–1662.

[60] Puga, D. (1999) "The Rise and Fall of Regional Inequalities," *European Economic Review*, No. 43, pages 303–334.

[61] Puga, D. and Venables, A. (1999) "Agglomeration and Economic Development: Import Substitution vs. Trade Liberalisation," *Economic Journal*, Royal Economic Society, Vol. 109(455), pages 292–311, April.

[62] Ohlin, B. (1933) "Interregional and International Trade," Harvard University Press, Cambridge.

[63] Redding S. and Venables A., (2004) "Economic Geography and International Inequality," *Journal of International Economics* 62 (2004) 53–82.

[64] Raveh, O. and Reshef, A. (2016). Capital imports composition, complementarities, and the skill premium in developing countries**.** *Journal of Development Economics*, 118, 183-206.

[65] Revenga, A. (1997). Employment and Wages Effects of Trade Liberalisation: The Case of Mexican Manufacturing, *Journal of Labour Economics*, 15(3), S20–S43.

[66] Said, M. and El Azzawi, S. (2009) "Trade Liberalisation, Inter-industry Wage Differentials and Job Quality in Egyptian Manufacturing," Gender and Work in The MENA Region Working Paper Series, Number 6, August.

[67] Said, M. (2007) "The Fall and Rise of Earnings and Inequality in Egypt: New Evidence From the ELMPS, 2006," *ERF Working Paper* 0708.

[68] Sébastien, J. and Nicoletti, G. (2002) "Product Market Regulation and Wage Premiums in Europe and North America: An Empirical Investigation," OECD Economics Department Working Paper No. 318.

[69] Sutton, J. (2002) "Rich Trades, Scarce Capabilities—Industrial Development Revisited," *The Economic and Social Review*, Economic and Social Studies, vol. 33(1), pages 1–22.

[70] Swann, P., Temple, P. and Shrumer, M. (1996) "Standards and Trade Performance: the UK Experience" *The Economic Journal*, 106 (September), 1297 – 1313.

[71] Siddiqui, R. (2009). Modeling Gender Effects of Pakistan's Trade Liberalisation. *Feminist Economics*, 15(3), 287-321

[72] Topalova, P. (2010). *Factor Immobility and Regional Impacts of Trade Liberalisation Evidence on Poverty from India*. IMF Working Paper No. 10/218.

[73] Trefler, D. (2004). The Long and Short of the Canada–U.S. Free Trade Agreement, *American Economic Review*, 94(4), 870–895.

[74] The International Trade Centre, 2015. *Making Regional Integration Work: Company Perspectives on Non-Tariff Measures in Arab States*

[75] Thoenig, M. and Verdier, T. (2003) "A Theory of Defensive Skill-Biased Innovation and Globalisation," *American Economic Review*, American Economic Association, vol. 93(3), pages 709—728, June.

[76] Topalova, P. (2005) "Trade Liberalisation, Poverty and Inequality: Evidence From Indian Districts," *NBER Working Papers* No. 11614.

[77] Tunisia - Labour Market Panel Survey, TLMPS 2014: OAMDI, 2016. Labour Market Panel Surveys (LMPS), http://erf.org.eg/data-portal/. Version 2.0 of Licensed Data Files; TLMPS 2014. Egypt: Economic Research Forum (ERF)

[78] UNCTAD (2004). *Trade and Gender Opportunities and Challenges for Developing Countries*.

[79] Zaki, C. (2014) "On Trade Policies and Wage Disparity in Egypt: Evidence from Microeconomic Data", *International Economic Journal*, vol. 28 no.1, pages 37-69.