



## **The Apparel Industry and the Jordanian Economy Calculating the Domestic Share of Sector Value Added**

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## **I Introduction**

Assessing the impact of the apparel industry on the Jordanian economy is both challenging and intriguing. The arrival of the apparel industry to an economy typically brings direct benefits such as the gains from international specialization and exchange, foreign direct investment, technology transfer, integration into higher value-added global markets, employment opportunities for workers lacking post-secondary education and backward linkages to input markets. The apparel industry can also have far reaching human capital development consequences such as new work opportunities for populations with limited labor market experience. Such work opportunities potentially alter the status and perceptions particularly of women in the workplace and improve the educational attainment of children in the bottom half of the income distribution.

Yet, the case of the apparel industry in Jordan has raised concerns about the impact on Jordanian welfare. These concerns are not new and have been the subject of policy and scholarly analysis in Jordan for the past decade. The apparel industry has its biggest impact on developing countries transitioning from an agrarian society to low-level manufacturing. Jordan is clearly past this stage, raising questions about the developmental relevance of the apparel industry for Jordan. There may be a mismatch between the skills of Jordanian workers and the skills required in the apparel sector. That is, Jordan may simply lack a comparative advantage in apparel.

It is common practice in a market-based economy to allow relative production costs to determine comparative advantage and the international allocation of production. Thus, the mere presence of the apparel industry in Jordan is in itself evidence of Jordan's comparative advantage in apparel. It is important to note, however, that Jordan's status as a global location for apparel production may be an artificial product of the Kingdom's tax, trade, labor market and migration policies.

The purpose of the following analysis is to quantify the impact of the apparel industry on the Jordanian economy as measured by domestic share of apparel-industry value added. Understanding of the current position of the apparel industry in Jordan will then set the stage for a richer analysis of the effect of the various Jordanian Government policies on the size and structure of the apparel industry in Jordan.

## **II Literature**

Having brought the apparel industry to Jordan through tariff incentives provided by the United States and easily-navigated immigration procedures, what is the value added of the apparel industry to Jordan? We begin as our point of departure, the quantitative analysis of Saif (2006), Cassing and Salameh (2006), Dougherty (2010), Feraboli and Trimborn (2008), Gaffney (2005), the analytical framework developed in Jordan's National Agenda, Kardoosh and Burgis (2006), Saif and El-Rayyes (2010) and World Bank (2008).

Saif (2006) has compiled data from unpublished records of the Department of Statistics that provide considerable evidence of value added from the apparel sector. Though the data from this analysis (1999) precedes the dramatic expansion of the apparel industry during the past decade, it is still informative.

For example, Saif reports that average annual wages in the QIZ (1560 JD) is lower than for manufacturing generally (2944.2 JD). However, perhaps more importantly, the ratio of value added to gross output is much higher in the QIZ than elsewhere in the Jordanian economy. In fact, value added divided by gross output in the QIZs (0.70) is more than twice that in Jordanian manufacturing generally (0.32).

Now, much of the value added is likely payments to capital, a significant portion of which does not currently accrue to Jordanian nationals. However, Saif concludes that wages in apparel still account for 35 percent of value added in the QIZ, as compare to 29 percent in manufacturing generally.

Saif's calculation gives us a value added from all labor in the QIZ. The amount accruing to Jordanians depends on the fraction of local labor employed. So, for example, if half of the workers employed in the QIZ were Jordanian, then the contribution to Jordanian income would have been nearly \$92 million.

Obviously, this is a small number when taken in the context of the overall Jordanian economy. However, to the extent that the apparel industry draws workers from the bottom decile of the income distribution, \$91 million would be 10 percent of this group's household income. Such a sum would be a significant contributor to household well-being for the poorest Jordanians citizens.

Saif (2006) further estimates that of Jordanian value added to the QIZ area, 40 percent is labor and 60 percent is Direct Processing Cost. Saif's calculations imply that the apparel industry brought an additional \$275,625 in value added above and beyond the direct impact on labor employed by apparel producers.

**Spillovers and Human Capital Formation.** Engaging in export activities is further believed to generate spillovers to other industries, the infrastructure broadly described as *learning-by-doing*. Saif (2006), reporting from Qustantitn Yaghnum from Zai Group, identifies

- International best practices and standards and
- Understanding how to deal with the employees inside the factory

as significant learning opportunities presented by apparel assembly operations in Jordan. However, to date, backward linkages are thought to be small given that Jordan does not have a vibrant textile or design industry that might supply the apparel industry.

One of the significant benefits of the presence of any export sector is the potential that technical know-how might be transferred to Jordanian nationals. The deeper the relationship between the investor and local production staff and the more localized all phases of production and management the greater the potential technology transfer. However, Saif (2006) reports, based on interviews with investors, that investment in the Jordanian QIZs are more the “contractor” type rather than the “Strategic Investor.”

Nevertheless, if previous historical events are a guide, the longer the apparel industry remains in Jordan the more localized the production process will become. Though much of apparel production in Jordan today is *cut make pack*, it is historically been the case that the higher value-added steps in the apparel production process become localized over time. Examples include China, Korea, Indonesia, Thailand, Hong Kong, India and increasingly Vietnam.

**Unemployment.** By contrast, among the greatest disappointments of the expansion of the apparel industry in Jordan is the failure to lower the unemployment rate. Jordanian Government strategy over the past decade has focused on providing incentives for job-creating investments. Indeed, between 2000 and 2005, the Jordanian economy grew at a rate of 6 percent per year. However, of new jobs created, 63 percent were filled by migrants. As a consequence, the Jordanian unemployment rate remained around 14 percent.

It is commonly argued that there are two fundamental causes of this outcome. First, tax incentives for investment appear to have targeted industries intensive in low-wage jobs, particularly apparel. That is, the jobs created may have been a poor match for the skills abundant in Jordan. Second, there are some labor market imperfections that promote queuing outside of higher paying jobs. For example, the Civil Service Bureau accepts applications even when no jobs are available. According to the World Bank (2008, p. vi), 20 percent of unemployed Jordanians are registered with the Civil Service Commission.

The evidence of a mismatch between jobs and skills, however, is not entirely compelling. It is true that the highest unemployment rate occurs among the adult population holding a bachelor’s degree. However, only 10 percent of the workforce falls into this category. More than half of the unemployed in Jordan have a secondary level of education or less. Such workers are typically observed in the apparel industry in other countries of the world. As of 2008, 61 percent of unemployed Jordanian workers have a secondary level of education or less. More importantly from the perspective of the apparel industry, 47 percent have less than a secondary level of education.

Furthermore, the unemployment statistics mask the potential supply of labor to the apparel industry in Jordan. The unemployment rate for women in Jordan (26%) is twice that of men (13%). However, women account for only 27 percent of the unemployed due to the very low female labor market participation rate (12%) in Jordan. Most unemployed women in Jordan have an intermediate diploma or bachelors degree, making them a poor match from employment in the apparel industry. However, women with a

secondary degree or less generally do not participate in the formal labor market and, thus, are not considered when contemplating the role of the apparel industry in the unemployment picture.

Now, it is interesting to ponder why the LFP for Jordanian women is so low. Large family size, poor quality or unavailable child care, low wages and the traditional role of women are likely explanations. However, we can make two clear statements. (1) There is a large pool of Jordanian females who have the educational attainment normally observed in the apparel industry. (2) Of the women with a secondary level of education or less, the unemployment rate is nearly as high as more highly educated women. In fact, the unemployment rate for the few women with an educational level of secondary or below is 22 percent.

Thus, the stylized argument that the jobs created by the apparel industry are a poor match for the demographic characteristics of the workers in the labor force is only partly (and not very interestingly) correct. If one adds women currently outside of the formal labor market, the potential domestic labor force available to apparel firms in Jordan is, in fact, quite large.

If a mismatch in skills and apparel jobs exists, it is not due to the educational characteristics and competing employment opportunities of Jordanian females. The mismatch must lie elsewhere. Some obvious possibilities include

- location of the production facilities
- cultural restrictions on female employment
- formal workplace experience of Jordanian females and/or
- legal restrictions on terms of the employment of Jordanian females (relative to non-Jordanian females).

The relationship between unemployment and migration is not just a simple mathematical one. The demographic and human capital effects of the apparel industry on a society occur only over time. The impact of the apparel industry will only emerge as the opportunity to earn money wages affects family size and workers become adapted to the rigors of factory life. The apparel industry has commonly been the work opportunity in which workers acquire formal labor market skills. The presence of a readily available pool of migrant labor will short circuit the normal mechanisms which induce factory managers and the pool of local labor to learn to work together to produce increasingly higher-value added products.

### **III Analytical Framework**

To update the Saif analysis, we employ a simple analytical framework that can be used to decompose value added in the Jordanian apparel industry into domestic and foreign payments to capital, labor, materials and government revenue. Analytical

details are provided below for the interested reader. Others may skip to Section IV without loss of understanding.

As a point of departure, the analysis begins assuming perfectly competitive goods and factor markets and a Cobb-Douglas technology. It is important to note that at this stage of the analysis the findings are invariant to assumptions concerning the specific market structure and technology. However, in later analysis of the welfare impact of the apparel industry on Jordan and various policy scenarios, these rigid assumptions will be relaxed to reflect a richer characterization of the apparel industry in Jordan.

### **Assumptions**

The theoretical framework begins with the following set of assumptions:

- Output  $X$  in the apparel industry is a Cobb-Douglas function of three inputs: capital  $K$ , labor  $L$ , and materials  $M$ :  $X = AK^{\alpha_K} L^{\alpha_L} M^{\alpha_M}$  where  $\alpha_K + \alpha_L + \alpha_M = 1$
- Prices of output and inputs  $L$  and  $M$  are taken as given by producers:  $p_X$ ,  $w$ ,  $p_M$ .
- Each of these prices may be subject to an *ad valorem* tax,  $t_X$ ,  $t_L$ ,  $t_M$ , so that prices paid and/or received by producers are  $\rho_X = (1 - t_X)p_X$ ,  $\rho_L = (1 + t_L)w$ ,  $\rho_M = (1 + t_M)p_M$ .

- Capital stock is given,  $\bar{K}$ , and owned or shared by domestic and foreign owners who choose  $L$  and  $M$  to maximize profits:

$$\pi = (1 - t_X)p_X X - (1 + t_L)wL - (1 + t_M)p_M M = \rho_X X - \rho_L L - \rho_M M$$

- Profit may also be subject to a tax,  $t_K$ . In the long run (not analyzed here), the return to capital net of this tax and depreciation will need to exceed its external rate of return in order to keep and attract capital.
- All output is exported (though that won't matter for what we are doing here).
- A given fraction of each input is domestic. That is, the fraction  $\delta_K$  of  $\bar{K}$  is owned domestically, a fraction  $\delta_L$  of  $L$  is domestic labor, and a fraction  $\delta_M$  of  $M$  is domestically produced materials. These fractions are exogenous.
- Of interest is private-sector domestic value added,  $V_P = \delta_K \pi + \delta_L wL + \delta_M p_M M$  if there are no taxes, and that plus tax revenues otherwise:  
 $V_T = V_P + t_K \pi + t_X p_X X + t_L wL + t_M p_M M$

### **Analysis**

Producers choose labor and material inputs to maximize profit:

$$\max_{L,M} \pi = \rho_X A \bar{K}^{\alpha_K} L^{\alpha_L} M^{\alpha_M} - \rho_L L - \rho_M M \quad (1)$$

First-order conditions are

$$\frac{\partial \pi}{\partial L} = \alpha_L \rho_X A \bar{K}^{\alpha_K} L^{\alpha_L - 1} M^{\alpha_M} - \rho_L = 0 \quad (2)$$

$$\frac{\partial \pi}{\partial M} = \alpha_M \rho_X A \bar{K}^{\alpha_K} L^{\alpha_L} M^{\alpha_M - 1} - \rho_M = 0 \quad (3)$$

These imply

$$\frac{\alpha_L}{\alpha_M} \frac{M}{L} = \frac{\rho_L}{\rho_M} \quad (4)$$

and thus

$$M = \frac{\alpha_M}{\alpha_L} \frac{\rho_L}{\rho_M} L \quad (5)$$

Substitute (5) into (2):

$$\alpha_L \rho_X A \bar{K}^{\alpha_K} L^{\alpha_L - 1} \left( \frac{\alpha_M}{\alpha_L} \frac{\rho_L}{\rho_M} L \right)^{\alpha_M} = \rho_L \quad (6)$$

Collect terms:

$$\alpha_L^{1-\alpha_M} \alpha_M^{\alpha_M} \rho_X \rho_L^{\alpha_M - 1} \rho_M^{-\alpha_M} A \bar{K}^{\alpha_K} = L^{1-\alpha_L - \alpha_M} = L^{\alpha_K} \quad (7)$$

Thus the profit-maximizing labor input is

$$L = \alpha_L^{\frac{1-\alpha_M}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_M - 1}{\alpha_K}} \rho_M^{\frac{-\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \quad (8)$$

Note that, from this analysis, the labor input will rise with  $\rho_X$  and fall with  $\rho_L$  and  $\rho_M$ . Also, since the sum of the exponents on these three prices is one, a proportional increase in all three prices will leave  $L$  unchanged.

Substitute (8) into (5):

$$M = \alpha_L^{\frac{\alpha_L}{\alpha_K}} \alpha_M^{\frac{1-\alpha_L}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{-\alpha_L}{\alpha_K}} \rho_M^{\frac{\alpha_L - 1}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \quad (9)$$

and both into X:

$$\begin{aligned}
 X &= A\bar{K}^{\alpha_K} \left( \alpha_L^{\frac{1-\alpha_M}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_M-1}{\alpha_K}} \rho_M^{\frac{\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \right)^{\alpha_L} \left( \alpha_L^{\frac{\alpha_L}{\alpha_K}} \alpha_M^{\frac{1-\alpha_L}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_L}{\alpha_K}} \rho_M^{\frac{\alpha_L-1}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \right)^{\alpha_M} \\
 &= \alpha_L^{\frac{\alpha_L}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1-\alpha_K}{\alpha_K}} \rho_L^{\frac{\alpha_L}{\alpha_K}} \rho_M^{\frac{\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K}
 \end{aligned} \tag{10}$$

Multiply by  $\rho_X$  to get the value of X output net of its tax:

$$V_X = \alpha_L^{\frac{\alpha_L}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_L}{\alpha_K}} \rho_M^{\frac{\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \tag{11}$$

Value-added accruing to labor is

$$\begin{aligned}
 V_L = wL &= \frac{\rho_L}{1+t_L} \alpha_L^{\frac{1-\alpha_M}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_M-1}{\alpha_K}} \rho_M^{\frac{\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \\
 &= \frac{1}{1+t_L} \alpha_L^{\frac{\alpha_L}{\alpha_K}} \alpha_M^{\frac{\alpha_M}{\alpha_K}} \rho_X^{\frac{1}{\alpha_K}} \rho_L^{\frac{\alpha_L}{\alpha_K}} \rho_M^{\frac{\alpha_M}{\alpha_K}} A^{\frac{1}{\alpha_K}} \bar{K} \\
 &= \frac{1}{1+t_L} \alpha_L V_X
 \end{aligned} \tag{12}$$

Value-added accruing to materials is similarly

$$V_M = p_M M = \frac{1}{1+t_M} \alpha_M V_X \tag{13}$$

and after-tax profit is

$$\begin{aligned}
 V_K &= (1-t_K)\pi = (1-t_K)[(1-t_X)p_X X - (1+t_L)wL - (1+t_M)p_M M] \\
 &= (1-t_K)(V_X - \alpha_L V_X - \alpha_M V_X) \\
 &= (1-t_K)\alpha_K V_X
 \end{aligned} \tag{14}$$

Value added accruing to the private sector (both domestic and foreign) is the sum of (12), (13), and (14), and that accruing only to domestic private-sector interests is

$$\begin{aligned}
 V_P &= \delta_K(1-t_K)\pi + \delta_L wL + \delta_M p_M M \\
 &= \delta_K(1-t_K)\alpha_K V_X + \delta_L \frac{1}{1+t_L} \alpha_L V_X + \delta_M \frac{1}{1+t_M} \alpha_M V_X
 \end{aligned} \tag{15}$$

Government revenue from the four taxes is

$$\begin{aligned}
V_G &= t_K \pi + t_L wL + t_M p_M M + t_X p_X X \\
&= t_K \alpha_K V_X + \frac{t_L}{1+t_L} \alpha_L V_X + \frac{t_M}{1+t_M} \alpha_M V_X + t_X V_X
\end{aligned} \tag{16}$$

Adding (15) and (16), we get total domestic value added:

$$\begin{aligned}
V_T &= \delta_K (1-t_K) \alpha_K V_X + \delta_L \frac{1}{1+t_L} \alpha_L V_X + \delta_M \frac{1}{1+t_M} \alpha_M V_X \\
&\quad + t_K \alpha_K V_X + \frac{t_L}{1+t_L} \alpha_L V_X + \frac{t_M}{1+t_M} \alpha_M V_X + t_X V_X \\
&= \left[ (\delta_K - \delta_K t_K + t_K) \alpha_K + \frac{\delta_L + t_L}{1+t_L} \alpha_L + \frac{\delta_M + t_M}{1+t_M} \alpha_M + t_X \right] V_X
\end{aligned} \tag{17}$$

This can also be rearranged in terms of the portions of value added not accruing domestically:

$$V_T = (1+t_X) V_X - \left[ (1-\delta_K)(1-t_K) \alpha_K + \frac{1-\delta_L}{1+t_L} \alpha_L + \frac{1-\delta_M}{1+t_M} \alpha_M \right] V_X \tag{18}$$

Although equation (17) may seem rather forbidding, we can actually attach a straightforward interpretation to each component. The first three terms capture capital, labor and materials contributions to the creation of value added. The alpha terms reflect each factor's share of value added. The coefficients of the alpha terms are fractions of each factor's payments that were retained domestically in Jordan, either through earnings of domestically owned factors or through taxes. The first three terms then are a cost share weighted average of the domestic value added share of capital, labor and materials. The last term captures the government revenue generated on the sale of the outputs.

#### IV Parameter Values and Calculation

To calculate industry domestic value added, we can use either (17) or (18) and the following data:

- $V_X$  = value of output of the factories, net of any tax that may be paid to the domestic government on that output (but including all taxes paid on inputs to its production, both primary and intermediate).
- $t_X, t_L, t_M, t_K$  = ad valorem tax rates on output, labor, intermediate inputs, and profits as they apply to the apparel sector

- $\alpha_K, \alpha_L, \alpha_M$  = shares of capital, labor, and intermediate inputs from the IO table (the one that includes taxes)
- $\delta_K, \delta_L, \delta_M$  = domestic shares of capital, labor, and intermediate inputs for the sector. Share for labor should probably be net of remittances sent abroad.

Parameter values collected in the course of this research are reported in Table 1. Details on data sources and qualifications will be discussed below.

**Table 1 Parameters Required for Value-Added Calculation**

Parameter		Value
$V_X$	value of output of the factories, net of any tax that may be paid to the domestic government on that output	866,001,000 JD
$t_X$	ad valorem tax rate on output	5.9%
$t_L$	ad valorem tax rate labor	0
$t_M$	ad valorem tax rate on intermediate inputs (assuming that the rate on imported intermediate inputs is identical to the rate on domestically produced inputs)	34.7%
	ad valorem tax rate on intermediate inputs (assuming that the rate on imported intermediate inputs is zero)	10.6%
$t_K$	ad valorem tax rate on profits	0
$\alpha_K$	Capital cost share	24.6%
$\alpha_L$	Labor cost share	6.3%
$\alpha_M$	Material cost share	69.1%
$\delta_M$	Materials value added produced domestically	21.4%
$\delta_K$	Fraction of capital owned by Jordanians	32.9%
$\delta_L$	Fraction of payments to labor paid not remitted by migrant labor	46.0%

Based on the data reported in Table 1, the components of domestic value added are reported in Table 2.

**Table 2 Domestic Value Added Percent**

Component	Formula	Calculation ( $t_M=10.6\%$ )	Calculation ( $t_M=34.7\%$ )
Capital	$(\delta_K - \delta_K t_K + t_K)\alpha_K$	8.1%	8.1%
Labor	$\frac{\delta_L + t_L}{1 + t_L} \alpha_L$	3.0%	3.0%
Materials Production	$\frac{\delta_M}{1 + t_M} \alpha_M$	13.4%	11.0%

Materials Taxes	$\frac{t_M}{1+t_M} \alpha_M$	6.6%	17.8%
Indirect Taxes	$t_X$	5.9%	5.9%
Total		36.9%	45.7%

The figures reported in Table 2 shed some light on the on-going discussion of the domestic value added of the Jordanian apparel industry. Looking exclusively at payments to capital and labor directly employed in the apparel industry, only 11.1 percent of value added accrues to domestic agents.

However, the apparel industry has significant backward linkages. Purchases of intermediate, imported and primary inputs are reported in Table 3. Clearly the most important input is imported fabric of 415 million JD. However, Jordan has a nascent textile industry which supplied 90 million JD of product to the apparel industry. Other significant contributors are trade (51 million JD) and road transport (13 million JD). Of domestically produced intermediate inputs employed in the apparel sector, 21.4 percent of inputs into those sectors are domestically produced.

The production of intermediate inputs then contributes an additional 11.0 to 13.4 percentage points to the domestic value added created by the apparel sector. This finding is consistent with the domestic industry apparel estimate that the domestic value added share is 22.1 percent.

Finally, industry activity generates significant tax revenue. Taxes levied on intermediate inputs contribute an additional 6.6 percent and taxes on final goods contribute 5.9 percent to domestic value added, raising the total domestic value added to 36.9 percent of industry output.

**Table 3 Intermediate and Primary Inputs by the Apparel Sector, 2006**

Industry	Apparel Industry Inputs (1000's JD)
Textile Industry	89573.3
Leather products	97.5
Paper & Paper Products	301.8
Printing & Publishing	327.0
Refinery & Refined products	1026.8
Soap and Detergents	78.7
Other Chemical Products	1065.4
Plastics products	80.7
Fabricated Metal Products	774.9
Engineering Instruments	245.9
Other Manufacturing Industries	2826.5

<b>Electricity</b>	<b>1788.5</b>
<b>Water Supply</b>	<b>796.5</b>
<b>Construction</b>	<b>146.0</b>
<b>Trade</b>	<b>51004.7</b>
<b>Hotels &amp; Restaurants</b>	<b>342.1</b>
<b>Road Transport</b>	<b>13071.2</b>
<b>Air Transport</b>	<b>410.6</b>
<b>Services Incidental to Transport</b>	<b>2331.5</b>
<b>Storage &amp; Warehousing</b>	<b>12.5</b>
<b>Postal Services</b>	<b>55.9</b>
<b>Telecommunication Services</b>	<b>1324.3</b>
<b>Information and Computer Technology</b>	<b>424.6</b>
<b>Banking Sector</b>	<b>5821.5</b>
<b>Insurance</b>	<b>148.7</b>
<b>Other Financial Sector</b>	<b>120.2</b>
<b>Business Services</b>	<b>1540.3</b>
<b>Real estate</b>	<b>3751.3</b>
<b>Health Services</b>	<b>282.5</b>
<b>Others Services</b>	<b>2588.6</b>
<b>Total Intermediate Inputs</b>	<b>182390.6</b>
<b>Imported Goods</b>	<b>415951.7</b>
<b>Total Primary Input</b>	<b>267654.9</b>
<b>Payment to Capital</b>	<b>213374.8</b>
<b>Payment to Labor</b>	<b>54280.1</b>
<b>Indirect Tax less Subsidies</b>	<b>63300.6</b>
<b>Total Inputs</b>	<b>866001.0</b>
Source: Adapted from data provided by Department of Statistics, Jordan	

The findings presented above are quite sensitive to the parameter values chosen. For this reason the balance of this research report will be devoted to an exposition of the data collection procedures and calculations.

## V Data

The calculations presented in section IV are quite sensitive to the parameter values. As a consequence, a careful evaluation of the source data is an important next step before proceeding to policy analysis.

Data for this project were collected from three sources. The input-output table was provided by the Jordanian Department of Statistics, Ministry of Planning. The foreign ownership share of capital in the apparel industry was provided by the Jordanian Investment Board. Migrant employment share, remittances, wages and hours were collected by the authors pursuant to Monitoring and Evaluation of

Better Work Jordan undertaken by Tufts University. Information on migrant employment share, wages, hours, workdays and remittances were obtained from a survey of 629 apparel factory workers in 21 apparel factories in Jordan between March 2010 and May 2011. The factories selected for data collection are all enrolled in Better Work Jordan. In each factory, 30 workers were randomly selected from the roster of employees to participate in a survey on demographic characteristics and working conditions.

The following variables can be extracted from the Jordan IO tables:

- $V_X = 866,001,000$  Jordanian Dinar

In the model above,  $V_X$  is value of output at price  $p_X$ , minus the tax paid on that output. Apparel industry sales, exclusive of indirect taxes, are reported in Table 4. The sum of uses over all sectors is 866,001,000 JD.

- $t_X = 5.9\%$

The Department of Statistics reported two IO tables, one exclusive of indirect taxes and one inclusive of indirect taxes. Total Domestic Output of the apparel industry including indirect taxes is reported to be 920,229,500 JD. Given that sales exclusive of taxes is 866,001,000 JD, the implicit tax rate is then 5.9%.

**Table 4 Uses of the Output of the Apparel Industry, 2006**

Industry	1000 JD	Industry	1000 JD
Livestock's & Livestock's Products	0.226927	Electrical Machinery	2.758581
Meat & Fish Products	20.0372	Engineering Instruments	10.66468
Olive Oil & Other Oils	78.44215	Motor Vehicles Bodies, Trailers	3.884886
Dairy products	22.15754	Other Transport Equipments	2.569918
Grain mill products	3.980808	Electricity	1.196908
Prepared Animal Feed	1.156466	Water Supply	0.003856
Bakery Products	92.30783	Construction	0.030203
Sugar & Confectionery	8.095392	Trade	10.8224
Other Food Products	27.24379	Hotels & Restaurants	82.53536
Soft Drink Beverages	0.006977	Road Transport	74.0682
Alcoholic Drinks	2.578057	Rail Transport	0.30682
Textile Industry	41.70878	Air Transport	394.8576
Clothing	11.45572	Services Incidental to Transport	135.2009
Leather products	46.52261	Storage & Warehousing	6.377007
Wood Products Except Furniture	0.089009	Travel, Tour Operators Services	37.82151
Furniture	0.799855	Postal Services	1.525379
Paper & Paper Products	3.821988	Telecommunication Services	16.40568
Printing & Publishing	0.459903	Information and Computer	0.017206

Refinery & Refined products	96.46778	Technology	
Fertilizers & Insecticide	3.808595	Banking Sector	103.9138
Paint Industry	3.353727	Other Financial Sector	15.14295
Pharmaceuticals products	8.348406	Business Services	8.247087
Other Chemical Products	10.41075	Real estate	6.688683
Plastics products	1.148372	Education	425.7777
Bricks, articles of cement concrete	0.013572	Health Services	59.76583
Cutting Shaping Finishing Stone	0.723677	Others Services	271.5118
Manufacture of Glass and Clay	0.176768	Total Intermediate Demand	2201.628
Other Non- Metallic Minerals	0.010568	Household Consumptions	180251.9
Iron and Steel Industry	0.096319	Non-Profit Institutions Serving Household	420.7725
Non Ferrous Metal Industry	32.71873	Government Consumption	9547.053
Structural Metals Products	2.077991	Gross Fixed Capital Formation	0
Fabricated Metal Products	3.733188	Changes in Stock	7095.239
Machinery and Equipments	5.247463	Exports	666484.4
Domestic Appliances	0.105968	Total Final Demand	863799.4
		<b>Total Domestic Output</b>	<b>866001.0</b>

**Source: Department of Statistics, Jordan**

- $t_M = 10.6\%$  or  $34.7\%$

As reported in Table 3, Indirect Taxes Less Subsidies in apparel is 63,300,600 JD, which provides us with the numerator of  $t_M$ . The question is what value should go in the denominator.

First, we assume that the rate on imported intermediates is the same as for domestically produced intermediate inputs. In Table 3, Total Intermediate Inputs is reported to be 182,390,600 JD.

However, if no taxes are levied on imported intermediates, then the denominator should include imported intermediates. In Table 3, we report this value as 415,951,700 JD. In this case the tax rate is calculated to be 10.6 percent.

- $t_L, t_K = 0$

Taxes on capital and labor cannot be inferred from the IO table. Thus, these values are taken to be zero.

- $\alpha_M = 69.1\%$

Materials employed in the apparel industry include Total Intermediate Inputs plus Imported Goods as a fraction of Total Input Demand. From Table 3 we have Total Intermediate Inputs as 182,390,600 JD, Imported Goods of 415,951,700 JD and Total Inputs of 866,000,100, yielding a materials cost share of 69.1 percent.

- $\alpha_K = 24.6\%$

Capital's share of total inputs can be calculated from Table 3. In particular, Payments to Capital is divided by Total Inputs.

- $\alpha_L = 1 - \alpha_M - \alpha_K = 6.3\%$

Labor's cost share is calculated as a residual after expenditure on materials and capital.

- $\delta_K = 32.9\%$

Payments to capital are then disaggregated between payments to foreign owned capital and Jordanian investors. The Jordanian Investment Board reports that the foreign ownership share of capital in the apparel industry is 67.1 percent. The remainder, 32.9 percent, is taken to be the domestically owned.

- $\delta_M = 21.4\%$

As reported in Table 4, the apparel industry purchased 182,390,600 JD of intermediate inputs in 2006 from other sectors of the economy and an additional 415,951,700 JD of imported intermediate inputs. Of the intermediate inputs produced in Jordan, on average 70.2 percent of inputs are themselves produced domestically, rather than imported. These figures yield a domestic share of intermediate inputs of 21.4 percent.

- $\delta_L = 46.0\%$

The domestic share of payments to labor depends on the migrant share of employment, remittances by migrants and migrant pay relative to domestic labor compensation. Estimates of these values are obtained from a workforce survey undertaken by Tufts University pursuant to Monitoring and Evaluation of Better Work Jordan.

Workforce Composition. Each subject was asked to identify their birthplace.

**Table 5 Jordanian Apparel Employment by Place of Birth**

Where were you born?	Freq.	Percent	Cum.

Don't want to answer	1	0.16	0.16
Not asked	30	4.77	4.93
Jordan	171	27.19	32.11
Bangladesh	74	11.76	43.88
Sri Lanka	262	41.65	85.53
Pakistan	2	0.32	85.85
China	23	3.66	89.51
India	66	10.49	100.00
Total	629	100	
Source: Better Work Jordan Monitoring and Evaluation Baseline Report			

Responses are tabulated in Table 5. If we delete those subjects who declined to answer or were not asked, the migrant employment share is 71.4%. However, the 30 workers not asked completed the Arabic language survey. If we take these subjects to be Jordanian, the migrant employment share is 67.9%.

Remittances. Subjects were also asked whether they send money home and how much money they remitted in the past year. Detailed results are available upon request. On average, each migrant remits 1311.78 JD per year (\$1849.61 equivalent.)

Daily Pay. Subjects are asked how often they are paid, how much they received the last time they were paid and what days they usually work, in addition to basic worker characteristics such as position and educational attainment. Daily pay is then regressed on worker position and worker characteristics. The excluded group is Jordanian operators (tailor) with a lower secondary education. The point estimate for the intercept is 5.80 indicating that the average daily compensation for a Jordanian sewer with a lower secondary education is 5.80 JD. Complete regression results are reported in Table 6. The coefficients for workers from Bangladesh and Sri Lanka are small and not significantly different from zero. This finding indicates that workers of all nationalities earn essentially the same daily salary. The only exception is workers from China. However, migrants from China are typically more skilled than other workers.

**Table 6: Determinants of the Daily Wages**

Source	SS	df	MS		Number of obs	461
					F( 17, 443)	5.79
Model	440.3368	17	25.9021653		Prob > F	0
Residual	1981.597	443	4.47313033		R-squared	0.1818
					Adj R-squared	0.1504
Total	2421.934	460	5.26507292		Root MSE	2.115

DailyPay	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Position1	1.159163	.4695023	2.47	0.014	0.2364339	2.081891
Position 2	1.238361	.7340831	1.69	0.092	-0.204357	2.681079
Position 3	0.077128	.4709221	0.16	0.87	-0.8483906	1.002647
Position 4	-0.08681	1.273282	-0.07	0.946	-2.589239	2.415609
Position 5	0.614754	.5264138	1.17	0.244	-0.4198247	1.649333
Position 6	0.931492	.3724138	2.50	0.013	0.199575	1.66341
Position 7	2.425854	.5882943	4.12	0	1.26966	3.582049
Position 8	0.456016	.3403614	1.34	0.181	-0.2129075	1.12494
Position 9	0.867229	.3021093	2.87	0.004	0.2734833	1.460974
No Formal Education	-0.14573	.8276281	-0.18	0.86	-1.772291	1.48084
Primary	-0.38692	.3424857	-1.13	0.259	-1.06002	0.286177
Upper Secondary	0.075568	.2873213	0.26	0.793	-0.4891144	0.64025
Technical	0.190559	.2830634	0.67	0.501	-0.365755	0.746873
Bangladesh	-0.33066	.4197296	-0.79	0.431	-1.155567	0.494251
SriLanka	0.023327	.2543394	0.09	0.927	-0.4765345	0.523189
China	3.570477	.5817723	6.14	0	2.4271	4.713854
Other	-0.37685	.3808623	-0.99	0.323	-1.125367	0.371676
_cons	5.795354	.2984841	19.42	0	5.208733	6.381975

Source: Authors' calculations

Work Days and Annual Pay. Employees in Jordanian factories typically report working six days per week, though there is some variation. Combined with the mandated 12 national holiday days, it is expected that workers in apparel factories are employed for 300 days per year.

**Table 7 Migrant Employment, Pay and Remittances**

Migrant Employment Share	Annual Pay per Migrant	Annual Remittances per Migrant	Domestic Share of Migrant Compensation	Domestic Share of Labor Income
71.40%	1737 JD	1311.78 JD	24.48	46.08%

Source: Authors' calculations.

Migrant Labor Income Cost Share. We can calculate then that a typical migrant worker in the apparel industry earns 1737 JD per year, of which 1311.78 JD are remitted internationally. Thus, 24.48 percent of migrant income is retained domestically. Further, given that the migrant employment share is 71.40 percent, 46.08 percent of labor income in the apparel industry is retained in Jordan.

This calculation is summarized in Table 7.

## **VI Conclusions**

Based on the data collected to date, payments to domestically owned capital capture 8.1 percent of the value added created by the Jordanian apparel industry and Jordanian workers account for an additional 3.0 percent. Thus, 11.1 percent of apparel industry value added accrues to domestic agents employed directly in the Jordanian apparel industry.

The apparel industry has significant backward linkages. The most important inputs are imported fabric of 415 million JD. However, Jordan has a nascent textile industry which supplied 90 million JD of product to the apparel industry. Other significant contributors are the trade (51 million JD), and road transport (13 million JD) sectors. Of domestically produced intermediate inputs employed in the apparel sector, 21.4 percent of inputs into those sectors are domestically produced.

The production of intermediate inputs then contribute an additional 11.0 percentage points to the domestic value-added created by the apparel sector. This finding is consistent with the domestic industry apparel estimate that the domestic value added share is 22.1 percent.

Finally, industry activity generates significant tax revenue. Taxes levied on intermediate inputs contribute an additional 6.6 percent domestic and taxes on final goods contribute 6.6 percent to domestic value added, raising the total domestic value added to 36.9 percent of industry output.

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