

---

**Trade openness and wage inequality: Case of Tunisia**

Ben Younes Hamza<sup>1</sup>, Ben Ameer Fayçal<sup>2</sup>

<sup>1</sup>LARMA (Research Laboratory in Applied Microeconomics)  
Faculty of Economic Sciences and Management of Tunis, University of Tunis-El Manar, Tunisia

<sup>2</sup>LARMA (Research Laboratory in Applied Microeconomics)  
Faculty of Economic Sciences and Management of Tunis, University of Tunis-El Manar, Tunisia

doi: 10.51505/IJEBMR.2023.7412

URL: <https://doi.org/10.51505/IJEBMR.2023.7412>

Received: April 4, 2023

Accepted: April 18, 2023

Online Published: April 26, 2023

**Abstract**

The 90's have been marked by an increasing globalization which has revealed two major trends, if on the one hand there has been a more pronounced opening up, especially in the ranks of emerging countries, on the other hand there has been a considerable rise in inequalities.

Despite an abundant literature on the link between trade openness and wage inequality, the latter remains relatively ambiguous, particularly in the absence of a consensus, especially for the developing countries.

This article therefore focuses on the impact of trade openness on wage inequality, particularly between skilled and unskilled workers for the case of Tunisia.

Our analysis took into account a number of factors that influence this relationship, such as labor market fluctuations, technological transfer and the effect of institutions.

Our contribution to this work is that unlike the majority of work conducted on the Tunisian case, our analysis has not been limited to the manufacturing industry but we have extended it to the services sector and the whole economy by including the non-manufacturing sector in order to provide a comparative analysis between these different sectors

The exploitation of the estimation results over the period 1990 to 2020 shows that, in general, openness has contributed to the increase in wage inequalities in Tunisia.

**Keywords:** Trade openness, Wage inequality, Panel data, Tunisia

**1. Introduction**

As a major force of the 20th century, trade openness has created a new kind of interactions between nations, economies, and individuals, and has significantly increased trade across borders at multiple levels.

It has also contributed to the fragmentation of production processes, labor markets and political entities.

However, despite the innovation, dynamism, and positive spillover effects of trade openness, it is likely to have some disruptive aspects, which is why there has been an intense debate between its supporters and opponents regarding its effects, especially among the most disadvantaged

populations. While some perceive it as an effective solution to reduce poverty through the surplus growth it generates, others argue that it only further accentuates wealth gaps without generating an overall increase in economic activity, thus leading to the continued marginalization of the poorest populations.

However, the debate has been somewhat modified in recent years, with a consensus that trade openness is seen as an important catalyst for growth. Thus, the classic question of the effects of such openness on economic growth has given way to a much more worrying question, namely the distribution of its gains, given the considerable rise in internal inequalities at the global level, which nowadays constitute a phenomenon that affects almost all countries.

Opponents of this external openness most often cite the examples of East Asian countries such as China and India, or those of Latin America, which are countries that have implemented a pronounced liberalization process. Despite a surge in their growth rates, their openness has gone hand in hand with a sharp rise in inequalities, affecting primarily the poorest individuals and placing these countries at the top of the international rankings concerning inequalities.

Thus, the most salient international dilemma today is how to take advantage of the supposed gains from trade openness while reducing its effects on disparities. Developing countries seem to be the perfect sample for illustrating this situation, countries for which inequality has become a major concern and a political priority and issue.

Therefore, our research problem is to understand how trade openness affects inequality, particularly wage inequality, in Tunisia, a developing country that has long suffered from these inequalities.

## **2. Literature review**

Many theories have sought to determine whether trade openness could lead to an increase in inequalities, by identifying the different channels through which the development of international trade could affect wage dynamics.

The first thoughts were those of the Heckscher-Ohlin-Samuelson (HOS) final goods trade model, between countries with different factor endowments. By referring to this model, trade opening that leads to greater specialization should have positive incidence on developing countries. A more simplified version of the HOS model suggests that each country will specialize and export production using the relatively abundant factor. According to the Stolper-Samuelson theorem, trade liberalization will lead to an adjustment in relative wages. In fact, when a developing economy whose abundant factor is unskilled labor begins to open up more to international trade, the demand for low-skilled labor will increase, the wages of these workers will tend to follow suit. On the other hand, wages for skilled workers will be lowered, leading to a reduction in the wage gap.

Seen in this light, openness should naturally bring more equality and benefit the poorest population.

However, several studies have subsequently criticized the HOS model, pointing out that the situation is much more complex than the assumptions indicated.

Indeed, the HOS model has been criticized for not taking into account elements such as

technological progress, which, according to Attanasio et al (2004) and Pavcnik et al (2004), is likely to contribute to the increase in disparities by requiring more and more qualification of the workforce.

The impact of new technologies, information and communication is often considered to be unidirectional, i.e. in favor of skilled workers who are better able to master and integrate these skills into their activities, while conversely leading to a reduction in the need for low-skilled labor.

Similarly, increased international competition has led even developing countries to become more interested in higher-skilled products.

On the other hand, the HOS model does not take into account the international mobility of the production factors. According to Lee and Vivarelli (2006), the capital mobility to developing countries can result in increased inequality.

Deardorff (2001) finds that the existence of transport costs as well as customs duties can be an obstruction to the equalization of factor remuneration.

Wood (2009) also shows that some of the HOS model's claims do not match up with reality.

For example, technological similarities between nations and the immobile production factor highlight these irregularities. In this case, it is important to note that one of the main characteristics of openness is capital mobility. Which coincides with the findings of Feenstra and Hanson (1996), Wang and Blomstrom (1992) or Zhu and Trefler (2005) who note that the HOS model does not take into account factor mobility at the international level, while in fact the inflow of FDI can be seen as a driver of inequality.

In this same context, foreign direct investment (FDI) does not escape the accusation of being responsible for rising inequalities.

MacDonald and Majeed (2010) in studying a panel of 65 developing countries between 1970 and 2008 to highlight the relationship between openness, inequality and poverty found no significant link between openness and inequality. However, they clearly detect a positive link between FDI and increased disparities, concluding that globalization has had a negative effect on wage distribution, this coincides with the findings of Davis and Harrigan (2011) who examined the case of Brazil, or Wu and Hsu (2012) for whom FDI is the main cause of rising inequality in China.

Lim and McNelis (2014) also conclude that FDI helps promote economic growth, however, it generates an increase in wage inequality. They find that this effect is more amplified in middle-income countries.

We can therefore observe that today both developed and developing countries suffer from wage inequalities that largely affect the poorest populations, who are the most vulnerable and the least able to protect themselves against the hazards of trade openness.

Indeed, as far as developing countries are concerned, several empirical studies have contradicted the HOS model or Stopler-Samuelson theory predictions. Many of these studies have concluded that international trade has increased the demand for skilled labor at the expense of unskilled labor in these countries.

Shah and Whalley (1991) found that after opening up, developing countries were unable to redistribute income effectively.

Robbins and Gindling (1999) emphasize that demand for skilled labor has increased following trade openness. Looking at the Chilean case, they find that the demand for skilled labor is higher for imports than for exports. Similar observations are made in the case of Colombia, where they find that technology transfer and the import of equipment and new technologies have contributed to the increase in demand for skilled labor in the country at the expense of unskilled ones.

Hanson and Harrison (1999) reach similar conclusions for Mexico. Indeed, all reforms aimed at greater openness have resulted in an increase in the wage gap.

Lustig (1998), who also looked at Mexico, found that the wages of less skilled workers fell by about 25 percent, while the wages of skilled ones rose by 10 percent.

Gorg and Strobl (2002) and Attansio et al (2004), focusing on the cases of Ghana and Colombia respectively, have also concluded that international trade has increased the need for skilled labor as well as increasing its relative wage to the detriment of unskilled labor.

Cornia (2003) studying the case of 73 countries between 1980 and 2000 has observed that wage inequalities have increased significantly, especially in countries characterized by a strong deregulation and external liberalization policy.

Arbache et al (2004), focusing on the case of Brazil, were able to show that trade openness led to a decline in wages of about 16 per cent in sectors exposed to foreign competition, while the decline was only 8 per cent in protected sectors employing mainly skilled workers.

Kahai and Simmons (2005), who used the GINI index as a measure of wage inequality to study its interaction with trade openness, concluded that trade openness succeeds in increasing inequality in developing countries.

Aradhyula et al (2007) came to the same findings, namely that trade openness had led to rising inequalities and that its effect was mostly felt in the developing countries.

Acar and Dogruel (2012), with a focus on the MENA region, concluded that openness improves women's participation in the labor market, which weighs heavily. It should be noted that in many of these countries, women receive lower wages than men do.

Bucciferro (2010) who was interested in Latin American countries as well as Castilho et al (2012) for the case of Brazil also agreed that trade opening had succeeded in reducing inequalities.

This is consistent with the results of Bayar and Sasmaz (2017), studying the case of 11 Latin American countries for which, over the long run, the combination of trade openness and financial sector development succeeded in reducing all inequality and poverty.

For Santos-Paulino (2012) who analyzed the effect of openness on poverty and inequality and focusing on the case of developing countries, she was able to highlight the fact that despite an increase in inequality, the latter results in a considerable increase in economic growth, which decreases poverty levels and improves the situation of the poorest.

Mah (2013) found that international trade also led to wage inequality in the case of China. The same goes for Tan et al (2015), in their study of a panel of six South American countries between

1995 and 2012.

Developed countries are not immune to the trend of rising inequality either.

Borjas et al (1992), analyzing the case of the United States, detected that international trade, along with the wave of immigration, participated in the decrease of about 25% of the demand for the least skilled workers. Sachs and Shatz (1994), who also looked at the United States in the 1970s and 1980s, showed that there was a considerable rise in inequality that coincided with the increase in trading with developing countries.

The same is true of Giraud (1998), who found that competing with low-wage countries increased wage inequality by about 20%.

Beyer et al (1999) found that global trade increased wage inequalities by 15%.

Wood (1995) came to the same conclusions, pointing out that the growing inequality in Northern countries is the result of competition with Southern countries that are characterized by relatively low wage levels.

Indeed, Leamer (1994) has established that the increase in intermediate manufactured goods imports from the South has largely contributed to the increase in wage inequalities in the North.

Cribb (2013) also explained that the rise in inequality in the UK was a result of trade openness. The country has been tempted to import intensive unskilled labor products from low-wage countries, which would cost less. However, this has led to a decline in the demand for unskilled labor within the country, further fuelling the wage gap.

Baldwin and Forslid (1999), consider international trade and new technologies as factors that aggravate wage inequalities.

For Zakhilwal (2001), greater integration in international trade leads to an increase in the wage gap between the higher and lower skilled workers.

Townsend (2007), who studied the impact of trade agreements on the evolution of wages in Canada, demonstrated that a 1% decrease in customs barriers led to a 0.4% decrease in wages and that this decrease was felt even more among the least qualified workers, thus leading to greater wage inequalities.

Faustino and Vali (2011) by regressing the level of inequality by a certain number of variables such as openness, FDI, GDP per capita, the unemployment rate, the inflation rate as well as the number of national listed companies in the case of 24 OECD countries between 1997 and 2007, came to the conclusion that trade openness and wage inequalities were going in two different directions while, conversely, inflation and unemployment positively affected inequality.

Polpibulaya (2015) concluded in a study of 86 developed and developing countries that a 1% increase in openness led to a 2.12% increase in inequalities.

### **3. Methodology**

We will use panel data econometrics to estimate our model.

This method has the particularity of providing us with an important source of information, both on the individual and temporal dimensions of the studied subjects (Trognon 2003).

The use of this technique relies on primordial tests to ensure the validity of the model, namely the verification of the homoscedasticity of the error terms but also the absence of autocorrelation. For our estimations, we will use the two-stage double least squares method, introduced in 1957 by Robert Basmann and then in 1961 by Henri Theil, in response to the endogeneity problem posed by one of our explanatory variables, namely the one representing the labor demand.

This method, known as instrumental, is carried out in two stages. On the one hand, we proceed to the substitution of the endogenous explanatory variables by variables that will be their representatives, called instruments.

Then, in a second step, we proceed to the estimation by ordinary least squares (OLS) of the instrumental variables and of the exogenous variables initially presented in the basic equation, thus giving more relevant and robust estimates.

### *3.1 Model Specification*

Several authors have used a multiple modeling approach to apprehend the effect of trade openness on employment and subsequently on wages in order to better understand its effects on wage inequality.

One of the most prevalent models is the one developed by Milner and Wright in 1998, whose starting point is a Cobb-Douglas production function. However, authors such as Katz and Murphy (1992) have based their model on a production function with a constant elasticity of substitution called the production function (CES), which takes into account two labor factors, namely skilled and unskilled labor.

In our case, we were inspired by the contributions of authors such as Cortes and Jean (1997) or Katz (1999) to define an equation in the following form:

$$\ln(y)_{it} = \beta_0 + \beta_1 \ln d_{it} + \beta_3 X_{it} + \delta_i + \xi_{it} \quad (1)$$

$y_{it}$ , Refers to the relative wage, which is the ratio of the average annual wage of skilled to unskilled workers used as a measure of wage inequality.  $d_{it}$ : is the labor demand.

X is a vector that includes all the variables explaining the wage gap. Authors such as Autor et al (2008) have used variables such as the minimum wage (s) to take into account the effects of institutions, the openness rate (op) as a variable representing trade openness, unemployment rate (ch) and growth rate (gr) to take into account cyclical fluctuations in the labor market.

However, other authors, such as Cortes and Jean (1997), have added another variable, namely capital intensity (k), which is the ratio between the capital stock and skilled employment.

The capital intensity focuses on the degree of complementarity between capital and skills, such as the higher the capital-labor ratio, the higher the level of skills.

We will also add the variable (g) introduced by Acemoglu and al (2005), which provides a measure of the way policies and institutions support their economies, it reveals the institutional quality within a country.

### *3.2 Sample presentation*

Our sample will consist first of six sectors of the Tunisian manufacturing industry that are the

food industry, the industry of building materials and glass, the mechanical and electrical industry, the chemical industry, the industry of textile, clothing and leather and the diverse manufacturing industry. Then we will consider the service sector, which is composed of sectors such as transport and communication, banking and insurance, hotels, coffee shops and bars, other commercial services, and finally the trade sector. Thirdly, we are interested in the whole economy by grouping together all the sectors mentioned, while also adding sectors belonging to the non-manufacturing industry, such as the mining and the hydrocarbons sectors. Our analysis period will be from 1990 to 2020.

We focused first on the Tunisian manufacturing industry, which was among the sectors that are the most exposed to this trade opening and which suffered from innumerable repercussions, especially in terms of job demand as well as in terms of wages, this sector also constituted for a long time the main pillar of the Tunisian economy. Subsequently, we added to our sample a set of sectors belonging to the non-manufacturing industry, and particularly the services sectors, because it should be noted that today those sectors are the driving force of the Tunisian economy, with a 59% contribution to the GDP and about 62%<sup>1</sup> contribution to the employment rate of the active population.

We also chose the period from 1990 to 2020, as far as it represents the starting point for a process of trade liberalization that is constantly progressing. Indeed, such a process was triggered by the adoption of the Structural adjustment plan introduced (SAP) towards the end of the 1980s, then it was accentuated with the accession to the GATT in 1990 and to the WTO in 1995. Trade liberalization deepened with the signing of the free trade area agreement with the European Economic Union in 1995 and its final entry into force in 2008, expressing the common wish of both sides to strengthen their cooperation ties and establish harmonious and sustainable relations, but also conditions favorable to the development and diversification of trade and which prioritize Tunisia's integration objectives and assist it to this end.

This period also includes the democratic transition that followed the events of 2011 and which were at the origin of a real upheaval not only at the political and economic level but also at the social level and whose effects are felt to this day mainly in terms of perpetuation of the crisis, aggravation of the precariousness of the most deprived strata and especially the increase in unemployment of the most qualified workers.

---

<sup>1</sup>The unfinished revolution chap8, Tunisia report, World Bank.

3.3 Variables description

Table 1. Variables presentation

Variables	Description
<b>Dependent variable</b>	
Wage Gap (y)	The ratio of the average annual wage of skilled workers to that of unskilled workers as a measure of wage inequality
<b>Explanatory variables</b>	
The openness rate (op)	The sum of exports and imports as a percentage of GDP by sector
Labor demand (d)	Total employment by sector
Capital intensity (k)	The ratio between capital stock and employment by sector
Growth rate (gr)	The change in GDP from one year to the next
Unemployment rate (ch)	The percentage of individuals in the labor force who are unemployed
The minimum wage (s)	The guaranteed interprofessional minimum wage
The governance (g)	The Index of Economic Freedom established by the Canadian Fraser Institute
<b>Instrumental variable</b>	
Average education's years (nme)	Average education's years by sector

3.4 Statistics and Data Analysis

Table 2. Descriptive statistics

Variables	Mean	Standard deviation	Min	Max	Skewness	Kurtosis
y	50.952	42.730	2.983	226.066	1.595241	5.524877
d	1.09e+05	1.06e+05	4796.000	4.73e+05	1.257381	3.943699
s	2647.397	999.966	1320.480	4743.936	.673923	2.423177
op	0.871	1.122	0.020	10.480	3.623922	24.55196
nme	7.579	1.883	3.219	13.455	.7659134	3.618628
ch	0.151	0.014	0.124	0.183	-.2118595	2.928095
k	0.022	0.048	0.001	0.418	.0022834	3.929021
gr	0.038	0.021	0.004	0.079	.3393945	2.262837
g	5.913	0.587	4.880	6.490	-.7795912	1.875711

Source. Author calculation using STATA software.

Table 2 transcribes the descriptive statistics, which report indicators of position, dispersion and form in order to verify empirically the symmetry, the flatness, the normality, the dispersion and



the precision of the information provided by our model’s variables.

*3.5 Correlation matrix*

Table 3. Correlation matrix

	d	o	k	ch	gr	g	s	nme
d	<b>1.00</b>							
op	-0.48	<b>1.00</b>						
k	0.38	-0.24	<b>1.00</b>					
ch	0.01	0.02	-0.01	<b>1.00</b>				
gr	-0.28	0.09	-0.14	-0.43	<b>1.00</b>			
g	0.40	-0.19	0.24	-0.40	-0.28	<b>1.00</b>		
s	0.02	-0.01	-0.01	0.12	-0.09	-0.11	<b>1.00</b>	
nme	0.94	-0.34	0.29	-0.03	-0.30	0.48	0.02	<b>1.00</b>

*Source.* Author calculation using STATA software.

Table 3 represents the correlation matrix between our different explanatory variables. We note that apart a strong correlation between the endogenous variable and the instrument used, which is already one of the conditions necessary for the use of the instrumental method, the correlation coefficient is well below 0.8 for the other variables, which is, the limit set by Kennedy (2008), from which there is reason to be concerned about a possible problem of multicollinearity.

**3. Findings**

Table 4. Estimation results using the 2SLS method

VARIABLES	(1) 2SLS (Manufacturing industry)	(2) 2SLS (Services sector)	(3) 2SLS (Whole economy)
d	-0.554*** (0.0745)	0.286*** (0.0564)	0.360*** (0.0531)
op	0.385*** (0.0520)	0.558*** (0.0377)	0.372*** (0.0260)
k	0.680*** (0.0830)	0.327*** (0.0254)	0.517*** (0.0250)
gr	0.0748 (0.0580)	0.159** (0.0639)	0.139** (0.0586)
ch	-1.203*** (0.447)	-0.824* (0.488)	-1.393*** (0.449)
g	-2.320*** (0.480)	-2.645*** (0.467)	-4.004*** (0.425)
s	-0.354 (1.359)	-2.538* (1.486)	-1.524 (1.367)
Constant	8.017*** (0.915)	8.424*** (0.934)	10.05*** (0.840)
Observations	180	150	390
R-squared	0.557	0.844	0.515
sectors	6	5	13
Prob (f-statistic)	0.000000	0.000000	0.000000
Sargan hansen	0.36450	0.89143	0.18632
Endogeneity test	0.0003	0.0000	0.0000
Robustness test	0.0000	0.0000	0.0000

(\*\*\*), (\*\*) et (\*) corresponding to statistical significance at 1%, 5% and 10% respectively.

Source. Author calculation using STATA software.

Our econometric analysis allowed us to understand the effect of all the variables used on the wage gap between skilled and unskilled workers, first at the level of the Tunisian manufacturing industry, then at the level of the services sector and finally by taking into account the whole economy including the non-manufacturing sectors in order to carry out a comparative study between these different sectors.

First, we have defined a set of specifications in response to the econometric techniques we employed, allowing us to capture the effect of all the variables employed on the wage gap between skilled and unskilled workers.

We used the double least squares method to estimate our model in response to the endogeneity

problem associated with the variable representing labor demand.

As an instrumental variable, we used the average number of education years per sector as a proxy.

We chose this variable in particular because it affects wage differences and inequality through labor demand.

Indeed, the level of education allows us to classify individuals into different categories according to their qualification levels. These qualifications have a major influence on wage due to the fact that salaries are proportional to the educational level and can therefore affect the income gap between skilled and unskilled workers. In turn, the demand for employment reflects the need for skills. Thus, the average number of years of education affects wage differentials through job demand.

Concerning our regressions, it appears that the effect of most of the explanatory variables was statistically significant.

We can see that the effect of the trade openness rate was positive and statistically significant at the 1% level on the wage ratio in our three regressions.

This result can be explained by the fact that the opening has brought its share of upheavals in the Tunisian economy with the emergence of a number of sectors requiring more qualifications including the services sector, which is now the driving force of the Tunisian economy with an increased participation in the national GDP. A sector that also employs more than 62%<sup>2</sup> of the workforce, including for example sectors such as banking and insurance that use more than 76%<sup>3</sup> of skilled workers, or the trade, education, health and administration sectors, which employ more than 60%<sup>4</sup> of the workforce, sectors that constantly require more qualifications and skills.

It also appears that the highest salaries belong to sectors such as banking, followed by the transport and communication and the extractive industries, particularly hydrocarbons. These sectors have seen salary increases of 8.7%, 6.73% and 6% respectively. Conversely, regarding the least remunerative sectors, we find at the top of the list sectors belonging to the manufacturing industry such as textiles, clothing and leather, various manufacturing industries and building materials and glass whose wage increases do not exceed 3%<sup>5</sup>.

As for the effect of the variable representing labor demand, it was found to be significant and negative at the 1% level for the manufacturing industry.

The observation is that job creation in this sector tends to respond to the needs of job seekers with lower education's level.

This last finding is in line with the evidence provided by the Tunisian statistical agency and various studies issued by the Tunisian Institute of Competitiveness and Quantitative Studies (TICQS) which have confirmed the fact that the labor demand, following the initiation of the various processes supporting the trade opening especially in the Tunisian manufacturing industry,

---

<sup>2</sup>The unfinished revolution chap8, Tunisia report, World Bank

<sup>3</sup>Author's calculation based on TICQS and NSI "NATIONAL STATISTICS INSTITUTE" statistics from employment surveys

<sup>4</sup>Note and analysis of TICQS No. 44 - 2016 Assessment of labour market evolution in Tunisia : 2006-2015.

<sup>5</sup>International Labour Office (ILO): Wage Structure Survey, Tunisia 2011

has not met expectations and predictions with a demand for quality work quite low, the latter has concerned much more the unskilled workforce. Indeed, as an example, the percentage of employees with no higher education degree in the manufacturing industry has reached 66.6%<sup>6</sup> while the percentage of senior technicians and engineers is only 5.3%<sup>7</sup> with sectors such as textiles, clothing and leather which employs about 90%<sup>8</sup> of unskilled labor.

These results are in line with the findings of Munshi (2012), who looked at the manufacturing industry in Bangladesh, and Chaudhry and Imran (2013) for the case of Pakistan. Indeed, these authors concluded that trade openness had increased the need for unskilled labor and subsequently contributed to the increase in their wages, thus reducing the wage gap between unskilled and skilled workers.

However, this trend is reversed when considering the Tunisian economy as a whole or the services sector. In fact, it is the latter that requires the most skilled labor and is among the highest paying sectors.

It must be noted that in Tunisia, salary levels highly depend on qualifications and the sectors in question. The observation of incomes shows that the net salary increases considerably with the higher educational level, in fact, the net base salary is almost quadrupled between a non-graduate and a higher graduated employee. This difference is even multiplied by 5 if you take into account salary supplements such as bonuses and benefits in kind<sup>9</sup>.

Concerning the effect of the variable representing capital intensity, it was positive and statistically significant at the 1% level, the latter went in favor of the remuneration of the most qualified workers, thus contributing to the wage gap between the two groups of workers. This is largely related to the technological development bias in favor of the most qualified workers who are better able to master it and integrate it into their activities.

Thus, the higher the rate of capital accumulation, the greater the demand for skilled workers.

Similarly, number of authors such as Cohen and Levinthal (1989), Borjas et al (1992), Fuchs and Perina (2019) and Pissarides (1997) or Jaumotte et al (2013), have demonstrated that technology transfer in developing countries is biased in favor of the most skilled workers and has a destructive effect on unskilled labor, in addition to increasing wage inequalities.

Pavcnik et al (2004) even consider this technology bias as an endogenous response to trade liberalization.

As for the variable representing the rate of economic growth, it had a positive and statically significant impact at the 1% threshold, however, this effect was found to be insignificant in the case of the manufacturing industry.

This can be explained by the fact that although there is a consensus at the global level supporting

---

<sup>6</sup>International Labour Office (ILO): Wage Structure Survey, Tunisia 2011

<sup>7</sup>Employment survey 2013 NSI

<sup>8</sup>Author's calculation based on TICQS data. Author's calculation based on NSI statistics from employment surveys

<sup>9</sup>Study of real wage trends in Tunisia before and after the revolution: 2005-2015.

the thesis of an economic growth generating jobs. For the Tunisian case, this work creation has much more concerned the service sectors which are asserting themselves today as being the most dynamic ones on the job market. This growth has also increased the need for qualification in a great number of sectors, mostly belonging to the services such as the financial sector, the communication sector or other various services. However, the weakness of the Tunisian economy lies in the fact that the creation of quality jobs remains insufficient, especially in the manufacturing industry.

Indeed, despite the progress made in education, health, as well as the fight against poverty, with the objective of creating a sustainable and sustained growth. Today, the country is experiencing many difficulties to achieve this goal, especially in the current post-revolutionary context, with an economic growth that does not manage to take off and reach the expected levels.

For its part, the minimum wage has a negative effect, but it was statistically insignificant in most of our regressions. It must be pointed out that the minimum wage indexed to the evolution of prices, is considerably behind other salaries, for example, between 1997 and 2012, it increased by only 0.5%<sup>10</sup>.

As for the effect of the unemployment rate, it turns out to be negative and statistically significant at the threshold of 1%, the latter leads to reducing the wage gap between skilled and unskilled workers. This counterintuitive effect is further evidence of the situation in Tunisia characterized by a disconnection and mismatch between the labor market and the educational system with a difficult insertion of young graduates in the professional sphere. It is also them who suffer the most from unemployment, as shown by the rate of unemployed graduates of higher education which reached in 2020, 30%<sup>11</sup> which is double the national average of 15%.

It should be emphasized that the Tunisian labor market is facing a low creation of quality jobs especially in the manufacturing industry. Jobs that concern largely unskilled work with an economy that keeps facing difficulties and a number of jobs not exceeding 5%<sup>12</sup> of the total number of applicants.

Concerning the effect of the governance variable, it was negative and significant.

Regarding this theme, Tunisia has a lot of efforts and a long way to go especially in relation with the institutional quality. Despite the fact that the latter has gained 10 positions in the world ranking in 2021 standing 119th<sup>13</sup> out of 162 countries, Tunisia is still at the bottom of the table at the international level and the statement is not very bright at the level of the Arab world where Tunisia is ranked 9th out of 12<sup>14</sup> countries.

Acemoglu et al (2005) consider that institutional quality is an important factor in economic

---

<sup>10</sup>TICQS Notes and Analysis No. 13: Wage growth and productivity

<sup>11</sup>NSI data on unemployment among college graduates 2020.

<sup>12</sup>Inadéquation des qualifications en Tunisie : quels sont les déterminants du sous-emploi ? TICQS 2019.

<sup>13</sup><https://www.fraserinstitute.org/economic-freedom/dataset?geozone=world&page=dataset&min-year=2&max-year=0&filter=1&countries=TUN>

<sup>14</sup>TICQS Economic Freedom Index EFI 2021.

performance since the proper functioning of the market is largely conditioned by the quality of the institutions. In the context of market activities involving a large number of agents and institutions, the role of good governance is to reduce information asymmetries and the various risks by ensuring that property rights and contracts are respected and also to clarify the responsibilities and limits of action of each party.

## **5. Conclusion**

The 1990s marked a global context where economies are increasingly integrated and in constant interaction through the acceleration and multiplication of trade. These years also saw an abundance in the studies focusing on the relationship between openness to foreign trade and income inequality. The majority of these studies were primarily dedicated to emerging South Asian and Latin American countries before there were a few ones covering the Mena countries, including Tunisia.

Indeed, the latter has long been a highly integrated country on the international scene, notably among the most integrated North African countries. However, the Tunisian state has accumulated years of maldevelopment by favoring growth and wealth creation to the detriment of redistribution and equity, resulting in a significant divide within the society, as well as a level of inequality among the highest in the world.

With regard to the effect of trade openness on wage inequality, our results run against the theoretical predictions of neoclassicals that trade openness would reduce the wage gap between skilled and unskilled workers in developing countries,

In our case, we found that, on the contrary, it exacerbated the inequalities in question. This is in line with a number of studies that have focused on developing countries, including Santos-Paulino (2012), Atif et al (2012), Mah (2013), Tan et al (2015) or other studies on the Tunisian case such as Ghazali (2009) or Mrabet (2010) whose conclusions were in favor of an increase in wage inequality following the trade opening.

Finally, this growing openness to international trade has long been perceived as easier access to capital and to new technologies, thus increasing the demand for skilled labor and enabling the absorption of the excess number of young graduates who come to the labor market year after year. However, this phenomenon did not materialize at the level of all the sectors, especially within the manufacturing industry, in which there was not the expected spillover effect of new technologies and the development of production systems, with a certain number of sectors that remain rather rudimentary and an industry where the demand for unskilled labor still prevails.

However, this trend is reversed in the service sector, where demand and needs for labor are more oriented towards skilled workers. This sector also has higher wage levels than the manufacturing industry, thus further contributing to the wage gap between skilled and unskilled workers.

In the end, our study also confirms that the link between openness and wage inequality may be the result of factors and phenomena, such as the emergence of a certain number of sectors requiring more qualifications, a technological transfer biased in favor of the most qualified workers, or the effects and quality of institutions, as well as the characteristics and fluctuations of the labor market within the country itself.

### **Acknowledgments**

The authors received no financial support for the research, writing, and publication of this article.

Authors declare that they do not have any conflict of interest.

This article has never been published before and it is not under review by other journals, as well as it has been approved by the authors to be published in your journal.

### **References**

- Acar, S., & Dogruel, F. (2012). Sources of inequality in selected MENA countries. *Structural Change and Economic Dynamics*, 23(3), 276-285.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of economic growth*, 1, 385-472.
- Aradhyula, S. V., Rahman, T., & Seenivasan, K. (2007). Impact of international trade on income and income inequality (No. 381-2016-22241).
- Arbache, J. S., Dickerson, A., & Green, F. (2004). Trade liberalisation and wages in developing countries. *The Economic Journal*, 114(493), F73-F96.
- Atif, S. M., Srivastav, M., Sauytbekova, M., & Arachchige, U. K. (2012). Globalization and income inequality: a panel data analysis of 68 countries. *Munich Personal RePec Archive*, N° 42385.
- Attanasio, O., Goldberg, P. K., & Pavcnik, N. (2004). Trade reforms and wage inequality in Colombia. In *Macroeconomic Policies and Poverty Reduction* (pp. 229-266). Routledge.
- Autor, D. H., Katz, L. F., & Kearney, M. S. (2008). Trends in US wage inequality: Revising the revisionists. *The Review of economics and statistics*, 90(2), 300-323.
- Baldwin, R. E., & Forslid, R. (1999). Putting growth effects in computable equilibrium trade models. *Dynamic Issues in Applied Commercial Policy Analysis*, Cambridge University Press, Cambridge, 44-84.
- Basman R., (1957), A Generalized Classical Method of Linear Estimation of Coefficients in a Structural Equation, *Econometrica*, 25(1), 77-83.
- Bayar, Y., & Sasmaz, M. U. (2017). Impact of foreign direct investments on unemployment in emerging market economies: A co-integration analysis. *International Journal of Business and Economic Sciences Applied Research (IJBESAR)*, 10(3).
- Beyer, H., Rojas, P., & Vergara, R. (1999). Trade liberalization and wage inequality. *Journal of Development Economics*, 59(1), 103-123.
- Borjas, G. J., Freeman, R. B., & Katz, L. F. (1992). On the labour market effects of immigration and trade. *Immigration and the Workforce*. Chicago: University of Chicago Press/NBER, 213-244.
- Bresson, G., Kramarz, F., & Sevestre, P. (1996). Dynamic labour demand models. In *The econometrics of panel data* (pp. 660-684). Springer, Dordrecht.
- Bucciferro, J. (2010). Economic restructuring and poverty/income inequality in Latin America. *Consilience*, (4), 1-16.

- Carroll, D., & Tani, M. (2013). Over-education of recent higher education graduates: New Australian panel evidence. *Economics of Education Review*, 32, 207-218.
- Castilho, M., Menéndez, M., & Sztulman, A. (2012). Trade liberalization, inequality, and poverty in Brazilian states. *World Development*, 40(4), 821-835.
- Chaudhry, I. S., & Imran, F. (2013). Does trade liberalization reduce poverty and inequality? Empirical evidence from Pakistan. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 7(3), 569-587.
- Cohen, W. M., & Levinthal, D. A. (1989). Innovation and learning: the two faces of R & D. *The economic journal*, 99(397), 569-596.
- Cornia, G. A. (2003). The impact of liberalisation and globalisation on income inequality in developing and transitional economies. Available at SSRN 380347.
- Cortès, O., & Jean, S. (1997a). Quel est l'impact du commerce extérieur sur la productivité et l'emploi? (No. 1997-08).
- Cortès, O., & Jean, S. (1997c). Commerce international, emploi et productivité. *Travail et emploi*, 70, 61-79.
- Cribb J., (2013), Public Sector Pay and Employment, Institute for Fiscal Studies, Spending Round Briefing.
- Davis, D. R., & Harrigan, J. (2011). Good jobs, bad jobs, and trade liberalization. *Journal of international Economics*, 84(1), 26-36.
- Deardorff, A. V. (2001). Fragmentation in simple trade models. *The North American Journal of Economics and Finance*, 12(2), 121-137.
- Deardorff, A. V. (2001). International provision of trade services, trade, and fragmentation. *Review of International Economics*, 9(2), 233-248.
- Faustino, H. C., & Vali, C. (2011). The effects of globalisation on OECD income inequality: a static and dynamic analysis. DE/Working papers n° 12/2011/DE.
- Feenstra, R. C., & Hanson, G. H. (1996), Globalization, Outsourcing, and Wage Inequality, *American Economic Review*, 86, 240-245.
- Feenstra, R. C., & Hanson, G. H. (1997). Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras. *Journal of international economics*, 42(3-4), 371-393.
- Fuchs, R. J., & Pernia, E. M. (2019). External economic forces and national spatial development: Japanese direct investment in Pacific Asia. In *Urbanization and urban policies in Pacific Asia* (pp. 88-111). Routledge.
- Ghazali, M. (2009). Trade openness and wage inequality between skilled and unskilled workers in Tunisia. *Économie internationale*, (1), 63-97.
- Giraud, P. N. (1998). Les causes des inégalités croissantes dans les pays riches. *Etudes* (1945), 388(1).
- Goldberg, P. K., & Pavcnik, N. (2005). Trade, wages, and the political economy of trade protection: evidence from the Colombian trade reforms. *Journal of international Economics*, 66(1), 75-105.



- Görg, H., & Strobl, E. (2002). Relative wages, openness and skill-biased technological change. *Openness and Skill-Biased Technological Change* (October 2002).
- Hanson, G., & Harrison, A. (1999). Trade Liberalization and Wage Inequality in Mexico, *Industrial and Labour Relations Review*, 52, 88-271.
- Heckscher, E. F. (1919). The effect of foreign trade theory of international trade. *Readings on The Theory of International Trade*, 272-300.
- Jaumotte, F., Lall, S., & Papageorgiou, C. (2013). Rising income inequality: technology, or trade and financial globalization?. *IMF economic review*, 61(2), 271-309.
- Kahai, S. K., & Simmons, W. (2005). The impact of globalisation on income inequality. *Global Business and Economics Review*, 7(1), 1-15.
- Katz, L. F. (1999). Changes in the wage structure and earnings inequality. In *Handbook of labour economics* (Vol. 3, pp. 1463-1555). Elsevier.
- Katz, L. F., & Murphy, K. M. (1992). Changes in relative wages, 1963–1987: supply and demand factors. *The quarterly journal of economics*, 107(1), 35-78.
- Kennedy, P. (2008). *A guide to econometrics*. John Wiley & Sons.
- Lai, P. L., Tan, K. K. Y., Ong, H. W., & Lee, V. W. T. (2015). An empirical study on trade openness and income inequality in Latin America incorporating with FDI inflows, GDP growth and inflation (Doctoral dissertation, UTAR).
- Leamer, E. E. (1994). Trade, wages and revolving door ideas.
- Lee, E., & VIVARELLI, E. M. (2006). Les conséquences sociales de la mondialisation dans les pays en développement. *Revue internationale du Travail*, 145(3), 191-210.
- Lim, G. C., & McNelis, P. D. (2014). Income inequality, trade and financial openness, Fordham University Schools of Business Research Paper No. 2425068.
- Lustig, N. (1998). La pobreza y el Programa Progres. Alivio a la pobreza. Análisis del Programa de Educación, Salud y Alimentación. Memoria del Seminario Progres y Política Social, CIESAS, México.
- Mah, J. S. (2013). Globalization, decentralization and income inequality: The case of China. *Economic Modelling*, 31, 653-658.
- Majeed, M. T., & MacDonald, R. (2010). *Distributional and Poverty Consequences of Globalization: A dynamic Comparative Analysis for Developing Countries* (No. 2010\_22).
- Milner, C., & Wright, P. (1998). Modelling labour market adjustment to trade liberalisation in an industrialising economy. *The Economic Journal*, 108(447), 509-528.
- Mrabet, Z. (2010). Impact de l'ouverture commerciale sur le marché du travail des pays en voie de développement: le cas de la Tunisie (Doctoral dissertation, Université Paris-Est).
- Munshi, F. (2012). Does openness reduce wage inequality in developing countries? Panel data evidence from Bangladesh. *The Singapore Economic Review*, 57(2), 1250012.
- Ohlin, B. (1933). *Interregional and International Trade* Harvard University Press. Cambridge

MA.

- Pavcnik, N. (2003). What explains skill upgrading in less developed countries?. *Journal of Development Economics*, 71(2), 311-328.
- Pavcnik, N., Goldberg, P., & Schady, N. (2004), "Trade Policy and Industry Wage Structure: Evidence from Brazil," *World Bank Economic Review*, 18, 319-344.
- Pissarides, C. A. (1997). Learning by trading and the returns to human capital in developing countries. *The World Bank Economic Review*, 11(1), 17-32.
- Polpibulaya, S. (2015). *Trade Openness and Income Inequality*, Clemson University.
- Robbins, D., & Gindling, T. H. (1999). Trade liberalization and the relative wages for more-skilled workers in Costa Rica. *Review of Development Economics*, 3(2), 140-154.
- Sachs, J. D., Shatz, H. J., Deardorff, A., & Hall, R. E. (1994). Trade and jobs in US manufacturing. *Brookings papers on economic activity*, 1994(1), 1-84.
- Santos-Paulino, A. U. (2012). Trade, income distribution and poverty in developing countries: A survey (No. 207). *United Nations Conference on Trade and Development*.
- Shah, A., & Whalley, J. (1991). The redistributive impact of taxation in developing countries. *Tax Policy in Developing Countries*, 19, 166.
- Theil, H. (1961). *Economic forecasts and policy*.
- Townsend, J. (2007). Do tariff reductions affect the wages of workers in protected industries? Evidence from the Canada-US Free Trade Agreement. *Canadian Journal of Economics/Revue canadienne d'économique*, 40(1), 69-92.
- Trognon, A. (2003). L'économétrie des panels en perspective. *Revue d'économie politique*, 727-748.
- Wang, J. Y., & Blomström, M. (1992). Foreign investment and technology transfer: A simple model. *European economic review*, 36(1), 137-155.
- Wood, A. (2009), Heckscher-Ohlin in Theory and Reality, In: P. Arestis and J. Eatwell (eds), *Issues in Economic Development and Globalization*, London: Palgrave Macmillan, Longer version available as Working Paper 157, Queen Elizabeth House, Oxford University.
- Wood, A. (1995), How Trade Hurt Unskilled Labour , *Journal of Economic Perspectives*, 9(3), 57-80.
- Wu, J. Y., & Hsu, C. C. (2012). Foreign direct investment and income inequality: Does the relationship vary with absorptive capacity?. *Economic Modelling*, 29(6), 2183-2189.
- Zakhilwal, O. (2001). The impact of international trade on the wages of Canadians (No. 2001156e). *Statistics Canada, Analytical Studies Branch*.
- Zhu, S. C., & Trefler, D. (2005). Trade and inequality in developing countries: a general equilibrium analysis. *Journal of international Economics*, 65(1), 21-48.