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ANALYSIS AND RECOMMENDATIONS FOR CUSTOMS TARIFF REFORM

Final Report

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This publication was produced for review by the United States Agency for International Development. It was prepared by Dr. Nihal Pitigala, Sheri Pitigala, and Dr. Maros Ivanic.

ANALYSIS AND RECOMMENDATIONS FOR CUSTOMS TARIFF REFORM

FINAL REPORT

USAID JORDAN ECONOMIC DEVELOPMENT PROGRAM

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AUTHORS: DR. NIHAL PITIGALA, SHERI PITIGALA, AND DR.
MAROS IVANIC

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1. INTRODUCTION

1.1 BACKGROUND

During the past decade, the Jordanian economy has embarked on a period of renewed growth, which has resulted in strong (real and nominal) GDP growth, rising per capita GDP and rising export performance. Since 2000, the year of Jordan's accession to the WTO and negotiation of key trade agreements with the US and the Arab region, real GDP has grown at an average annual rate of 6.6 percent, and per capita GDP has grown at 3.5 percent per annum.

However, Jordan faces a number of challenges going forward. While economic growth has been rapid over the past eight years, this growth comes after a protracted period of economic malaise and the real economy in Jordan is only now catching up to the level in 1982, the last year before the beginning of the initial decline. Also, unemployment remains relatively high, officially at 12.7 percent in 2008 though informal estimates put it substantially higher.

Jordan has arrived at an important crossroads in its economic development path. While recent economic performance has been relatively strong, in terms of GDP growth, the benefits have yet to "trickle down" to improve the standard of living of the average Jordanian. Some sources of this growth, such as the apparel sector, are unlikely to be sustainable in the long run. While a wide range of policies have influenced the direction and pace of Jordan's development path, trade policies have played a critical role in guiding the direction of current investment, employment and export development in Jordan.

Jordan's greatest challenge remains the necessity to create adequate conditions for increased private investment and improved competitiveness to generate the high and sustainable growth needed to create employment and to reduce poverty. Despite relatively few scarce natural resources, Jordan's relatively young and education population must be fully leveraged to transform Jordan from a vulnerable lower-middle income economy into a modern, knowledge-based economy.

Given Jordan's small size, the path to prosperity must be trade-led. Jordan's small market cannot generate the scale and efficiencies required of competitive industries. Inward-looking producers will find their growth constrained by a small market, limiting their future growth and ability to generate new employment opportunities. International markets enable the realization of scale economies and can drive productivity growth and wealth generation through improved technologies, standards and value-added production and services. In short, trade-led growth will be critical to sustaining Jordan's economic growth prospects, reducing poverty, and improving the standard of living for its citizens.

1.2 ROLE OF TRADE POLICY

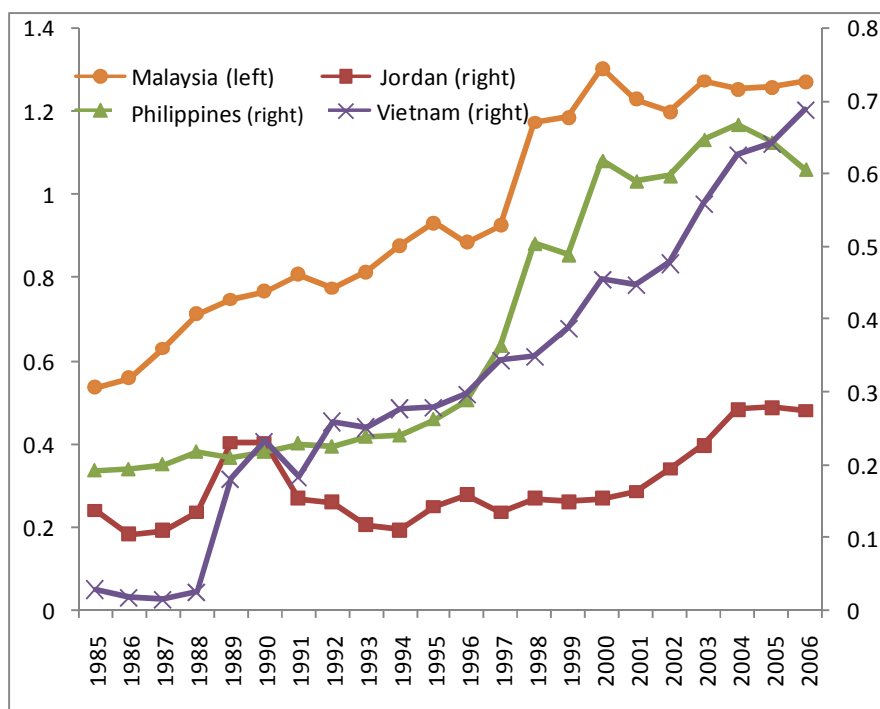
The Government of Jordan has, over the past ten years, made great strides in liberalizing its trade and investment environment. Jordan's accession to the WTO in April 2000 signaled its commitment to global integration. Upon accession to the WTO, Jordan substantially reduced its simple average tariff rate (based on Most Favored Nation, or MFN, tariff rates)¹ from 23.8

¹ Most Favored Nation (MFN) tariffs are those tariffs that apply to all trade partners outside existing preferential or free trade agreements.

percent in 2000 to 11.2 percent in 2008. These reforms, and Jordan's membership in a number of regional agreements, have promoted the expansion of trade in Jordan, nearly doubling the annual growth rate, from an average 9.4 percent between 1990 and 1999 to an average 17.7 percent since 2000.

However, Jordan has yet to reap the full benefits of trade reform. Much of the observed growth is attributable to the expansion of apparel exports to the USA under the Qualifying Industrial Zone program and, later, the Jordan-US Free Trade Agreement. Over the past two years, while tariffs on many production-related inputs (raw materials, intermediate goods, and machinery and equipment) have been reduced, many to zero, the tariff schedule remains highly dispersed and causes unforeseen distortions to the domestic economy, by creating an “anti-export” bias that favors domestic-oriented activities. Consequently, exports remain a small fraction of GDP, amounting to a mere 27 percent in 2008, which is relatively low compared to other countries of a similarly small size (in terms of GDP) and far lower than developing country “success stories”, such as Malaysia, Philippines and Vietnam, which have benefited from high levels of export-led growth.

Figure 1—Export-led Growth in Emerging Markets



The Government of Jordan is now embarking on a new phase of structural and other reforms, including income tax reform and the rationalization of its many economic zones and other incentive regimes. These reforms will reduce existing distortions in the Jordanian economy that currently reduce the incentive to invest in certain economic activities and allocate resources away from more efficient and toward less efficient uses.

Tariff reform is a natural complement to these other reforms and has been featured as an important cornerstone in the Ministry of Industry and Trade's National Trade Policy Strategy that is currently under consideration by the Council of Ministers. As one of the primary mechanisms, together with exchange rates, by which international trade affects domestic

resource allocation, i.e. the direction of inward investment, and the incentives for firms to invest in competitiveness-enhancing initiatives, whether productivity improvements, product development and standards, and the application of new technologies. The structure of Jordan's current tariff regime has encouraged the development of low value-added, low skill-intensive manufactures that rely heavily on foreign labor, at the expense of the development of higher value-added, higher skill-intensive jobs for Jordanians. Tariff liberalization can play a direct role in putting Jordan on a more sustainable economic development path that brings new job creation opportunities to and an increased standard of living for Jordanians.

It is important to note, however, that tariff reform is a necessary but insufficient reform. Tariff reform can provide the market incentive for Jordanian firms to improve their competitive positioning. However, many Jordanian firms lack the capacity (financial and know-how) to improve their competitiveness and also find that many other policies impede their ability to reduce costs and improve their productivity. Therefore, tariff reform must be accompanied by other policies and programs that can assist affected firms to adjust to market incentives. It should also be noted, however, that while such policies and programs can be implemented in the absence of tariff reform, their effectiveness would be reduced, as they are, like tariff reform, necessary but insufficient to promote competitive industries. In short, tariff reform should be part of a larger package of reform and programs to assist the private sector to build their competitiveness and access export markets. The Ministry of Industry and Trade's Industrial Policy Strategy, which is also under consideration by the Council of Ministers, provides a framework and action plan to address the constraints faced by Jordan's industries. Ensuring that these programs are well-designed and well-funded will be critical to support firms and workers in the adjustment process.

1.3 STUDY OBJECTIVES AND STRUCTURE

The USAID Jordan Economic Development Program (SABEQ) has been requested by the Ministry of Finance, as part of a larger fiscal reform package, to undertake an assessment of current tariff policies on economic performance and to recommend reforms that will better serve the future development of the Jordanian economy. This study evaluates several reform options and offer recommendations. The overall purpose of this study is to provide an assessment of policy options and to recommend to the Government of Jordan a strategy that is supportive of the GOJ's overall reform program and addresses the fiscal, industrial production and labor adjustment issues of the Jordanian economy.

The report is organized around the primary analytical components of the study:

- **Chapter 2—Methodology** provides an overview of the methodology adopted to analyze different reform options through the quantification of economic impacts.
- **Chapter 3—Context of Reform** provides an overview of recent economic performance in Jordan, including GDP, export and import growth, as well as the role of tariffs in supporting the underlying structure of the economy; the chapter also outlines the expected impact of reform, including international practices and experiences.
- **Chapter 4—Reform Approach** outlines the objectives of reform, the alternative approaches to achieving those objectives, and recommends the most appropriate options for analysis.

- **Chapter 5—Impact Analysis: Macroeconomic Effects** examines the macroeconomic impacts of the different reform options, benchmarked against the status quo approach, including impacts on medium- and long-run GDP growth, welfare, prices, trade flows, and the fiscal balance.
- **Chapter 6—Impact Analysis: Production and Factor Effects** provides an industry-level analysis of the direction and magnitude of adjustment associated with tariff reforms, and identifies industry characteristics that will determine the depth and duration of adjustment.
- **Chapter 70—Recommendations** presents the strategy for designing and implementing tariff reforms and any required complementary measures, and appropriate sequencing and timing of those reforms.

Two supporting Annexes are also included:

- **Annex A** provides detailed data on the Structure and Growth of Industrial Output in Jordan.
- **Annex B** provides an overview of the Computable General Equilibrium (CGE) model that is featured in the analysis.
- **Annex C** provides a list of sectors in Jordan, classified by skill-intensity.

2.METHODOLOGY AND ANALYTICAL TOOLS

The tariff reform analysis and recommendations contained herein are based on a comprehensive and integrated set of tools and methodologies to assess the current performance of Jordan's economy under the existing tariff regime and the expected macroeconomic and sector level outcomes from different reform options. The key tools and methodologies, and their data sources, are described below.

2.1 ANALYSIS OF RECENT ECONOMIC PERFORMANCE

Understanding Jordan's recent economic performance is critical in designing a reform program that can directly contribute to the achievements of Jordan's economic development goals. An assessment of Jordan's recent economic performance, at both the macro and sector level, was conducted, utilizing a series of analytical tools:

- The current tariff structure was analyzed to better understand the underlying incentive environment for Jordanian producers and to identify the potential scope of reform. The results also provide an indication of which sectors may be most sensitive to reductions in tariffs, based on current levels of effective protection.
- The performance of Jordan's industry sectors was analyzed, including both export performance and domestic market performance, at 4-digit ISIC level, to identify sectors that have positively contributed to Jordan's economic growth and those that are facing potential decline.
- The results of the analysis were then utilized to identify the impact of the current tariff regime on the performance of each of the sectors, in terms of value-added and competitiveness, as well as employment and consumption, to understand how current levels of protection have or have not supported the development of competitive industries and the progress toward the achievement of Jordan's economic development goals.

Data Sources:

- Sector data (2002-2008) from Jordan Department of Statistics Economic Surveys database and Establishment Census of 2006
- Sector information provided by Industrial Directorate, Ministry of Industry and Trade
- Labor market data (2000-2008) from Jordan Department of Statistics Employment & Unemployment database , Job Creation Survey database and Employment in Establishments database
- Import, export and tariff data (2002-2008) from Jordan Customs and UN Comtrade database
- Other firm and sector characteristics collected through primary data collection based on firm-level survey instrument and personal interviews

2.2 MACROECONOMIC ANALYSIS BASED ON COMPUTABLE GENERAL EQUILIBRIUM MODEL

2.2.1 BENEFITS OF CGE MODELING

Understanding the macroeconomic impacts of tariff reform is important to provide Jordan's policy-makers with a better understanding of the impact of the current tariff structure and proposed policy reforms, including useful information on the short- and long-term costs and benefits associated with each of the options, as well as the costs and benefits of "non-reform".

The quantitative analysis of the effects of policies on economic outcomes has grown sharply in recent years, made possible by advances in theory and analytical techniques, and no less importantly, by the dramatically increased computational and data processing power of computers. Computable general equilibrium (CGE) models are a class of economic model that use actual economic data to estimate how an economy might react to changes in policy, technology or other external factors. This includes impacts on, not only, the traded goods sector, but also on traded and non-traded services, as well as factor markets (labor and capital). The main benefit of CGE models is that they offer a rigorous and theoretically consistent framework for analyzing trade policy questions. While not forecasts, *per se*, the numbers that come out of the simulations give a sense of the order of magnitude that a change in policy can mean for economic welfare or trade. Different assumptions, including the degree of labor and capital market flexibility, allow the estimation of short-, medium- and long-term impacts.

Why do policy-makers need to concern themselves with trade models?

Excerpt from WTO Discussion Paper #10, "Demystifying Modelling Methods for Trade Policy" by Roberta Piermartini and Robert Teh

"The basic answer is that the use of models should help improve policy-making. Hertel (1997) emphasized the value of a CGE framework to policy formulation and the flexibility that it provides policy-makers 'to apply their own insights into particular problems within a consistent economy-wide framework.'

"Economic models provide a theoretically consistent, rigorous and quantitative way of evaluating different trade policies. Models are a distillation of economic theory and so the use of models ensures that policy-making is guided by a correct understanding of how economies function. Models can confirm and strengthen existing insights. The policy-maker may have formed a judgment that trade reform will be good for the country. A simulation of the model can confirm that judgment and provide an estimate of the likely gains. Model simulations can surprise the policy-maker and alert him to some of the unintended consequences of his action that would not have been clear without the economy-wide framework and discipline of economic models. For example, a policy-maker may be particularly concerned by the effect of foreign competition on the domestic steel sector. The policy-maker may be inclined to adopt a tariff on imports to relieve the pressure of competition on the domestic industry. However, the model simulation may show that there are detrimental effects of the tariff on downstream industries and that if the interests of all sectors are taken into account, the economy would be worse off with the tariff than without it."

CGE models have been used extensively in the analysis of unilateral reforms, as well as bilateral, regional, and multilateral negotiations. Recent examples include WTO Doha Round negotiations and the impacts of various approaches that have been tabled; bilateral and regional agreements such as the Greater Arab Free Trade Area (GAFTA), the Central American Free Trade Area (CAFTA), ASEAN Free Trade Area, EU Partnership Agreements (including Jordan), as well as recent unilateral reforms, including, for example, in the EU, Egypt, Lebanon, Philippines and Vietnam. INSERT CITATIONS, WHERE AVAILABLE.

2.2.2 THE GTAP CGE MODEL AND DATABASE

The current analysis utilizes the model and database developed through the Global Trade Analysis Project (GTAP), which is coordinated by the Center for Global Trade Analysis housed at Purdue University (Indiana). GTAP is a global network of researchers and policy makers conducting quantitative analysis of international policy issues. aNNEx B provides a detailed overview of the GTAP model.

The current analysis also utilizes the GTAP Database, a fully documented, publicly available global data base which contains complete input-output data, bilateral trade information, transport, and protection linkages among regions for all GTAP commodities. The current version 7, utilized here, includes data from 113 countries and regions, covering 57 economic sectors, providing access to transparent and standardized data.

2.2.3 OUTPUTS OF CGE MODEL

The results of the CGE modeling provide information on the following impacts of tariff reform:

- Gross Domestic Product
- Price levels
- Wages
- Sector-level production and employment, at ISIC Revision 3, 3-digit level
- Revenues from tariffs and other government revenues, including Income Tax, General Sales Tax and Special Sales Tax.

Each of the above outcomes is provided at four points in time: short-run, medium-run and two long-run time periods. The short- and medium-run are based on assumptions about the mobility of factors in the economy. While timelines are not directly associated with the short- and medium-run, but rather the time it takes for factor markets to adjust based on the imposed assumptions, international experience (validated based on Jordanian data related to labor and capital mobility, see Chapter 6, Section 6.2.1) suggests the following timeframes:

- The **short-run**, when factors of production are expected to have limited mobility within Jordan, represents the first 3 to 9 months following the initial policy “shock”. The short-run results allow us to understand the expected “adjustment costs” in terms of output and labor.
- The **medium-run**, when capital and labor are both more mobile within Jordan, represents months 9 to 18 of the reform process, as economic agents (producers, workers, consumers) are able to adjust to the new incentive environment. This is achieved by implementing a standard assumption on capital mobility where capital

flows between countries in order to equate returns across countries. For example, if returns to capital in Jordan were to rise, enough capital would flow from other countries into Jordan so that the returns in Jordan and the rest of the world are the same.

- The **long-run**, in the current analysis is fixed at two points in time, the years 2015 and 2020. The long-run is based on the same assumptions as the medium-run scenarios, such as international capital mobility, while adding long-run projections on growth in the world, including Jordan. These projections are based on the IMF's projections of population, labor and capital growth and they are directly implemented into the model. While the IMF does not describe the nature of the global growth, we use our model assumptions to replicate the projected growth using exogenous risk premium variables. The implementation of the IMF projections provides a baseline scenario of a likely development in the international demand and supply of various goods, such as agricultural products, food, energy, manufactures and services. Being able to see Jordan's development in this context, allows one to make predictions with respect to the development of its respective sectors, both with and without reform.

2.2.4 CGE MODEL STRENGTHS AND WEAKNESSES

While CGE models, such as the GTAP model used here, are powerful tools for understanding the impacts of proposed trade reforms, several caveats need to be kept in mind when interpreting the results:

- As indicated above, the database for Jordan was “incomplete” due to the lack of sufficient data. The missing values were estimated based on the West Asia regional database. In some cases, the actual input-output relationships in Jordan may vary somewhat. This was the case, for example, in the Iron and Steel sector, where Jordan's industry produces primarily secondary products while others in the region produce primary products, implying a different input-output structure.
- CGE models typically rely on the adoption of a number of behavioral parameters that are based on economic theory and are often quantified based on estimates adopted from the empirical literature. While these estimates are a “best guess”, the actual impact may vary considerably, resulting in different economic impacts.
- CGE models often have difficulty in simulating the impact of the reduction in previously “prohibitive” tariffs that are sufficiently high to eliminate or reduce to very small values the level of imports. This has the effect of locking in pre-existing trade patterns and prevents the model from generating large changes in trade in sectors with little or no trade. Under this specification, if a country's imports of a given product from another country are zero initially, they will always be zero, even after significant reductions of trade barriers. If imports are nonzero but small, they will remain small even if there are large changes in prices.

- CGE models do not take into account some of the benefits of trade liberalization, including, for example, reduced transaction costs if tariff liberalization results in the simplification of Customs administration or reductions in rent-seeking and other behavior that otherwise increase trade costs.

Data Sources:

- Sector data (2002-2008) from Jordan Department of Statistics Economic Surveys database
- Partner country data and regional input-output data from Global Trade Analysis Project (GTAP) database, version 7
- Labor market data (2000-2008) from Jordan Department of Statistics Employment & Unemployment database and Job Creation Survey
- Consumption and other consumer data from Department of Statistics Household Expenditures and Income Survey database
- Import, export and tariff data (2002-2008) from Jordan Customs and UN Comtrade database
- Macroeconomic data from Jordan Central Bank Annual Report and Department of Statistics National Accounts database

2.3 FISCAL IMPACT ANALYSIS BASED ON PARTIAL EQUILIBRIUM MODEL

The Government of Jordan faces substantial fiscal constraints that should be considered in any reform of this nature. While short-term “static” impacts of any reform are expected to reduce direct revenues from imports (tariffs, GST and SST), in the medium- to long-term, these costs are expected to be much smaller as trade grows. More importantly, the dynamic impacts of reform will directly contribute to the generation of other tax revenues, including corporate and personal income taxes.

A Partial Equilibrium model is utilized to provide the short-term impact of the different reform options on revenues from imports. The reform options are being designed in such a way as to ensure that the short-term costs are within a range that can be absorbed by the Government, which may be spread over several years as any reform is phased in.

The model utilized is the World Bank’s Trade Reform Impact Simulation Tool (TRIST). The TRIST model is based on data for actually collected revenue so collection efficiency and exemptions can be taken into account. It provides an understanding of the direct revenue impacts of reform, including customs duties, VAT or sales tax (General Sales Tax in Jordan) and excise tax (Special Sales Tax in Jordan). The model has most recently been applied to tariff reforms (unilateral and regional) undertaken in Bolivia, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Tanzania, and Zambia.

The CGE model complements the above, providing the medium- and long-term revenue impacts, both direct and indirect, including income tax revenues generated as a result of growth.

Data Sources:

- Import, tariff, GST and SST data (2008) from Jordan Customs, based on individual transaction level data extracted from ASYCUDA World.

2.4 PRODUCTION AND EMPLOYMENT ADJUSTMENT ANALYSIS

Tariff reform will, naturally, encourage the reallocation of resources, away from less efficient and toward more efficient activities. This may occur within the same sector or between sectors. This will entail short-term adjustment costs, in terms of production and employment. Understanding these shifts will be important for policy-makers and will provide valuable information that can inform the design of an appropriate program of assistance to ease the adjustment process, including the required degree of re-training for workers that must find jobs in sectors different than those in which they currently work.

The potential scope of adjustment in the short-term will be assessed using two complementary standard methodologies. The CGE model, itself, will provide estimates on the expected shifts in production and employment across all economic sectors in Jordan. In order to understand the micro-level responses to reform, an analysis of the Effective Rates of Protection (ERP) will be utilized. Nominal tariffs do not provide the “true” level of protection faced by individual industries and firms, as the impact of tariffs, in terms of the incentives they provide, vary according to the level of value added and the tariffs paid on any intermediate or raw material imports. ERP analysis enables the quantification of the magnitude of the required tariff-induced production adjustment for each tariff scenario.

In order to better understand the expected duration of the “short-term”, an analysis of historical labor market data is conducted. Using information on the average duration of unemployment, average annual turnover by sector, and estimates on the mobility of different labor categories, the quantification of the short-term is estimated.

In the medium- and long-term, tariff reform will create new investment and employment opportunities that are better aligned with Jordan’s current and evolving comparative advantages, enabling the development of more competitive sectors and enterprises. The CGE model will provide detailed information, at the sector level, on the production and employment growth opportunities. It is expected that most sectors will grow in response to the reform, as resources shift to more competitive enterprises within those sectors. The information will be useful to guide the future direction of vocational and technical training, as well as other supporting policies and infrastructure that can best meet the needs of these growing sectors.

Data Sources:

- Sector data (2002-2008) from Jordan Department of Statistics Economic Surveys database
- Labor market data (2000-2008) from Jordan Department of Statistics Employment & Unemployment database , Job Creation Survey database and Employment in Establishments database
- Import, export and tariff data (2002-2008) from Jordan Customs and UN Comtrade database
- Value added and other firm and sector characteristics collected through primary data collection based on firm-level survey instrument and personal interviews

3.CONTEXT OF REFORM

3.1 BACKGROUND

While the GOJ has made great strides to gradually reduce import tariffs, the overall tariff structure retains a number of distortions that prevent the more efficient allocation of scarce resources and, therefore, reduce the productive capacity of Jordan's economy and potential gains from trade. When matched against recent industry performance, the analysis reveals that the level of protection, coupled with the escalating tariff structure, has directly contributed to a misallocation of resources toward lower value-added, low skill-intensive activities, which are now facing competitive pressures from imports, at the expense of developing higher value-added, higher skill-intensive activities. This has had a direct and negative impact on both consumers and Jordan's educated labor force, while only marginally benefitting producers. Restructuring the tariff schedule to reduce the current distortionary effects can promote a more efficient allocation of Jordan's human capital and other resources toward activities that better reflect its comparative advantage to drive sustainable economic development, new job creation and higher standards of living.

3.2 JORDAN'S CURRENT TARIFF STRUCTURE

The following sections provide an overview and analysis of Jordan's current tariff structure and the economic incentives that it provides to Jordanian producers.

3.2.1 NOMINAL TARIFF STRUCTURE

This section provides an analysis of Jordan's "nominal" tariffs, including both Most Favored Nation (MFN) tariffs (those that apply to most trade partners, per Jordan's WTO commitments), as well as applied preferential tariffs that apply to select partners with whom Jordan has signed formal preferential or free trade agreements.

3.2.1.1 MFN TARIFF STRUCTURE

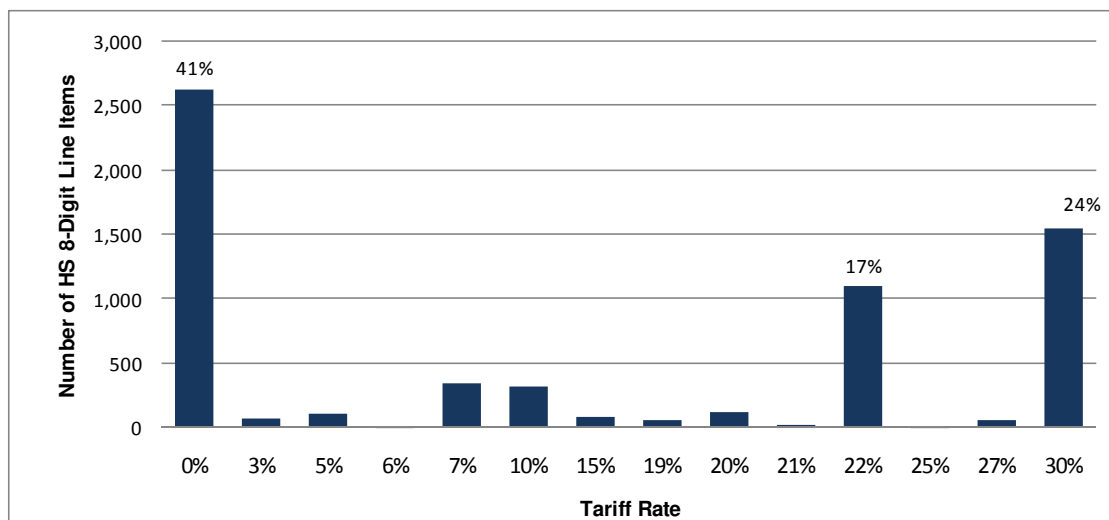
Figure 2 provides a graphical summary of the current MFN tariff structure. As a result of recent reforms, a substantial share of capital goods, as well as raw materials and intermediate goods used for industry, are zero-rated, equivalent to 41 percent of total HS 8-digit line items.² Most other items, on the other hand, are currently duties at relatively high rates, ranging from 20 percent to 30 percent (with a select number of alcohol and tobacco items at rates above 100 percent). In addition, the 8-digit classification is utilized to impose tariffs differentiated by end-users, creating potential difficulties for Customs officials that must determine the type of end-user, which is sometime ambiguous if the importer is a wholesaler (that industry purchases from) or is a producer. Such differentiation also unnecessarily creates opportunities for rent-seeking behavior.

The tariff schedule remains dispersed, in that it protects certain industries much more than others. The dispersion in tariffs interferes with the optimal allocation of resources since the relative returns to activities are not determined by comparative advantage, but rather by the differences in protection rates arising from the differential in tariffs. Typically, the activities that seek and receive protection are those industries that cannot compete well with foreign

² The Jordanian tariff schedule, which currently applies the 2007 Harmonized Coding System (HS), comprises some 5,502 6-digit lines items and 6,206 8-digit line items. The last two digits of the 8-digit codes are utilized by Jordan Customs to differentiate between different types of end-users, e.g. industry versus consumers.

imports or use their resources to compete in external markets. Consequently, the activities that have received higher protection use up resources inefficiently, preventing the resources from being used for more competitive activities.

Figure 2—Structure of Jordan Tariff Schedule (2008)



The higher the dispersion of tariffs, the higher is the deviation of activities from their most efficient use. High dispersion in tariffs is even more harmful than high protection in itself. If all industries are protected to the same extent, then resource flows will be neutral among sectors. High protection, of course, will create more macroeconomic and competitiveness problems than low protection. The combination of high protection and its wide dispersion will be even more of an impediment to the best use of resources.

Tariff dispersion also gives rise to higher administrative costs and opportunities for rent-seeking behavior with relation to tariff classification as well as incentives for lobbying for protection.

Two indicators are typically used to measure the degree of tariff dispersion—the standard deviation of tariffs from their mean and the incidence of tariff peaks:

- Standard deviation of tariffs from mean.** This measures the degree to which tariffs depart from the mean. Most product categories in Jordan display high degrees of dispersion, most with standard deviations above the mean greater than 10 percent (see Figure 3). Taking the tariff schedule in aggregate, the degree of dispersion is 15.1 percent. As displayed in Figure 4, this degree of dispersion is much higher than the more successful Lower-Middle Income countries (in terms of export growth and diversification), such as China (7.11 percent) and the Philippines (8.3 percent).

Figure 3—Dispersion of Tariffs

Items	No of Lines*	Average Duty	Standard Deviation	Min	Max
Live Animals; Animal Products	312	14.7	10.4	0	30
Vegetable Products	326	16.9	12.3	0	35
Prepared Foodstuffs; Beverages, Spirits and Vinegar; Tobacco and Manufactured Tobacco Substitutes	258	28.6	41.2	0	180
Mineral Products	167	9.1	12.4	0	30
Products of the Chemical or Allied Industries	925	2.1	4.9	0	30
Plastics and Articles Thereof; Rubber and Articles Thereof	299	6.7	9.7	0	30
Raw Hides and Skins, Leather, Furskins and Articles Thereof; Saddlery and Harness; Travel Goods, Handbags	74	16.4	12.7	0	30
Wood, Pulp and Their Articles	349	12.5	13.2	0	30
Textiles and Textile Articles	886	10.2	11.6	0	24
Footwear, Headgear, Umbrellas, Sun Umbrellas, Walking Sticks, Seat Sticks, Whips, Riding Crops and Parts Thereof	56	26.9	8.6	0	30
Articles of Stone, Plaster, Cement, Asbestos, Mica or Similar Materials; Ceramic Products; Glass and Glassware	174	18.3	13.0	0	30
Natural or Cultured Pearls, Precious or Semi Precious Stones, Precious Metals, Metals Clad with Precious Metal	59	16.2	9.9	0	30
Base Metals and Articles of Base Metal	751	11.8	12.8	0	30
Machinery and Mechanical Appliances; Electrical Equipment; Parts Thereof; Sound Recorders and Reproducers, Televisions	1078	9.3	12.7	0	30
Vehicles, Aircraft, Vessels and Associated Transport Equipment	207	11.4	11.7	0	30
Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical or Surgical Instruments and Apparatus	305	14.0	12.7	0	30
Arms and Ammunition; Parts and Accessories Thereof	26	26.2	9.2	5	30
Miscellaneous Manufactured Articles	147	24.8	11.9	0	66
Works of Art, Collectors' Pieces and Antiques	8	27.3	7.0	10	30
TOTAL	6407	11.5	15.1	0	180

Source: Jordan Tariff Schedule, as of December 2007, derived from CITS.

* Number of lines at HS 8-digit level.

Figure 4—Dispersion of Tariffs in Comparator Countries

	Standard Deviation of MFN Ad Valorem Applied Tariff	MFN Ad Valorem Applied Tariff (Simple Avg, %)	Maximum MFN Ad Valorem Applied Tariff (%)
China	7.11	9.81%	65%
Philippines	8.26	6.27%	65%
Lebanon	10.41	5.42%	75%
Thailand	14.06	11.92%	80%
Lower-Middle Income Average	14.13	10.65%	160.5%
Jordan	15.10	11.20%	180%
Indonesia	15.41	6.95%	170%
Morocco	24.82	24.20%	329%
usTurkey	30.24	9.58%	225%
Tunisia	30.40	26.91%	150%
Egypt, Arab Rep.	148.3	19.58%	3000%

- **Tariff peaks.** Tariff peaks refer to the share of tariff lines that exceed a reference level. While there is no international agreement as to what that reference point should be, two references that are typically applied. International peaks are those tariff lines that are above 15 percent. National peaks are those that are three-fold above the national mean— 33.6 percent (11.2 percent multiplied by 3) in the case of Jordan. While national peaks in Jordan are relatively low (less than one percent of all line items), international peaks are high, even when compared to other Lower-Middle Income countries (see Figure 5). For example, the more successful Southeast Asian countries all maintain both lower simple average tariffs and lower degrees of dispersion, which has aided in the development of not only direct exporting industries, but the development of supplier (indirect exporter) industries.

Figure 5—Tariff Peaks (% of total tariff lines)

	Share of Tariff Lines with International Peaks	Share of Tariff Lines with Domestic Peaks
Chile	0.16	0.16
Philippines	9.27	9.27
Lebanon	10.13	6.81
Thailand	23.07	14.26
Lower-Middle Income Average	24.57	4.88
Malaysia	30.01	14.13
Jordan	35.92	0.50
Vietnam	41.74	3.11

In addition to the degree of dispersion, Jordan's tariff structure exhibits a relatively high degree of **escalation**, whereby raw materials, intermediate goods and capital equipment are taxed lower than finished goods. The degree of escalation is likely even higher today, given recent efforts to reduce the tariffs on capital equipment and non-dual use inputs to zero. The degree of escalation is particularly high in the agricultural sector (which includes food processing for the purposes of analysis). While only marginally higher than the average lower-middle income economy, this degree of escalation is higher than, for example, the Philippines, China and Tunisia (see Figure 6).

Figure 6—Tariff Escalation (Percent Difference from Raw to Finished Goods)

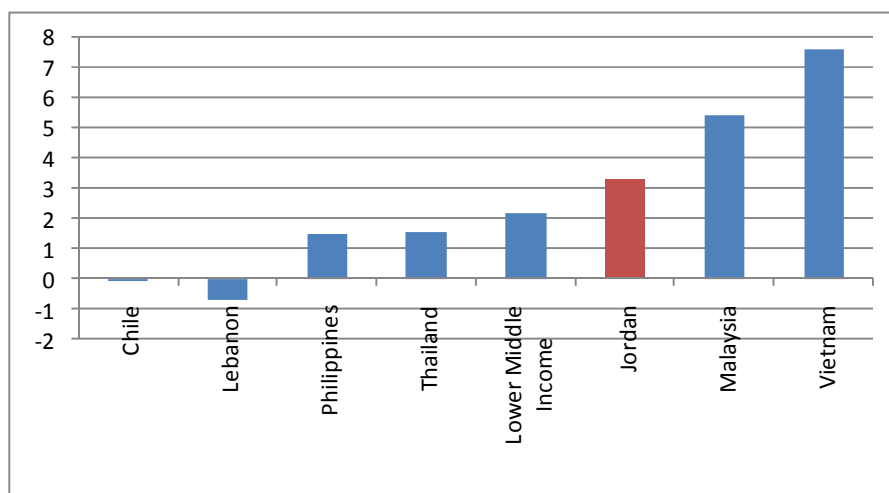


Figure 7 provides a summary of the average level of protection across industry sectors in Jordan. While these are simple averages that are not fully reflective of the level of protection on specific Jordanian products (as it includes products that may not be produced in Jordan), it clearly reflects the fact that finished consumer goods industries are subject to high levels of protection, while intermediate and capital goods related sectors tend to be subject to substantially lower levels of protection (or are unprotected).

Figure 7—Economic Activity by Average Level of Protection

ISIC	Economic Activity	Average Tariff
Highly Protected Sectors		
2696	Cutting, shaping and finishing of stone	30.00%
1912	Manufacture of luggage, handbags and the like, saddlery and harness	30.00%
3610	Manufacture of furniture	29.66%
1541	Manufacture of bakery products	28.61%
2022	Manufacture of builders' carpentry and joinery	28.18%
2695	Manufacture of articles of concrete, cement and plaster	27.22%
2691	Manufacture of non-structural non-refractory ceramic ware	27.00%
1554	Manufacture of soft drinks; production of mineral waters	26.73%
2023	Manufacture of wooden containers	25.30%

ISIC	Economic Activity	Average Tariff
2029	Manufacture of other articles of cork, straw and plaiting materials	25.16%
2102	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	24.94%
3150	Manufacture of electric lamps and lighting equipment	24.50%
2930	Manufacture of domestic appliances n.e.c.	24.19%
3699	Other manufacturing n.e.c.	23.91%
2695	Manufacture of articles of concrete, cement and plaster	27.22%
2693	Manufacture of structural non-refractory clay and ceramic products	23.36%
1722	Manufacture of carpets and rugs	22.00%
1721	Manufacture of made-up textile articles, except apparel	21.91%
1110	Extraction of crude petroleum and natural gas	21.67%
1810	Manufacture of wearing apparel, except fur apparel	21.41%
1513	Processing and preserving of fruit and vegetables	21.20%
2511	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	20.46%
3430	Manufacture of parts and accessories for motor vehicles and their engines	20.42%
2899	Manufacture of other fabricated metal products n.e.c.	20.11%
2109	Manufacture of other articles of paper and paperboard	20.03%
2693	Manufacture of structural non-refractory clay and ceramic products	23.36%
2320	Manufacture of refined petroleum products	19.81%
1543	Manufacture of cocoa, chocolate and sugar confectionery	19.71%
2221	Printing	19.43%
2811	Manufacture of structural metal products	19.38%
3691	Manufacture of jewellery and related articles	18.54%
2694	Manufacture of cement, lime and plaster	18.52%
3120	Manufacture of electricity distribution and control apparatus	17.77%
2812	Manufacture of tanks, reservoirs and containers of metal	17.13%
2610	Manufacture of glass and glass products	17.11%
1549	Manufacture of other food products n.e.c.	16.56%

Moderately Protected Sectors

2893	Manufacture of cutlery, hand tools and general hardware	15.74%
2699	Manufacture of other non-metallic mineral products n.e.c.	14.92%
2919	Manufacture of other general purpose machinery	14.65%
1511	Production, processing and preserving of meat and meat products	14.27%
2915	Manufacture of lifting and handling equipment	13.95%

ISIC	Economic Activity	Average Tariff
3130	Manufacture of insulated wire and cable	13.51%
1514	Manufacture of vegetable and animal oils and fats	13.48%
1911	Tanning and dressing of leather	13.46%
2519	Manufacture of other rubber products	13.04%
2710	Manufacture of basic iron and steel	11.94%
1410	Quarrying of stone, sand and clay	11.67%

Low Protected Sectors

2421	Manufacture of pesticides and other agro-chemical products	11.11%
1531	Manufacture of grain mill products	10.33%
3512	Building and repairing of pleasure and sporting boats	10.00%
1533	Manufacture of prepared animal feeds	9.83%
2101	Manufacture of pulp, paper and paperboard	9.59%
2720	Manufacture of basic precious and non-ferrous metals	8.99%
2422	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	8.46%
2924	Manufacture of machinery for mining, quarrying and construction	7.77%
2424	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	7.35%
1520	Manufacture of dairy products	6.92%
1730	Manufacture of knitted and crocheted fabrics and articles	6.86%
1729	Manufacture of other textiles n.e.c.	6.44%
2929	Manufacture of other special purpose machinery	5.52%
3110	Manufacture of electric motors, generators and transformers	5.47%
2925	Manufacture of machinery for food, beverage and tobacco processing	4.64%
2520	Manufacture of plastics products	4.52%
2412	Manufacture of fertilizers and nitrogen compounds	3.14%
2429	Manufacture of other chemical products n.e.c.	3.04%
2010	Sawmilling and planing of wood	2.41%
1920	Manufacture of footwear	1.62%
1711	Preparation and spinning of textile fibres; weaving of textiles	1.20%
3311	Manufacture of medical and surgical equipment and orthopaedic appliances	1.04%
2921	Manufacture of agricultural and forestry machinery	0.71%
2922	Manufacture of machine-tools	0.63%

Unprotected Sectors

2411	Manufacture of basic chemicals, except fertilizers and nitrogen	0.18%
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ISIC	Economic Activity	Average Tariff
	compounds	
1421	Mining of chemical and fertilizer minerals	0.00%
2212	Publishing of newspapers, journals and periodicals	0.00%
2222	Service activities related to printing	0.00%
2413	Manufacture of plastics in primary forms and of synthetic rubber	0.00%
2423	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	0.00%
2731	Casting of iron and steel	0.00%
2892	Treatment and coating of metals; general mechanical engineering on a fee or contract basis	0.00%
3410;3420	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	0.00%

The existing tariff escalation and differential treatment of sectors and products in Jordan is often justified as affording “breathing room” to industries already strained by foreign competition, particularly from China—this appears to be a case for a number of “import-substituting” sectors, such as furniture and food processing, to name a few. While many developing and emerging economies display some degree of dispersion and/or escalation in their tariff structures, the negative impact in Jordan is likely to be significant. Tariffs that protect domestic industries in Jordan create disincentives to export (i.e. an anti-export bias) in the following ways:

- **Import duties on final goods increase their prices**, thereby increasing the profitability of producing import substitutes in Jordan, such as in those sectors identified above. By contrast, exports must be sold at going prices in world markets (as Jordan, a small producer, cannot affect world prices and is therefore a price-taker), and so resources are diverted from the production of exports to production for the domestic market.
- **Escalated tariff structures increase effective protection** above the nominal protection that import substitution production receives. That is, the value added (gross processing margin) in production for the domestic market exceeds the value added that would have been available without any tariffs or other domestic protection, by proportionately more than the protection of the final product. This further increases anti-export bias. However, the actual degree of protection (“effective protection rate”) depends not only on the differential between duties on intermediate versus finished goods, but also on the degree of value-added. Given the same tariff structure (e.g. 5 percent tariffs on inputs, 15 percent on finished goods), sectors in which domestic value-added is lower will receive a higher degree of protection than sectors where value added is higher.
- **Tariff escalation also discourages the allocation of resources toward intermediate stages of production “in favor” of the final stages of production.** Given the growing trend toward cross-border production networks, Jordan’s tariff

structure may provide a disincentive to allocate scarce resources toward activities in which Jordan has a comparative advantage. The expansion and diversification into higher value-added exports, jobs, and income is unwittingly forgone in favor of protecting less competitive, final-assembly type sectors.

- **This “escalating” tariff structure tends to favor final goods production at the expense of intermediates, and in the long run encourages assembly type activities.** Vested interests in maintaining protection on the final goods produced in the country, but who also lobby for tariff free access to their inputs. When there is no domestic intermediate goods industry, or the intermediate industry is small, there is no effective opposing lobbying influence for tariffs on these intermediates; the result is low tariffs on intermediates and high tariffs on selected final goods – a situation known as tariff escalation.

3.2.1.2 MFN TARIFFS AND REGIONAL AGREEMENTS

Equally as important as the dispersion between MFN tariffs is the dispersion between MFN and preferential tariffs that are offered to members of Jordan’s preferential and free trade agreements. Jordan has signed trade agreements with a number of trading partners in the region and beyond, including the US (JUSFTA), EU (Euro-Med Agreement) and other European countries (EFTA), Singapore, the Greater Arab region (GAFTA, as well as Agadir) and, most recently, with Canada. These agreements are in various phases of implementation and a number of other agreements are under consideration with Turkey, COMESA, MERCOSUR and others. While these trade agreements offer exporters in Jordan preferential access to a key export markets in the region and internationally, they can also pose a number of challenges that can create welfare losses to the Jordanian economy:

- **Welfare Transfers to Foreign Producers.** First, in the presence of high MFN tariffs, these agreements potentially transfer welfare from Jordanian consumers to foreign producers. In the absence of such trade agreements, tariffs promote the transfer of welfare from consumers (who pay higher prices) to producers (who can charge higher prices). In the presence of trade agreements, the producer “benefits” of protection are extended to producers in member countries. In practice, only 39 percent of total imports currently come from non-trade partner countries. Jordanian domestic-oriented producers compete most directly with GAFTA trade partners, who account for 33 percent of imports.
- **Welfare Losses from Trade Diversion.** Second, while trade agreements typically expand the level of trade with partner countries, these trade gains can neither increase or decrease national welfare. If liberalization promotes new trade development, “trade creation”, then welfare increases, as is the case of unilateral liberalization. If, however, an agreement encourages, due to tariff-imposed price advantages, the shift of imports from more efficient non-member producers to less efficient member producers, “trade diversion”, then the economy would be less well off.

While a full econometric analysis would be required to separate out import growth generated through trade creation versus trade diversion—and such as study, requested by MIT, will be forthcoming for the GAFTA agreement—the degree of trade diversion has been “guesstimated” by looking at the impact of “reverse-engineering” Jordan’s trade agreements, i.e. by looking at how much trade would be

“re-diverted” back to non-member countries if all of Jordan’s trade agreements were abolished. Using this method, it is estimated that Jordan’s current trade agreements, while they may be overall welfare-enhancing, annually diverts JD 186 million away from more efficient producers in other countries.

Most of Jordan’s partners have already avoided such welfare losses by imposing lower MFN tariffs on imports from non-member countries. With the exception of Morocco, Sudan and Tunisia, all of Jordan’s existing trade partners have substantially lower MFN tariffs, some close to zero for most goods (such as United Arab Emirates and Singapore).

Figure 8—Partner MFN Tariffs

Country	2000	2007
Singapore	0.0	0.0
Saudi Arabia	0.0	0.0
Libya	20.0	0.0
Kuwait	0.0	0.0
European Union	2.2	1.6
United States	3.6	2.7
Oman	4.7	3.8
Qatar	6.0	3.8
Bahrain	8.4	4.1
United Arab Emirates	4.0	4.2
Lebanon	19.5	5.6
Yemen	12.8	6.7
Egypt	12.1	9.8
Morocco	29.5	13.4
Sudan	25.0	17.1
Tunisia	27.9	22.9

Reducing the level of MFN tariffs in Jordan would directly reduce any welfare losses to the Jordanian economy and, therefore, increase the overall gains from regional trade.

3.2.2 EFFECTIVE RATES OF PROTECTION: FIRM-LEVEL ANALYSIS OF IMPACT OF ESCALATING TARIFF PROTECTION ON VALUE-ADDED AND MARKET ORIENTATION

The nominal rate of protection, while an important input into the calculation of the level of protection, is not the best measure of the level of protection provided to firms or sectors. The level of nominal tariff protection affects the real incomes of the users and producers of protected goods in different ways. For a furniture producer, for example, taxes or other restrictions on furniture imports raise domestic furniture prices and are beneficial to domestic producers selling in the local market. On the other hand, a tariff induced increase in the domestic price of wood raises furniture producers’ costs can work against that protection.

The net impact of trade policies on the producers of any good depends on their effects on prices of both their outputs and their inputs. The Effective Rate of Protection (ERP) is a more

illuminating measure as it more accurately reflects the incentives inherent in the tariff structure for different economic activities. The ERP defined as the extent to which domestic unit value added (or value added per unit of output) is increased by tariffs and other trade restrictions above the level that would exist without trade restrictions. The ERP measures the net protective effect on producers of any product due to the structure of protection on both its inputs and its outputs (see (Corden 1971) and (Greenaway and Milner 2003)). The ERP measures the effect of tariffs on value added price, and, hence ERP is an indicator of increased or decreased incentives for “resource pull” into an industry relative to free trade. A simple formula for effective protection is:

$$ERP = (Tf - aTc) / (1 - a)$$

Where:

ERP= the effective rate of protection

Tf = the rate (%) of nominal protection on output

Tc = the average rate (%) of nominal protection on material inputs

a = share of inputs in the value of output in an unprotected (free trade) situation.

ERP measures are important in that they highlight if the existing tariff structure favors one type of activity over the other type that reflect true comparative advantage of Jordanian industry and how proposed tariff changes are likely to alter the incentive for more relevant activity.

If all tariffs on inputs equaled the tariff on the final product, the value added at domestic prices would be increased relative to the value added at world prices by the same amount and the nominal rate of protection would equal the effective rate of protection. Usually, the tariffs on raw materials and intermediate products are well below the tariffs on final goods, leading to higher effective rates of protection. For any given level of tariffs on final goods and intermediate goods, the level of protection will be highest for those goods with the lowest value added ratios relative to output values.

As discussed above, Jordan’s escalating tariff structure is structured as such. Recent rounds of tariff reductions on intermediate and capital goods have further exacerbated the degree of escalation. An escalating tariff structure, such as Jordan’s, typically provides low value-added producers with a very high level of effective protection compared to those producers with higher value-added, creating a disincentive to invest in the latter and to reallocate resources toward less efficient producers. Since firms’ output decisions are driven by weighing potential revenues against costs of production, it follows that the ERP is a more accurate view of the extent to which the tariff structure favors or penalizes a particular industry. In the case of Jordan, where intermediate imports are much lower or duty-free, such a scenario amplifies the protection on finished goods at the expense of intermediate goods manufacturers.

This section develops a firm-level analysis of ERPs to understand the current level of effective protection provided to different sectors and different products or firms within sectors, and the potential ramifications of tariff reform by focusing on sectors that are representative of Jordan’s agriculture and manufacturing base. An attempt is made to incorporate key industry sectors, including those that form the basis for the National Industrial Policy Strategy, as well as energy-intensive sectors that the Ministry of Industry and Trade have identified as sectors that may be particularly “sensitive” to tariff reform.

Overall 66 firms were covered in the survey of which 16 were agriculture based or use primary agricultural products as an important input, e.g., processed meat or vegetables, and 50 were manufacturing industries, across a spectrum of value added and stages of processing.

Figure 9—Nominal Rates and Effective Rates of Protection

Nominal Protection measures protection on the price of import-competing goods, that is, the degree by which protection allows domestic producers of goods that compete with imports to increase the domestic price above world prices. When a tariff is the only means of protection, then the tariff rate usually is nominal protection. For example, if piece of steel furniture imports are subject to a 25% tariff, then a steel imported from India with a FOB value of JD100 will be sold for JD125 ($JD100 + 25\% \times JD100$) in the Jordanian market. Jordanian furniture manufacturers can charge JD125 and still compete with imported furniture.

Effective Protection is a more inclusive measure of the impact of a country's entire tariff structure upon a firm's activities. You can think of effective protection as "net" protection. Consider a simple example of a producer of 'furniture' that requires only one intermediate input 'steel'. Suppose that production of furniture worth 100 at world market prices requires the use of steel worth JD 85 in world markets. 'World value added' or the cost of all manufacturing margins, including labor and normal returns to capital is JD 15 (the difference between JD100 and JD 85). Now consider a domestic producer of furniture in Jordan provided a nominal protection at a rate of 30 percent on steel furniture and steel has zero duty. The protection provided to furniture is clearly beneficial; it's now accorded JD 45 value added ($JD 15$ value added at world prices + 30 JD provided by a 30% tariff on furniture) or, effective protection of 200% ($JD 30 / JD 15$). But, if the steel maker instead provided a 30% tariff and furniture is made duty free, you may see the furniture maker is made worse off. In fact, furniture makers value added is eroded with a negative protection of 170%, ($JD 85 \times 30\% = JD 25.5$) $JD 25.5 - JD 15$ value added/ $JD 15$). The net effect depends not only on the nominal protection, but also on the market in which the producer

Note that the level of protection afforded an industry, defined as the tariff-induced change in value-added relative to no tariffs at all, may exceed, equal, or fall short of the NRP depending on whether input tariffs are lower or higher relative to the output tariff.

The results of nominal (NRP) and effective (ERP) protection measures for a range of manufacturing and agriculture firms are shown, respectively, in Figure 10. First, it is clearly seen that, where nominal tariffs are greater than zero, ERPs are substantially higher, as can be expected from an escalated tariff structure. While firms in Agriculture and Food Processing have a higher mean NRP, 22 percent, compared with 16 percent in manufacturing, manufacturing firms benefit from a much higher mean ERP, 59 percent, as well as considerable dispersion (with a standard deviation 86 percent), compared to Agriculture (where the mean ERP is 45 percent and the standard deviation is a low 8 percent).

Figure 10—Nominal and Effective Rates of Protection for Selected Products and Sectors

Product/Sector	NRP	ERP
Building material (Marble)	30%	85%
Building material (Portland Cement)	30%	38%
Building material (Granite)	30%	115%
Chemical & Rubber (PVA)	0%	0%
Chemical & Rubber (Paint binder)	0%	0%

Product/Sector	NRP	ERP
Chemical & Rubber (Adhesive)	0%	0%
Chemical & Rubber (Paint)	30%	59%
Cosmetics (Facial mud)	0%	0%
Cosmetics (Salt bag)	0%	0%
Cosmetics (Soap)	0%	0%
Electronic and other equipment Refrigerator (Frost)	22%	34%
Electronic and other equipment (Air conditioning household)	22%	37%
Electronic and other equipment (Air conditioning industrial)	22%	40%
Electronic and other equipment (Microwave)	30%	85%
Electronic and other equipment (Armored power Cable)	27%	238%
Furniture (Wooden)	25%	380%
Furniture (Plastic)	30%	108%
Metal products (Furniture)	23%	35%
Metal products (Aluminum doors)	22%	57%
Metal products (Brass fittings angle)	0%	0%
Other Manufacturing (Capita Equipment)	0%	-2%
Other Manufacturing (Chalk)	22%	27%
Other Manufacturing (Tubes and Pipes)	0%	0%
Other Manufacturing (Garbage bags)	7%	20%
Paper and Printing (Pharmaceutical)	0%	0%
Paper and Printing (Tissue box)	30%	167%
Other Manufacturing (Tissue roll)	30%	82%
Food-Other food (Chicken Luncheon Meat)	27%	38%
Food-Other food (Beef Luncheon Meat)	27%	54%
Food-Other food (Hot Dogs)	22%	44%
Food-Other food (Beef Burger)	22%	63%
Food-Other food (Chicken Burger)	22%	42%
Food-Other food (Confectionary)	22%	61%
Fruit and vegetables (Tomato)	22%	52%
Food-Other food (Jam 1)	22%	73%
Food-Other food (Jam 2)	22%	59%
Food-Food-Dairy (Cheese)	0%	0%
Food-Other food (Golden Biscuit)	22%	27%
Food-Other food (Broad Beans)	22%	36%
Food-oils and fat (Olive Oil)	30%	38%

There is a significant degree of heterogeneity both within and across manufacturing firms. For example, firms in the Electrical Goods, Building Material and Furniture sectors have high ERPs, while others firms, such as those in the Capital Goods sector, have low ERPs. Firms in the Furniture sector are accorded a high 380 percent level of protection, whereas those in the Capital Goods sector are negatively protected as a consequence of tariffs on inputs. While there is more homogeneity among firms in the Agriculture sector, there is some variance in Processed Foods firms where some inputs are protected (for example, chicken) and others are not (other meats).

Such an incentive environment has important implications for resource allocation in Jordan. The ERP measures are suggestive of the extent to which the tariff schedule favors some firms and industries, such as those in the Electrical Goods and Furniture sectors, and are able to lucratively “pull” resources toward it, and away from less protected activities both within and between industries, such as firms in knowledge- and/or resource-intensive sectors like Chemicals, Capital Goods and Cosmetics.

3.3 IMPACT OF TARIFF STRUCTURE ON JORDANIAN ECONOMY

Tariff policy, together with the exchange rate, forms the transmission mechanism through which international trade affects domestic resource allocation, the efficient and competitive restructuring of industry and agriculture, access to new and diverse technologies, and improved incentives to exporters, and, hence, the overall structure of economy. In fact, Jordan's tariff structure has had a profound impact on the structure of Jordan's industries and level of value-added. The analysis presented in the following sections reveals the links between the tariff structure and industry performance, as well as consumer welfare and labor market effects.

3.3.1 OVERVIEW OF IMPACT OF TARIFFS ON WELFARE

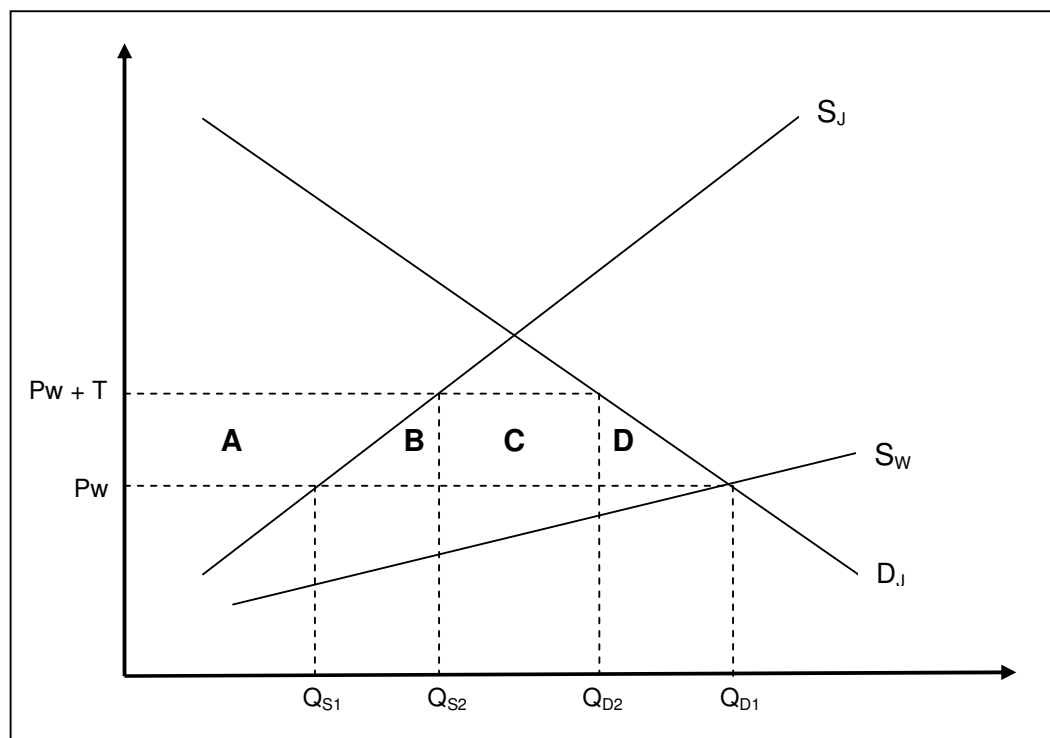
Tariffs have a direct impact on the welfare of consumers, producers, and labor. A demonstration of some of these effects can be done using a partial equilibrium framework. In Figure 11, the usual representation of supply and demand for an import-competing product that can be imported at the world price, P_w (determined by international supply, S_w), is presented. With no trade restrictions and with the Supply and Demand curves as shown, Q_{S1} units of the goods will be produced and Q_{D1} units will be consumed, with imports of the difference between the consumption and production. With trade restricted by a tariff, the import price becomes $P_w + T$ and the price that the domestic producer can sell at is raised to this same level. Consumption decreases to Q_{D2} and production increases to Q_{S2} , with imports decreased accordingly. Tariffs allow domestic producers to sell more at higher prices.

Using the concepts of consumers' and producers' surplus (i.e. welfare), the transfers resulting from the imposition of the tariff can be identified. In this simple example, the higher price results in a loss of consumers' surplus equal to the areas $A+B+C+D$. The gain in producers' surplus is equal to area A . The government gains in revenue equal to area C . Areas B and D , the difference between the loss to consumers and the gains to producers and government revenue, is the net “dead weight loss” in overall national welfare from the tariff distortion.

However, the situation is more complex in the presence of trade agreements that provide producers in selected markets preferential or free access to a protected market. In this case,

the tariff enables producers in partner countries to benefit from the higher price, $P_w + T$. The transfer of welfare from consumers to producers, area A, is then shared with foreign producers, representing a transfer of welfare to foreign producers and, consequently, a higher dead weight loss to the domestic economy. Government revenues are also reduced, as these imports are dutied at a lower rate (or are zero-rated), creating a further dead weight loss to the economy.

Figure 11—Partial Equilibrium Impact of Tariffs on Welfare



While an extremely simplified example, this captures much of the distributional impact of the tariff. If the example were extended to a general equilibrium treatment for an economy where goods are used as intermediate products, the higher costs are passed on to other firms that use this industry's output or that compete for resources from this industry. The effective rates of protection calculations, provided in section 3.2.2 above, give some indication of the disincentives implied to other sectors from protecting one sector.

The following sections provide some empirical evidence of the impact of tariffs on the Jordanian economy.

3.3.2 IMPACT OF PROTECTION ON MARKET ORIENTATION AND INDUSTRY PERFORMANCE

As discussed in section 3.2.1.1 above, the structure of Jordan's (nominal) tariff structure gives rise to a high degree of escalation in a number of sectors and, therefore, high rates of effective protection to low value-added sectors and low rates of effective protection to many other, higher value-added sectors. The analysis here reveals that those firms and sectors

with higher rates of effective protection have remained largely domestic oriented, while those with high value added and consequently lower effective rates of protection are more export oriented, providing strong evidence in favor of the expectation that escalated tariffs create an anti-export bias that disfavors export-oriented activities in favor of domestic-oriented production. In the case of Jordan, the evidence presented below also suggests that a number of these domestic-oriented, import-competing sectors are not able to maintain their market shares in the presence of GAFTA and other trade agreements that, as described in section 3.3.1, allow foreign producers to gain at the expense of national welfare.

3.3.2.1 INDUSTRY STRUCTURE

Jordan's industrial sector currently accounts for 29 percent of GDP (2007), growing from 26 percent in 2000. Current gross output of the industrial sector is JD 8.5 billion, which grew more than 100 percent over the level of production in 2002. Annex A provides details of current production and growth rates of individual industrial sectors, defined at the 4-digit level of the International Standard of Industrial Classification (ISIC). As seen from Annex A, while the majority of sectors have grown over recent years, output in a few selected sectors has actually declined—these include petroleum and gas, made-up textiles (excluding wearing apparel), leather, rubber products, and non-structural ceramics.

In terms of employment, the industrial sector employs some 176,000 workers in Jordan, while the services sector employs close to 700,000. The largest industrial sectors in terms of employment include wearing apparel, furniture, bakery products and structural metal products.

Figure 12—20 Largest Employers in Industry

ISIC	Economic Activity	2007	Share of Industry Employment
1810	Manufacture of wearing apparel, except fur apparel	25,524	14.4%
3610	Manufacture of furniture	12,513	7.0%
1541	Manufacture of bakery products	12,434	7.0%
2811	Manufacture of structural metal products	9,049	5.1%
2695	Manufacture of articles of concrete, cement and plaster	8,120	4.6%
4010	Production, collection and distribution of electricity	7,664	4.3%
2696	Cutting, shaping and finishing of stone	6,476	3.6%
1421	Mining of chemical and fertilizer minerals	5,700	3.2%
2423	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	5,654	3.2%
2520	Manufacture of plastics products	4,805	2.7%
1520	Manufacture of dairy products	4,191	2.4%
1511	Production, processing and preserving of meat and meat products	3,687	2.1%
1554	Manufacture of soft drinks; production of mineral waters	3,564	2.0%
2212	Publishing of newspapers, journals and periodicals	3,308	1.9%
2320	Manufacture of refined petroleum products	3,176	1.8%
2221	Printing	3,074	1.7%

ISIC	Economic Activity	2007	Share of Industry Employment
2424	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	2,888	1.6%
1549	Manufacture of other food products n.e.c.	2,674	1.5%
3130	Manufacture of insulated wire and cable	2,535	1.4%
2022	Manufacture of builders' carpentry and joinery	2,524	1.4%

3.3.2.2 IMPACT OF TARIFFS ON MARKET ORIENTATION

The tariff structure appears to have had a significant impact on the market orientation of firms and sectors. The majority of Jordan's industrial sectors remain inward looking, dependent on the domestic market for their revenue growth. Overall, only 17 percent of total industrial production is exported. Figure 13 categorizes each sector by its market orientation. Only a handful of sectors has developed with a strong export orientation (greater than 50 percent of sales)—these include machine tools, wearing apparel, agricultural machinery, basic chemicals, fertilizer minerals and compounds, pesticides, pharmaceuticals and wire and cables. With the exception of wearing apparel, these exporting sectors generally face low tariffs at home.

Figure 13—Industrial Sectors by Market Orientation

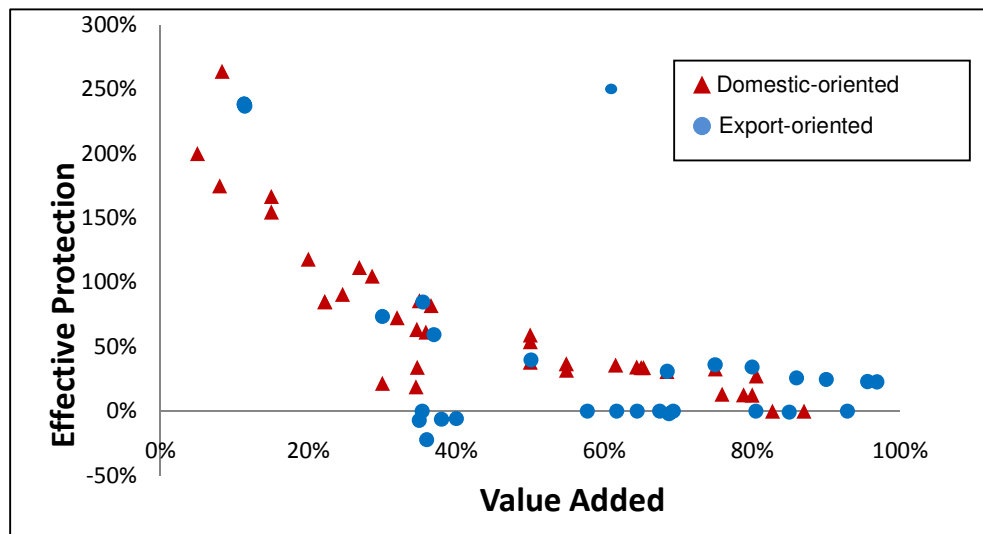
Mostly for Export Markets (>50% sales for exports)	Mostly for Domestic Market (<25% sales for exports)
1421 Mining of chemical and fertilizer minerals	1110 Extraction of crude petroleum and natural gas
1810 Manufacture of wearing apparel, except fur apparel	1410 Quarrying of stone, sand and clay
2411 Manufacture of basic chemicals, except fertilizers and nitrogen compounds	1513 Processing and preserving of fruit and vegetables
2412 Manufacture of fertilizers and nitrogen compounds	1520 Manufacture of dairy products
2421 Manufacture of pesticides and other agro-chemical products	1531 Manufacture of grain mill products
2423 Manufacture of pharmaceuticals, medicinal chemicals and botanical products	1541 Manufacture of bakery products
2921 Manufacture of agricultural and forestry machinery	1543 Manufacture of cocoa, chocolate and sugar confectionery
2922 Manufacture of machine-tools	1551 Distilling, rectifying and blending of spirits; ethyl alcohol production from fermented materials
3130 Manufacture of insulated wire and cable	1600 Manufacture of tobacco products
	1711 Preparation and spinning of textile fibres; weaving of textiles
	1721 Manufacture of made-up textile articles, except apparel
	1729 Manufacture of other textiles n.e.c.
	1911 Tanning and dressing of leather
	2010 Sawmilling and planing of wood
	2212 Publishing of newspapers, journals and periodicals
	2320 Manufacture of refined petroleum products
Large Share for Export Markets (>25% sales for exports)	
1514 Manufacture of vegetable and animal oils and fats	
1722 Manufacture of carpets and rugs	
1920 Manufacture of footwear	
2101 Manufacture of pulp, paper and paperboard	
2109 Manufacture of other articles of paper and	

paperboard	2413 Manufacture of plastics in primary forms and of synthetic rubber
2422 Manufacture of paints, varnishes and similar coatings, printing ink and mastics	2511 Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
2424 Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	2520 Manufacture of plastics products
2429 Manufacture of other chemical products n.e.c.	2610 Manufacture of glass and glass products
2691 Manufacture of non-structural non-refractory ceramic ware	2694 Manufacture of cement, lime and plaster
2699 Manufacture of other non-metallic mineral products n.e.c.	2695 Manufacture of articles of concrete, cement and plaster
2720 Manufacture of basic precious and non-ferrous metals	2811 Manufacture of structural metal products
2899 Manufacture of other fabricated metal products n.e.c.	2812 Manufacture of tanks, reservoirs and containers of metal
2915 Manufacture of lifting and handling equipment	2892 Treatment and coating of metals; general mechanical engineering on a fee or contract basis
2919 Manufacture of other general purpose machinery	2924 Manufacture of machinery for mining, quarrying and construction
2929 Manufacture of other special purpose machinery	2925 Manufacture of machinery for food, beverage and tobacco processing
2930 Manufacture of domestic appliances n.e.c.	3110 Manufacture of electric motors, generators and transformers
3311 Manufacture of medical and surgical equipment and orthopaedic appliances	3150 Manufacture of electric lamps and lighting equipment
3410;3420 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	3512 Building and repairing of pleasure and sporting boats
3430 Manufacture of parts and accessories for motor vehicles and their engines	
3691 Manufacture of jewellery and related articles	
3699 Other manufacturing n.e.c.	

Figure 14 illustrates the impact of this incentive structure on firm-level value-added and market orientation. The data reveal that effective protection rises exponentially when the value-added share of output falls below 40 percent, whereas a higher level of value-added is associated with smaller or negative effective protection. In other words, there is a strong and inverse relationship between value added and the degree of effective protection. The evidence reaffirms that Jordanian tariff structure is heavily skewed towards incentive for low value added activity.

Moreover, the analysis reveals a correlation between the market orientation of firms and the level of effective protection (and hence, value-added). By and large, the highly protected, low-value added firms are more oriented toward the domestic market, while the less protected, higher value-added firms are more export-oriented. If some goods are afforded much higher levels of protection from foreign competition in the domestic market, and its costs are little affected by input tariffs, the economy is likely to draw inefficient firms into the domestic market that otherwise would not survive under free trade and/or reduce the incentive for existing firms to become more efficient or add more value.

Figure 14—Incentive Environment for Value Added and Export Activities



As can be seen, while escalating tariffs do not necessarily eliminate the possibility of attracting high value-added, export-oriented activities into Jordan, the incentive structure drives more resources than would otherwise be attracted (under free trade) towards low value added activity that are dependent on the domestic market. This “resource pull” toward such sectors is what creates an anti-export bias that evidenced by such firms’ low export penetration. The consequence of this is the increasing vulnerability of the Jordanian economy to more competitive low-wage countries, such as India and China, as well as Egypt.

The following sections provide a summary of the performance of highly protected versus less protected or unprotected sectors.

3.3.2.3 PERFORMANCE OF PROTECTED SECTORS

As seen from Figure 13 above, a large number of Jordan’s industries remain domestic-oriented. Figure 15 provides a summary of the performance of these domestic-oriented sectors. While Jordan’s manufacturing sector has, in general, experienced a high level of growth over recent years, there are a number of domestic-oriented sectors that have performed less well, in terms of overall growth and, more importantly, in terms of their domestic market shares, signaling their inability to keep pace with growing market demand and threatened by imports from the region and beyond. As Figure 15 reveals, most of these sectors operate under high levels of protection.

Figure 15—Performance of Domestic-Oriented Sectors

Economic Activity	Growth of Exports	Growth in Local Market Share	Tariff
Made-up textile articles, except apparel	-87%	-10%	22%
Cement, lime and plaster	-71%	-1%	19%
Non-structural non-refractory ceramic ware	-70%	-6%	27%
Structural non-refractory clay and ceramic	-44%	-46%	23%
Wooden containers	0%	-85%	25%
Tanks, reservoirs and containers of metal	0%	-43%	17%
Luggage, handbags and the like	0%	-17%	30%
Furniture	3%	-9%	30%

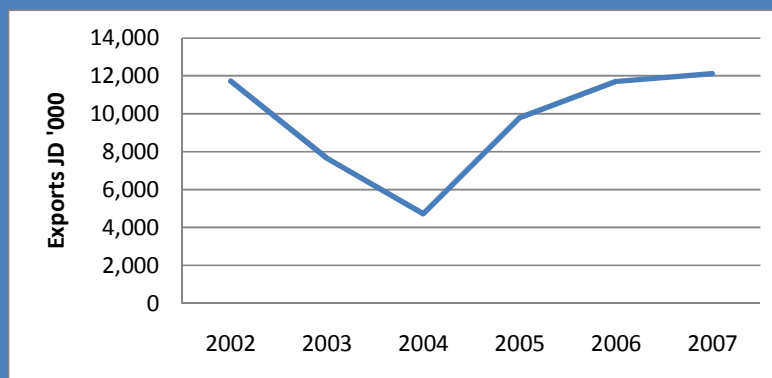
While this analysis cannot draw a definitive link between tariffs and market performance (which would require an econometric analysis beyond the scope of the current study), the evidence strongly suggests that many sectors have failed to reap the “gains” of protection. Like the experience of infant industries worldwide, protection has not promoted the best interests of the sector, but has, instead, created an anti-export bias that has severely limited growth opportunities. Protectionism encourages investment in sectors in which Jordan has no comparative advantage and that would not otherwise exist in its current configuration (in terms of products, stage of production, and/or value-added). Consequently, as the incentive to invest in standards and technologies that would promote competitiveness remain low, given that high tariffs allow domestic producers to produce (and sell) at above-market prices, such sectors find it difficult to achieve competitiveness in export markets (hence the “anti-export bias”). Such domestic-oriented producers, while “protected” from non-trade agreement partners, remain under pressure from regional competitors that benefit from GAFTA and other trade agreements. Jordan’s Furniture sector provides an instructive example of how protectionism can defeat, rather than promote, competitiveness (see Figure 16). While the specific issues vary by sector, recent sector studies in Jordan reveal a set of characteristics common to highly protected sectors that impede their development as competitive industries. **INSERT CITATION OF SABEQ, IDD AND OTHER STUDIES**. These common issues include:

- **Low value-added, low skill-intensive activities that do not leverage Jordan’s human resource based comparative advantage.** Many of these sectors focus on final assembly type operations, using imported inputs, and little in the way of value-added or skills. Examples include much (though not all) furniture, plastic products, processed foods, and the like. Jordanian firms in these sectors find it difficult to compete against lower wage countries in the region (such as Egypt) and beyond (China and India), who are still price-competitive in the Jordanian market despite high protection.
- **Lack of product specialization.** Given the small number of consumers and limited buying power, producers expand revenues through offering a wide array of products. Few domestic-oriented firms truly specialize in specific products or market segments.

Figure 16—Challenges of Growing in a Small, Protected Market

Jordan's Furniture sector comprises some 3,436 enterprises (2006), the large majority of which are small 1-4 person workshops (more than 3,200). Only 9 firms employ more than 100 workers, while another 70 employ more than 10. Total employment in the sectors is 12,500. The large manufacturers have a symbiotic relationship with the smaller workshops. The large manufacturers often contract out portions of their work to the small workshops, who act as a flexible labor pool and provide a range of specialty skills that the large manufacturers can access on an as-needed basis.

The sector is largely oriented towards producing for the domestic market, which currently accounts for 8.7 percent of total sales. Export growth has been uneven over the last years, with exports in 2007 at close to the same level in 2002.



While domestic sales have doubled over the same period, from JD 57.7 to 125.5 million, local producers have been losing ground to imported furniture. The sector's domestic market share has declined from 73 percent in 2002 to 66 percent in 2007. Imports from Egypt, Saudi Arabia and other GAFTA markets, as well as from China and India, have captured an increasing share of Jordan's small but growing market.

While tariff on imported goods are mostly zero-rated, tariffs on finished goods are 30 percent. The performance and structure of the sector has been driven, to a great extent, by the existing tariff regime, which has encouraged the development of a relatively low value added industry that relies heavily on the import of raw materials and intermediate goods. It has also encouraged the dependence on the local market for sales thanks to the high rents provided despite the low level of value added.

Local market demand has not encouraged investment in design and other value-added investments. Products are largely commodity-type goods. Moreover, given the small size of the market and limited sales opportunities for any given product line, producers do not specialize, but cater to a wide range of market segments (e.g. home furnishings, kitchen cabinetry, institutional furniture). Local firms are finding it difficult to compete with international firms that focus on their resources on a small range of products. Consequently, even the larger firms lack the scale economies to attain the degree of efficiency required to compete on international markets. Many firms have capital and machinery that are underutilized. Thanks to high tariff protection, such inefficiencies are not discouraged, as producers are able to sell commodity-type products at specialty market prices.

Consequently, few firms have been able to achieve the economies of scale necessary to increase productivity and reduce per-unit production costs.

- **Lack of international product standards and product differentiation.** As domestic market standards are often below international standards, few domestic firms have the market incentive to invest in such standards. Equally important, by and large, product differentiation is lacking. As product designs are often copied from abroad, Jordanian firms find it difficult to justify higher prices for their goods compared to similar imports.
- **Lack of production capacity for international orders.** The lack of scale economies makes it difficult for domestic-oriented firms to fulfill large international orders in a timely fashion. At the same time, due to the lack of product differentiation, they also have difficulty in meeting the demands of niche markets. Jordanian producers produce “mass market” type goods at specialty market prices.

A popular argument against trade liberalization, including in Jordan, is that many of these industries are still in their infancy and, as such, must be sheltered from competition in order to have the incentive to invest capital, learn how to produce goods efficiently, take advantage of scale economies through large-scale production, and develop innovative or distinctive products that can be sold on world markets (Tybout, 2000).

Such “infant industry” programs were common in the 1950s and 1960s throughout the developing world, including Latin America, Africa, the Middle East, South Asia and Southeast Asia. They are still much in evidence in many countries. Numerous studies,³ summarized in a 2004 USAID report (Nathan Associates for USAID, 2004), have documented the failure of infant industry policies and are summarized below:

- **Protection reduces productivity and efficiency.** Studies have shown that, without foreign competition, firms do not have the incentive to for inefficient producers to build scale economies, eliminate waste, adopt new technologies (or to shut down).⁴ There is no evidence that protected infant industry firms have been able to build scale economies, particularly in small countries with limited markets.

While in some cases such policies successfully pushed industrialization (for example, in India), they are rarely of an efficient kind (Maskus, 1985). Developing countries are full of large manufacturing operations that operate at inefficiently low scales because market sizes are small and product quality is not good enough to penetrate export markets. Moreover, protectionism can, in fact, directly reduce competitiveness by enabling inefficient firms to remain in the market and discourage the development of scale economies.

- **Infant industries rarely “grow up”.** Once protection is in place, political-economy incentives often compel the beneficiaries to seek more protection or a longer period of protection. For protected firms, the activity with the highest return can be political lobbying.

³ See Tybout (2000) for a comprehensive listing.

⁴ Such studies have been conducted on Turkey (Levinsohn, 1993), Ivory Coast (Harrison, 1994), Africa (Yeats and Ng, 1996), India (Krishna and Mitra, 1998), Cameroon (Gauthier et al, 2002), and Columbia (Fernandes, 2003). Multi-country studies include Lee (1992) and Roberts and Tybout (1996).

- **Infant industries reduce national welfare.** Even if a protected sector expands, aggregate national welfare can still be lowered because other firms in the same or other sectors might have been able to use the resources devoted to expansion more productively. Policymakers need to recognize that even if infant-industry protection can be shown to generate benefits over time those benefits must be set against the current costs of foregone comparative advantage.

3.3.2.4 PERFORMANCE OF UNPROTECTED SECTORS

While a number of sectors in Jordan continue to benefit from high levels of nominal and effective protection, there are a number of other sectors that are little protected, if at all, in Jordan. The performance of these unprotected sectors stands in stark contrast to the many protected sectors described above. As Figure 17 demonstrates, these unprotected sectors have been better able to penetrate export markets. In fact, 68 percent of Jordan's exports are only marginally protected, if at all, in the domestic market (see

Figure 18). The discipline of the market has forced such firms to invest in value-added production, product standards, product differentiation and specialization, i.e. the key ingredients required of competitive industries.

Figure 17—Performance of Export-Oriented Sectors

Economic Activity	Current Export Share	Export Growth, 2002-2007	Average Tariff
Chemical and fertilizer minerals	77%	75%	0%
Pharmaceuticals, medicinal chemicals	72%	181%	0%
Basic chemicals, except fertilizers	83%	27%	0%
Machine-tools	83%	72%	1%
Agricultural and forestry machinery	92%	133%	1%
Medical and surgical equipment	27%	18%	1%
Other chemical products n.e.c.	22%	29%	3%
Fertilizers and nitrogen compounds	90%	109%	3%
Other special purpose machinery	84%	477%	6%
Pesticides and other agro-chemical products	79%	215%	11%

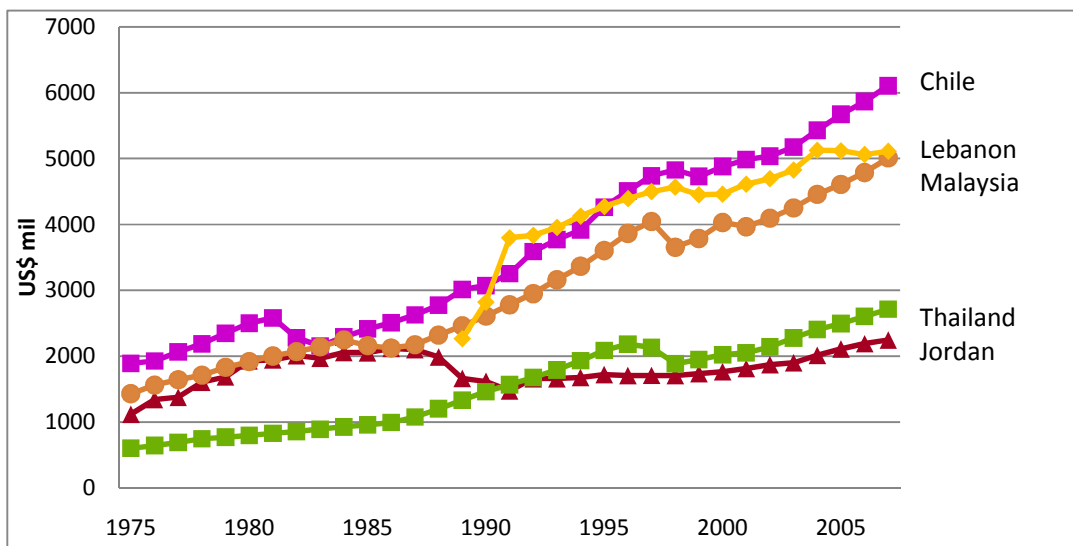
Since 2002, following Jordan's accession to the WTO and the reduction of tariffs, a number of new export industries have emerged, particularly in high-value added sectors, such as machinery and equipment. It is expected that further reductions to tariffs (and the inherent anti-export bias they create) will usher in a new wave of investment that can further diversify Jordan's industry toward value-added, export-oriented production.

Figure 18—Share of Exports with Little or No Protection

Nominal Tariff Rate	Share of Exports (cumulative)
0%	37%
Less than 6%	63%
Less than 10%	68%
Less than 22%	69%

The positive performance of these unprotected sectors is aligned with international experience in trade liberalization. Contrary to proponents of infant industry policies, international evidence strongly suggests that policies that open an economy to trade and investment are needed to support sustained economic growth. No country in recent history has achieved economic success without open trade policies. The success of the East and Southeast Asian economies demonstrate the important role of openness to trade, and investment, for economic success. The growth in per capita incomes in these economies, and in rapid Latin American reformer countries, clearly demonstrates the linkages between trade openness and growth and, more importantly, growth that filters down to reduced poverty and improved standards of living.

Figure 19—Comparative GDP per capita



Freeing trade frequently benefits the poor in particular. Countries such as Jordan can ill-afford the large implicit subsidies that trade protection provides, often channeled to narrow special interests in selected industries. Equally important, the increased growth that results from liberalized trade tends to increase the incomes of the poor in roughly the same proportion as those of the population as a whole through new job creation and increased returns to labor.

At the sector- and firm-levels, trade liberalization brings a number of benefits that ultimately scan drive the growth of “pro-competitive” gains, including greater **efficiencies** from scale

economies, **productivity** improvements through access to capital and technology and the impetus for cost savings, as well as improved product **quality** driven by the discipline of product-market competition. At the sector-level, trade liberalization promotes competitive gains from a more efficient market structure with fewer (larger) firms. The following discussion looks, in turn, at the empirical evidence on each of these expected firm- and sector-level benefits of trade liberalization to draw some important lessons for Jordan:

- **Manufacturing sector-level performance.** A recent survey of evidence of trade reforms and manufacturing performance by Jayanthakumaran (2002) offers one of the most comprehensive analyses of the link between trade liberalization and manufacturing sector performance. The evidence points to a fall in manufacturing output in the first year following reform and then a recovery after the second year, surpassing the pre-liberalization level in most of the “episodes” of reform, especially those classified as cases of “strong liberalization”, where the reform was substantial and rapid. The average manufacturing output growth rate for the three years after liberalization was 7.3 percent compared to 6.7 percent before liberalization and 5.3 percent in the first year of liberalization, sustained ‘episodes’ of reform have relatively more success than weak ‘episodes’ or reform.

What emerges from Jayanthakumaran’s survey is that strong ‘episodes’ led to greater export growth, as well. Based on evidence from reforms in Indonesia, Philippines, Sri Lanka, Turkey, and Chile, he demonstrates that all have experienced sustained manufacturing and export growth exceeding pre-reform levels. Turkey offers a spectacular export growth in the post-reform period (46 percent). Chile, though it experienced a contraction in manufacturing growth for a longer period post-reform, due to the substantial restructuring that ensued, exports grew rapidly thereafter (13 percent per annum), largely on the account of the restructuring as existing exporters benefitted from improved resource allocation.

- **Firm-level productivity and efficiency gains.** Despite challenges to the direction of causal effects between exports and productivity there is substantial evidence trade reforms can bring about a permanent change in productivity growth. Nishimizu and Page (1991) analyzed trade policy and productivity growth in a multi-country, multiple regression framework. They came to the following conclusions. First, export growth in industries was positively associated with total factor productivity growth and this was absent in import-substituting regimes. Second, dynamic gains can accompany superior productivity performance in a more open and market-oriented policy environment.

Protection attracts a large number of small, high-cost producers and results in a fragmentation of the protected market, evidence which is seen in many of Jordan’s domestic-oriented industries. Import-substitution policies tend to have a negative impact on total factor productivity. This was tested and supported in the case of Turkish industries (Krueger and Tuncer 1982) and Indian industries (Golder 1986).

Productivity growth can also be directly promoted through more efficient use of capital. In firms dependent on small local markets, the fixed capacity level may become idle. This is an issue in Jordan where a number of firms surveyed were operating well below capacity economies of scale required for efficient production. In Chile (Condon, Corbo and De Melo 1984) and Egypt (Handoussa, Nishimizu and

Page 1986), this was found to be an important reason for total factor productivity (TFP) growth following trade liberalization. Such improvements in productivity can be explained in terms of higher capacity, as firms previously facing a shortage of foreign exchange were able to stock up on parts and raw materials after reform.

The notion that expansion of output results in a higher level of productivity, commonly known as Verdoorn's law, has been widely tested. Expansion of output creates economies of scale, specialization and a favorable environment for innovation, and these factors eventually result in higher levels growth and of productivity. The expectation is that liberalization will increase efficiency and thereby allow a sufficiently greater scale of production. This hypothesis has been supported for Indian industries (Golder 1986), Egyptian industries (Handoussa, Nishimizu and Page 1986), Mexican industries (Weiss 1992), Sri Lankan industries (Weiss and Jayanthakumaran 1995) and Mexico (Grether 1996).

- **Firm-level product quality improvements.** Exposure to greater product competition can also improve the quality of products from local manufacturers. The emergence of China and India in the world market have created a new economic environment for competing developing countries. The impact on developing countries is often caricatured as threat not only to their exports but also to the survival of their industrial sector, in the absence of protection.

However, evidence suggests that many firms, instead, are able to take the “high road” to competitiveness by positioning themselves in the market by offering upgraded and/or differentiated products, with greater value-added, moving away from production of “copies” of “mundane” labor-intensive products (Pietrobelli and Rabellotti, 2006). In support of the above rationale, Fernandez and Paunov (2009) investigated whether increased competitive pressure from imports forces firms to improve the quality of their products. Using a rich dataset on Chilean firms, matched at ISIC 4-digit product level, the authors find a positive and robust effect of import competition on product quality. Estimates broken into all products and plants as well as sub-sample based on industry characteristics found that import competition has a positive and significant effect on product quality on different plant sizes and characteristics among all plants in Chile. Products with less upgrading potential are likely to be discontinued by plants.

Taking into account the evidence provided by Iacovone and Javorcik (2008) that Mexican plants invest in product quality upgrading before they export, Fernandez and Paunov suggest that over time plants, including those with no export experience, may be able to progressively target more sophisticated export markets.

In summary, international evidence strongly supports that liberal trade policies can better support the growth of competitive domestic industries than infant industry policies and this appears to borne out by Jordanian experience.

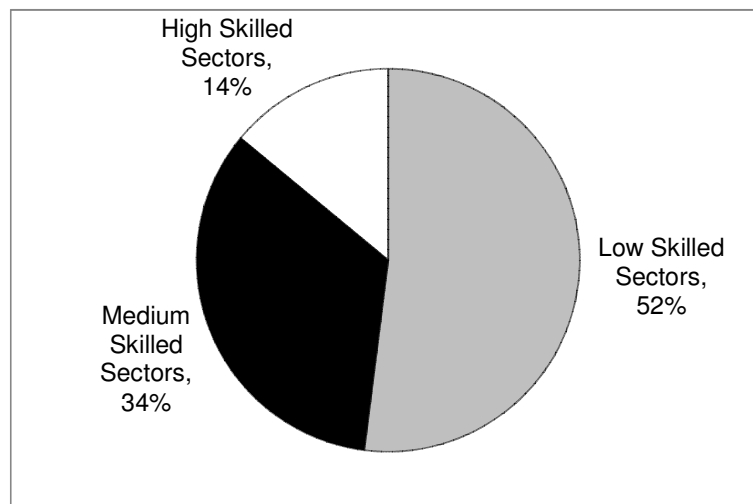
3.3.3 IMPACT ON LABOR

The analysis of trade restrictions can be extended to understand the impacts on the returns to ownership of capital and to the incomes earned from supply of different types of labor.⁵ Countries relatively well endowed with capital compared to labor will tend to have a comparative advantage in producing goods that are capital intensive while countries well endowed with labor will tend to find their comparative advantage in producing labor intensive goods. Trade will tend to raise the return to capital in the capital abundant countries and tend to raise the price of labor in labor abundant countries. With prices for goods equalized through trade and identical production technologies available to all countries, this can lead to factor price equalization. This line of reasoning can be logically extended to differences in the abundance of different labor skills between countries (skilled versus unskilled labor).

An analysis of the Jordanian labor force and job creation reveals that the structure of current tariff regime is associated with investment in largely low-skill intensive activities and constrained growth in high skill activities in which Jordan is likely to have a greater comparative advantage, given its educated population.

Based on the classification of Jordan's economic sectors by "education intensity" (Peneder 2007),⁶ current employment (based on the latest available 2007 data from the Department of Statistics), is heavily oriented toward lower-skill intensive sectors, which account for 52 percent of total employment. High-skill intensive sectors make up only a small proportion of current employment (all in Services), 14 percent, while the remaining 34 percent of employment is in medium-skill intensive sectors in Manufacturing and Services. **Annex C** provides a breakdown of Jordan's sectors, at ISIC 4-digit level, by the education/skill intensity.

Figure 20—Distribution of Jobs by Sector Skill Intensity



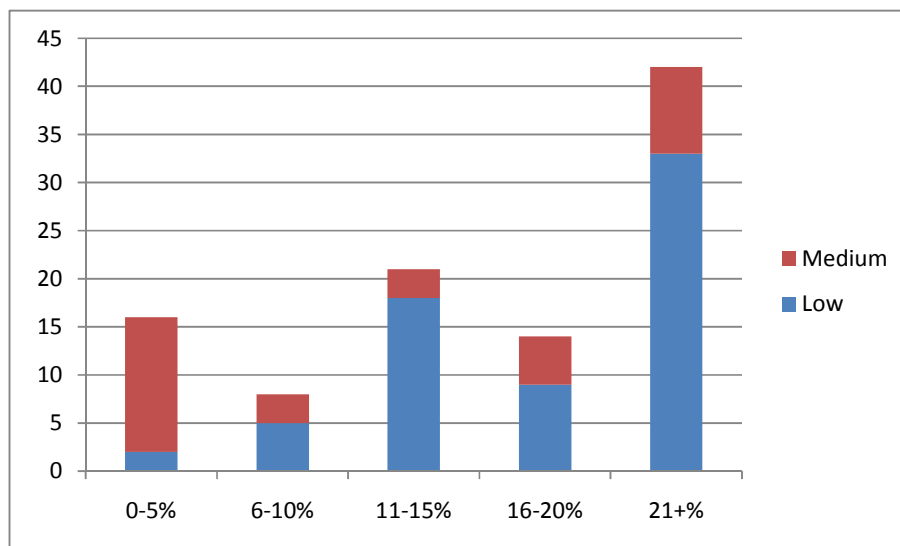
⁵ The Hecksher-Ohlin framework provides a simple explanation of trade flows based on the relative endowments of different factors of production.

⁶ Jordan's sectors, at ISIC 2 digit level are classified by education intensity using a classification based on a cross-country study by Michael Peneder, "A Sectoral Taxonomy of Educational Intensity". The study classifies sectors into 7 different categories based on the predominate level of education and skills required: very low, low, medium low, intermediate, medium high, high, very high. While the classification system is based on OECD data, an analysis of current employee compensation across sectors, whereby it is assumed that higher average wages are associated with sectors requiring higher skill (or education) level, reveals a strong correlation between Jordanian data and the classification system.

Between 2000 and 2007, approximately 195,300 new jobs have been created in Jordan, across a broad range of sectors, in terms of skill intensity, though more than one-third are in low-skill intensive sectors. Set against this are the decline of jobs in selected sectors, the large majority of which (greater than 75 percent of the losses) are defined as “medium skill” intensive sectors. Of the new “net” jobs created (new jobs in expanding sectors minus job losses in shrinking sectors), 82 percent are in low or medium skill sectors, and only 18 percent in high skill service sectors.

The tariff structure has a strong correlation with between the level of protection and the skill intensity of the sector. Figure 21 illustrates the relationship between protection, based on the simple average tariff in a given sector, and skills-intensity. As seen from Figure 21, the current tariff structure is heavily biased toward protecting Agriculture and Industrial sectors predominated by low skill levels. Among the 35 sectors that are subject to relatively high levels of protection, above 15 percent, 23 are classified as “very low” or “low” in terms of education intensity. Together these 23 sectors account for 42 percent of employment in the traded goods sectors (Agriculture and Industry). At the same time, those sectors that are subject to the lowest levels of protection tend to be much more skill-intensive. This differentiation of protection by sector skill intensity provides a clear incentive to invest in low-skill activities and, hence, discourages investment in higher skill-intensive activities that may be better aligned with Jordan’s inherent comparative advantages.

Figure 21—Distribution of Jobs by Sector Skill Intensity and Level of Protection



While the overall impact of the tariff regime on the skills composition of Jordan’s economic sectors is clear, there are a number of other aspects that need to be investigated in the Jordanian case. First, not only has there been an incentive to channel investment into low skill-intensive sectors, this has occurred despite the relatively high level of education of the Jordanians, suggesting a mismatch between investment and Jordan’s relative abundance of educated labor. While almost 50 percent of Jordanians have a secondary or tertiary education, only 33 percent of the workforce has such qualifications. This seeming disparity is explained by flows of migrant labor into and out of Jordan.

In order to sustain the expansion of low-skill intensive sectors, Jordanian investors have come to heavily rely on foreign labor, primarily from the Egypt and elsewhere in the region. Foreign labor currently comprises more than 20 percent of employment in Jordan, including 60 percent of Agriculture sector employment and more than 30 percent in Manufacturing, the latter growing significantly since 2000, when foreign labor comprised only 12 percent of the Manufacturing workforce. It is estimated by the World Bank that since 2001, approximately 63 percent of newly created jobs have been filled by foreign workers (World Bank 2008). While these are official data, based on foreign work permits, it is likely that these ratios are actually higher once illegal workers are taken into consideration. Foreign workers tend to be less skilled and educated than Jordanian workers—two-thirds of foreign workers have less than secondary education, while only less than one-third of Jordanian workers lack secondary-level qualifications.

Second, while Jordan absorbs a large share of foreign labor from the region and beyond, Jordan is also a source of out-migration, primarily to the Gulf region. While immigrant workers tend to be minimally educated and low-skilled, Jordanian migrants tend to be well educated and working in a range of professional services. While comprehensive data on Jordanian expatriates working abroad, existing sources suggest that as many as xx Jordanian professionals are employed in the Gulf region and Europe. While Jordanians surely choose to work abroad for a variety of reasons, the distortionary environment at home likely plays an important role in limiting employment opportunities for Jordan's educated work force.

Third, due consideration should be given to the potential impact of tariff policies on gender in Jordan. The most disadvantaged segment of the Jordanian workforce, measured by the rate of unemployment, is that of highly educated women. More than 26 percent of those with a Bachelor's degree or above are unemployed, compared to 9 percent of their male counterparts. This again may be exacerbated by the disincentives for developing the type of industries that could employ such workers in Jordan. While many other factors have influenced this outcome, including labor laws (with respect to maternity leave) and the types of degree specializations selected by females (education and humanities), it is also evident that women, because of social constraints, do not find it as easy as men to go to neighboring countries to find alternative work opportunities. To the extent that the tariff regime discourages investment in high-skilled sectors, in favor of lower skilled sectors, there may therefore be a bias in the incentive system that limits the opportunities for women in a way that it does not for men.

There are important implications of the present tariff policies that relate to the labor market. When taken in the context of the current incentives inherent in the tariff structure, it is clear that the current policy strongly encourages investment in low skilled activities that rely on foreign workers, to the disadvantage of higher educated Jordanians, especially women. Since it appears that tariff policies are highly biased in favor of low value added industries with intensive use of unskilled labor, the trade restrictions would normally operate to both increase the returns for owners of capital employed in these industries but also increase the wages for low skilled labor. However, most of the income transfers that occur are likely focused on the owners of capital invested in these industries, as any pressure to increase wages for the unskilled is offset by the easy access to employers to very low skilled workers from neighboring or regional countries.

The tariff protection system in Jordan is, in summary, biased towards use of low skill labor and may be a major obstacle in the development of a skill-intensive and knowledge-based economy that can generate sustainable jobs for Jordanians, a main pillar of the National Agenda and His Majesty's vision for the development of Jordan. The findings here strongly validate a recent World Bank study (World Bank 2008) on Jordan's labor market that indicates that current government policies have encouraged investment in low-skilled activities that rely on foreign labor, at the expense of more educated Jordanian workers. While tariffs are not the only policy that have influenced this trend by distorting the incentive environment—others include labor and tax laws—the tariff structure has undoubtedly played a direct and distorted role in favoring low skill intensive sectors. As highlighted in the World Bank report, if Jordan is to compete internationally, it needs to remove the inherent disincentives to high skill intensive sectors to better encourage skilled Jordanians to contribute their skills to the national economy. This will require the reform of policy-induced distortions, including tariff, labor and tax policies, and the overall reform of the business climate to better encourage the creation of new businesses. The movement toward a more open economy, through the reduction in the level of escalation of tariffs, may be a necessary step in the effort to develop a skill intensive and knowledge based economy in Jordan.

3.3.4 OTHER IMPACTS

In addition to the distortionary impacts of tariffs on production and employment, the presence of tariffs also gives rise to other, indirect economic losses. As displayed in Figure x.x above, the imposition of tariffs can induce the transfer of welfare away from consumers and toward producers.

Capturing this welfare can induce producers to “rent seek”—to expend resources on lobbying for special treatment in order to obtain or maintain protection, rather than investing in wealth-creating activities, such as obtaining new plant equipment, training for workers, or other efficiency-enhancing activities. The complete cost of such rent seeking activities is the summation of resources exhausted in seeking rents plus the consumer surplus that could be created if rent seeking resources were switched to productive endeavors.

If obtaining gains through lobbying for protection is cheaper than building more efficient production, a firm will choose the former option, reaping gains entirely unrelated to any contribution to total wealth. It is privately profitable for the producer, but harmful for society's economic welfare. In order to get a tariff imposed, a firm may use considerable time and effort and resources in lobbying for protection with government officials and continue to lobby for protection as various tariff reform proposals are developed. Government officials may waste time or shirk their other duties in finding ways to accommodate the rent seekers amongst the private sector.

Tariffs also give rise to other types of rent-seeking behavior. The difference between the import price and the domestic price contributes to generating a whole new set of rent seeking activity based on smuggling and/or under invoicing imports or using other techniques to avoid paying import duties. In the case of Jordan, where tariffs are differentiated by end-user, rent-seeking may be encouraged at the border as firms seek to have the lowest tariff applied to their imports. All of this activity is common and may result in an expenditure of resources that is significant, resulting in direct revenue losses to Government and additional losses in welfare as firms utilize scarce resources on rent-seeking, rather than productive activities. Even those who do not participate in this rent

seeking activity can pay a heavy cost. The importer who refuses to pay money to facilitate the movement of his cargo may pay costs that are increased artificially so as to facilitate rent seeking from those willing to pay bribes.

Rent-seeking for protection results in a sub-optimal allocation of resources—money spent on lobbying rather than on research and development, improved business practices, employee training, or additional capital goods—which slows economic growth. In other words, such “rent-seeking” behavior can result in further “dead weight” welfare losses to the economy, above and beyond the transfers between different economic agents.

3.4 IMPLICATIONS FOR ECONOMIC DEVELOPMENT

The relatively high level of protection, its high degree of dispersion and escalation work against the avowed economic goals the GOJ has resolved to achieve in the medium term. Given the present tariff structure, it would be difficult to reach the goals outlined in the Industrial Policy Strategy to raise real GDP growth to 7 percent per year and to reduce the unemployment rate to close to 7 percent. The present tariff regime does not enable Jordan to exploit its comparative advantages. Investment is pulled toward domestic sectors and away from export-oriented sectors—this is an important reason why Jordan does not export more than it does. Such distortions are also a source of economic inefficiency because valuable resources are being diverted to less productive sectors that are protected from otherwise low international prices, and away from Jordan’s activities that better reflect Jordan’s true comparative advantage. This leads to investment in non-competitive activities, causing returns to investment to decline over time, compromising Jordan’s future output growth.

The analysis presented here provides ample evidence of the need for further reform of Jordan’s tariff regime. In an international trading system that is increasingly characterized by vertical integration, which provides Jordan with new opportunities to exploit its comparative advantages, the degree of tariff escalation that is evident in Jordan discourages the efficient allocation of resources, which may be more appropriately allocated toward more skill-intensive “intermediate” stages of productions (versus final assembly, which is often lower skills based).

The evidence presented here amply demonstrates that mostly unsuccessful experience to date in Jordan with using tariff protection to promote the development of industry. To summarize, again, high levels of protection have encouraged the development of a number of import-competing sectors in either low value-added assembly and other light manufacturing sectors and in energy-intensive sectors. These sectors, to a large extent, have been unable to attain export competitiveness. While the specific obstacles to competitiveness vary from sector to sector, many of these obstacles were created, in fact, by the degree of protectionism. High protection has encouraged import-competing sectors to focus almost exclusively on the small Jordanian market, inhibiting investment in the economies of scale, standards and product differentiation required to be more competitive in international markets. The high protection, as revealed by the ERP analysis, has encouraged investment in low-value added assembly-type activities in which Jordanian producers find it difficult to compete against lower wage countries.

On the other hand, many sectors that currently face low levels of protection have been successful in penetrating export markets. The market-disciplining forces of low tariffs has

encouraged these sectors to focus on efficiency enhancements, adding value and creating products that are able to meet export market requirements and end-user demands. An effective tariff policy is central to the integration of Jordan into the international economy and the growth that such integration will generate. Tariff policy, together with the exchange rate, forms the transmission mechanism through which international trade affects domestic resource allocation, including the efficient and competitive restructuring of industry and agriculture, new product development to meet the changing demands of markets and consumers, promoting access to new and diverse technologies, and improved incentives to exporters.

The costs of non-reform, i.e. continuing the path of the protection of infant industries, are the foregone benefits of reform as identified above. The combined impact of these lower efficiencies and productivity are, ultimately, slower economic growth and lost job opportunities. These losses can be further exacerbated as the halting pace of reform would result in a further loss of competitiveness as other countries reform their trade regimes and move forward. This, in turn, would send a negative signal to market agents, including investors, that the country is not sustaining its reform efforts.

Therefore, the GOJ should continue its efforts to rationalize the tariff structure in a way that better promotes the expansion and diversification the export base, and the economy as a whole. Tariff reduction by itself, however, without reducing the dispersion of the tariff structure, will convey relatively small benefits. The realization of Jordan's export potential can be best promoted through the reduction in dispersion and escalation in tariffs in concert with ongoing efforts to lower tariff rates more generally. This may be realized through a three-prong approach that reduces the number of tariff bands (and exceptions to those bands), and, at the same time, reduces both the simple average tariff and the dispersion between different stages of production.

4. REFORM APPROACH

4.1 THE WAY FORWARD

4.1.1 KEY OBJECTIVES OF REFORM

From the above discussion it should be clear that there are a number of goals to strive for in the reform of the tariff regime in Jordan. Four fundamental goals suggest themselves following both Jordan's tariff regime and the experience of developing countries in the last three decades.

First, low tariffs are better than high tariffs. And the extent of protection that the country is prepared to provide should be largely determined by how much competitiveness it wants to achieve. For Jordan it seems eminently clear that the country can ill afford to have the high level of protection that it has had in the last decade. Also the extent of protection the country can have is determined by the levels of protection of Jordan's competitors and countries that have made strong trade reforms in the 1990s. Low protection is a goal to strive for.

Second, tariffs that are neutral of incentives among activities do not favor one activity over others, and do not cause distortions. As the country strives for neutral incentives through a uniform tariff, it should also attempt not to discriminate against input producing industries with tariff escalation. Low tariffs on these industries would mean a high effective rate of protection that will affect the competitiveness of the country adversely. So a low uniform tariff is an ideal. This would lead to low effective rates of protection which in turn would make the economy more competitive than at present.

The overall goal of reform is to create an incentive environment is as neutral as possible so that comparative advantage is market-driven rather than tariff-driven. The contrast between the present tariff regime and a tariff regime that is better aligned with what other developing countries have done in the 1990s suggests a remaining agenda for tariff reforms:

1. Reduce the overall tariff level from the present 11.2% to a rate more competitive with other countries in the GAFTA region and beyond (e.g. ASEAN) and make tariffs the only instrument of protection.
2. Reduce nominal tariff dispersion by moving to fewer rates in stages that would lead to a more uniform tariff.
3. Reduce nominal tariff escalation by not having different rates geared to the particular stage of processing.

4.1.2 OPTIONS FOR REFORM

The choice of a strategy for tariff reform is important because it will affect the final outcome. In assessing the different options for a reform strategy for Jordan, it is important to consider the full breadth of objectives. The options for reform are therefore weighed against the goal of a balanced approach to achieving an optimal level of output (GDP) growth and export development, which in turn will raise standards of living (through prices, wages and per capita income growth).

In order to arrive at an appropriate reform approach, the following provides an overview of some of the most common approaches to tariff reform and their advantages and

disadvantages with respect to Jordan's current tariff structure and impacts on industry and the overall objectives of reform.

- **Uniform Tariff.** A widely advocated tariff reform strategy calls for uniform tariff rate for all traded goods. If all tariffs were to be set at a single rate, for example 10 percent, then all border prices would reflect the same effective rate of protection, which would be equivalent to the nominal rate, as the standard deviation (and escalation) would be zero. This is the main benefit of such an approach, as it would create a level playing field between different products and different stages of production, which, in turn, would prevent the misallocation of resources to less efficient activities. A uniform tariff conveys a number of other advantages. In addition to the administrative simplicity (and elimination of the opportunity for rent-seeking at the border), if the tariff is uniform, the gains to industry lobbying are much smaller (and may be negative), creating a kind of free-rider problem for the lobbying industry and dramatically reduces the incentive to lobby for protection.

Few countries have actually implemented such a regime. Singapore and Hong Kong have done it in the extreme, applying zero tariffs on virtually all goods (with the exception of alcohol, tobacco and other selected items). Chile is one of the only countries to introduce a non-zero uniform tariff level. Chile first introduced a uniform tariff in the 1970s and has gradually (following a policy set back in the late 1970s), with a progressive reduction of the uniform tariff by reductions of one percent per year reductions. The current 6 percent uniform tariff was reached in 2003. The experience of Chile, one of the fastest growing countries in Latin America (see section x.x above) demonstrates the benefits of a low uniform tariff. The Chilean experience with uniform tariffs also supports the notion of the reduced cost of lobbying, as Chilean producers became proponents, rather than opponents, of further reform.

However, in the case of Jordan, a uniform tariff would be difficult to achieve in light of its current WTO commitments. Upon accession, the Government of Jordan bound a large number of its rates at zero (xx percent of the total number of 6-digit line items). In addition to the bound products, an even larger number of line items have been brought down to zero. A non-zero uniform tariff would, then, require an increase in many tariff lines, including intermediate and capital goods, which may penalize "technology" imports that are critical for increasing productivity. Proposing a uniform tariff would also require the re-negotiation of its WTO commitments, which may not be feasible in the current context of stalled Doha Round negotiations.

- **Banded Approach.** It is often argued that for administrative convenience the tariff structure should be simplified into a small number of bands. For example, with four tariff bands, tariffs could be 0, 5, 10, 20, (or 0, 5, 10, 15 percent), but values in between would not be allowed.

However, tariff simplification of this nature is not tariff uniformity and that simplification with many bands likely to allow high rates of effective protection since such a system is likely to suffer from virtually all the problems of a diverse structure, including encouragement of lobbying for high protection by industry groups, and will encourage misclassification by customs authorities, in comparison with a uniform system.

If, however, tariff simplification is used as a vehicle for moving toward low and uniform tariffs by limiting the number of tariffs bands and reducing both tariff levels and the dispersion of the tariff structure in the process, then it is a very useful approach (World Bank, 2001). More generally, a tariff structure that is low and has a small standard deviation will convey many of the same benefits of a low uniform structure. For example, with a sufficiently small standard deviation, there will be little gain from lobbying or incentives for corruption and, in customs, for misclassification. But tariff simplification by itself, without reduction of the level or dispersion of the tariff structure, will convey relatively small benefits from lower administrative costs. We turn below to techniques (below) on how such dispersion may be reduced in simplified tariff structure.

- **Concertina Method.** While a uniform tariff is not currently feasible, a second-best regime would be low uniform tariffs with low or no variance, administered in a predictable and transparent way. Various ‘rule of thumb’ approaches have been used to design such a regime. One such approach is the so-called “concertina” method, whereby goods with the highest tariffs are reduced first, with subsequent stages to bring tariffs down to a lower, more uniform rate. The Concertina method is useful in that priority is given to reducing the highest rates so that they are compressed overtime narrowing the gap between high and low rates. As a consequence, the greatest gains will come from reductions in the maximum rates. In addition, very high tariffs may be prohibitive of imports, so that there will be revenue gains from reductions in the rates. Reductions of the high rates will also reduce smuggling, corruption and rent-seeking disproportionately. However, depending on the existing industry structure, such an approach does not always lead to welfare improvements, especially in cases where there exist intermediate inputs that cannot be produced domestically.
- **Proportional Reduction.** An alternative is to bring down all rates in a proportional manner; for example, all tariffs may be cut in half. A proportional reduction also brings down the highest rates by the most in terms of percentage points, i.e. a 50 percent reduction in tariffs would bring a 50 percent tariff rate down 25 points to 25 percent, whereas a lower tariff, say 20 percent is brought down by only 10 percentage points to 10 percent. Such an approach provides more “uniformity” in the reduction process, as all tariffs move downward, leading to a quicker reduction in dispersion and escalation.
- **Swiss Formula Approach.** Another alternative option is to use what is called the Swiss-formula cuts that narrows the gap between high and low tariffs with a built-in maximum tariffs. Swiss formula cuts are a special kind of harmonizing method. It uses a progressive non-linear formula under which high tariffs are cut more than low tariffs. Its functional form is as follows:

$$\text{New Tariff} = (\text{Old Tariff} * A) / (\text{Old Tariff} + A)$$

where ‘A’ is referred to as the Swiss Coefficient.

The Swiss coefficient sets a ceiling that tariffs approach but never reach, thus determining the overall level of ambition of the formula. For a given initial tariff rate, the smaller is the coefficient, the larger will be the percent cut.

A Swiss Formula, while similar to the proportional reduction, has a more pronounced impact on the degree of dispersion and escalation and, therefore, a more pronounced (potential) impact on welfare as distortions are more drastically reduced.

Based on the various costs and benefits of the alternative options for tariff reform, it is recommended that a **mixed approach, combining Swiss Formula cuts and a banded structure** be used to guide reform. A Swiss Formula is first applied to achieve the welfare benefits that would be expected to accrue from a substantial reduction in distortions. The resulting tariff levels are then used to identify “optimal” bands that are then imposed, which would further enhance the benefits to reform through administrative simplification.

4.1.3 DESCRIPTION OF SCENARIOS

The following presents the alternative reform scenarios that are then analyzed with respect to the macro- and sector level impacts that are discussed in the following chapters. All the scenarios considered share a number of basic elements:

- All scenarios reduce the tariffs on capital goods to zero in order to make more broadly available the current discretionary incentives under the Investment Law (of 1995).
- The above also enables the elimination of a number of “dual use” goods whereby tariffs are differentiated, at the HS 8-digit level, by end-users (industry versus others); however, dual rates were retained (but compressed) for most other items.
- Tariffs on alcohol, tobacco and passenger vehicles remained at current levels.

As Government of Jordan budgetary constraints are a serious concern, the reform scenarios that were assessed were designed specifically to limit, at least in the short- to medium- run, any potential negative fiscal impact. As such, the selection of scenarios considered three different budget constraints, ranging from JD70 million per annum to JD 125 million per annum, to arrive at an appropriate degree of reform using the Swiss Formula.

A partial equilibrium model was used to provide guidance on the degree of reform that could be pursued within the given budget constraints and to arrive at defined tariff bands based on a Swiss Formula. The analysis yielded three reform scenarios that are described in Figure 22.

Figure 22—Reform Scenarios for Analysis

Old Rates	Scenario 1 (Swiss Coefficient ≈63)	Scenario 2 (Swiss Coefficient ≈27)	Scenario 3 (Swiss Coefficient ≈13)
27-30%	20%	15%	10%
18-27%	15%	10%	10%
10-18%	8%	5%	5%
5-10%	5%	5%	5%
<5%	0%	0%	0%

5.IMPACT ANALYSIS: MACROECONOMIC EFFECTS

5.1 EFFECTS OF LIBERALIZATION

This chapter presents the results of the CGE analysis of the reform scenarios presented in the previous section. The reform scenarios are benchmarked against the case of non-reform, providing a baseline against which to measure the expected impact of each reform scenario. In general, the results for the three scenarios are consistent with expectations about the effects of trade liberalization on the Jordanian economy. As would be expected, the long run gains to the economy are positive and strongly outweigh any short run adjustment costs. Also, as each of the three reform scenarios represent degrees of liberalization (with Scenario 1 representing a limited degree of reform, Scenario 2 representing a moderate degree of reform, and Scenario 3, a substantial reform), the positive impacts on GDP, GDP per capita, wages, and trade are most pronounced in Scenario 3. The results for each of the variables are presented in the following sections.

5.1.1 OVERVIEW OF SHORT RUN IMPACTS

In the short run scenario capital and labor are assumed to be mobile within Jordan, i.e. no labor or capital can enter or exit. This scenario is expected to capture the most immediate impacts of the reform, where companies can shut down or expand their production and labor force can switch jobs. However, no international investment occurs, given the short timeframe. The immediate impacts of reform are important in showing the level of adjustment costs by explaining the dynamics of capital and labor flow in the economy following the policy decision.

The short-run results are characterized by little change in the GDP since no new capital or labor may be introduced in the economy. The short run impacts on the Jordanian economy are influenced through a number of (sometimes competing) avenues of transmission:

- **Reduced protection for import-competing sectors.** Because the liberalization is assumed to bring no new capital into Jordan or raise the overall productivity, the impacts of the reform are reflected primarily through the changes in the relative prices of imports. For example, when tariffs go down, the cost of imports decline relative to the domestic production, making other industries or consumers switch to the relatively cheaper imports. For that reason, in the first round of impacts, import-competing industries are likely to be negatively impacted by liberalization.
- **Reduced cost of raw materials and intermediate inputs.** However, industries are able to profit from the tariff reduction on their inputs as cheaper inputs allow them to reduce their costs and expand, though only a few sectors face cheaper inputs, given that many capital and intermediate goods have already been reduced or zero-rated during previous rounds of tariff adjustments.
- **Changes in consumption patterns.** Finally, as the relative prices of the commodities change, consumers may also switch their demands, impacting the total output of the domestic industries. Also, as consumers become more wealthy, consumption patterns are expected to shift away from basic food commodities and toward less “essential” and luxury goods.

Because of the last two reasons, it is impossible to predict the overall impact of a trade reform on any individual industry as this depends on the preferences of the output users and the reform that applies to their inputs. In order to make meaningful predictions, a simulation is necessary which takes into account all these linkages.

The simulation results indicate that, in the short run, while some sectors will be negatively impacted, others will grow and, on average, since there is no change in the amount of capital and labor available, there is little change overall in the level of output. Consequently, with the exception of immediate price impacts, GDP and other macro-level indicators are only moderately affected by the reform and only at the sector level, which is discussed in Chapter 6, are the short run impacts of reform visible.

5.1.2 OVERVIEW OF MEDIUM RUN IMPACTS

The medium run is characterized by the ability of capital to flow internationally. Because capital can flow into Jordan, tariff reform brings additional capital-driven growth, in addition to the welfare gains from a better allocation of resources.

While the medium run is not very different in concept from the short run, the additional assumptions on capital mobility make a lot of difference in its results. Unlike the short run results, the medium run results in the economy benefitting from new capital flows into those sectors that have become more competitive in the wake of the reform. Furthermore, the additional growth in these sectors, which results in their higher production and output, may in the second round of impacts increase the demand for the remaining, less competitive industries, helping them to grow more than they would have in the case of Non-Reform.

5.1.3 OVERVIEW OF LONG RUN IMPACTS

The long run simulation, while based on the same assumptions as the medium run (such as international capital mobility), takes into consideration the level of expected long run growth in Jordan and the rest of the world, providing a baseline for the likely development in the international demand and supply of various goods, such as agricultural products, food, energy, manufactures and services. Putting the reform in the context of Jordan's position vis-à-vis other countries, enables an estimation of how Jordan is likely to grow over time with (and without) reform. This is particularly insightful, given that the growth of the large developing economies such as China and India will increase the demand for natural resources, which is expected to result in an increase in the relative cost of energy, which implies that, in the long run, reform can assist Jordanian industries to move toward those activities in which it can have a comparative advantage in this context.

The baseline Non-Reform scenario of this long run simulation assumes significant growth of Jordan's economy and all sectors taking part in this growth, though at differential rates. Because the growth of Jordan is not outpaced by the growth of its population, the GDP per capita grows at a slightly more modest rate too. The overall increase in productivity without reform translates into an increase in wages that grow modestly relative to the consumer price index. Each of the trade reform scenarios has a clear and positive impact on the Jordanian economy, with total growth exceeding the baseline by 13 to 20 percentage points, while real wages grow by an additional 7 to 12 percentage points.

5.2 IMPACT OF LIBERALIZATION ON KEY MACROECONOMIC INDICATORS

5.2.1 FISCAL BALANCE

Given the budget constraints of the Government of Jordan, the fiscal impact of any reform is an important consideration. As discussed in Chapter 4, Section 4.1.3, the design of the various reform scenarios was based on a number of factors including the expected revenue losses that may need to be absorbed by the Government in the short- to medium-run. Presented in Figure 23 below are the expected tariff and other government revenue impacts of each reform scenario over time. The three scenarios represent three different “budgets” for reform. As would be expected, the smaller the reform, the smaller the negative revenue impacts. The short run tariff revenue loss for Scenario 1 amounts to JD 75 million, Scenario 2 amounts to JD 106 million, and Scenario 3 amounts to JD 115 million. However, a smaller reform also generates, over the long run, smaller fiscal gains given the overall lower level of economic activity. In all cases, any revenue losses in the short run would be mitigated in the medium run as non-tariff revenues expand with a boost in economic growth. In the long run (2020), reform is, for all practical purposes, tariff revenue neutral.

Figure 23—Macroeconomic Impacts: Change in Fiscal Revenues (JD millions)

	Short Run (est. 2010)	Medium Run (est. 2011)	Long Run 1 (2015)	Long Run 2 (2020)
No Reform	n/a	n/a	Total: 1,522 <i>Of which:</i> Tariffs: 96 Other: 1,426	Total: 2,305 <i>Of which:</i> Tariffs: 83 Other: 2,222
Scenario 1 (0%, 5%, 8%, 15%, 20%)	Total: -86 <i>Of which:</i> Tariffs: -75 Other: -11	Total: 284 <i>Of which:</i> Tariffs: -61 Other: 345	Total: 1,912 <i>Of which:</i> Tariffs: 16 Other: 1,896	Total: 2,737 <i>Of which:</i> Tariffs: 4 Other: 2,733
Scenario 2 (0%, 5%, 10%, 15%)	Total: -121 <i>Of which:</i> Tariffs: -106 Other: -15	Total: 408 <i>Of which:</i> Tariffs: -88 Other: 496	Total: 2,082 <i>Of which:</i> Tariffs: -21 Other: 2,103	Total: 2,923 <i>Of which:</i> Tariffs: -30 Other: 2,953
Scenario 3 (0%, 5%, 10%)	Total: -130 <i>Of which:</i> Tariffs: -114 Other: -16	Total: 444 <i>Of which:</i> Tariffs: -97 Other: 541	Total: 2,082 <i>Of which:</i> Tariffs: -26 Other: 2,108	Total: 2,980 <i>Of which:</i> Tariffs: -42 Other: 3,022

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform “shock” and the medium run would materialize within 12 to 18 months.

5.2.2 ECONOMIC GROWTH (GDP)

Based on the benchmark of “No Reform”, it can be expected that the Jordanian economy, as measured by Gross Domestic Product (in constant JD), will grow by an average annual rate of 3.7 percent (see Figure 24). By Year 2020, such a growth rate would yield JD 9.3 billion over the 2007 base of JD 18.9 billion. Scenario 1, the most moderate reform scenario, would result in an additional JD 11.7 billion in GDP by 2020, yielding an equivalent average annual growth rate of 4.5 percent. Scenario 2 would result in an additional JD 12.7 billion in GDP, yielding an equivalent average annual growth rate of 4.9 percent. Scenario 3 would result in an additional JD 13.0 billion in GDP, JD 3.7 billion higher than in the absence of reform, yielding an equivalent average annual growth rate of 5.0 percent. The impact of Scenario 3 is on par with international experience—a World Bank empirical analysis of more than 50 reform efforts worldwide suggests that the average gain in GDP growth is on the order of 1.5 percentage points (Matusz and Tarr, 1990).

In the short- to medium-run, the results of each of the scenarios mirror the above. The more pronounced the reform, the more pronounced are the immediate benefits of reform in terms of GDP growth, ranging from JD 1.6 billion to JD 2.6 billion in additional GDP in the medium run as resources begin to move to more efficient uses.

Figure 24—Macroeconomic Impacts: Change in GDP (JD millions)

	Short Run (est. 2010)	Medium Run (est. 2011)	Long Run 1 (2015)	Long Run 2 (2020)
No Reform	Baseline = JD 18,940	n/a	5,796	9,270
Scenario 1 (0%, 5%, 8%, 15%, 20%)	10	1,662	7,993	11,673
Scenario 2 (0%, 5%, 10%, 15%)	14	2,379	8,946	12,697
Scenario 3 (0%, 5%, 10%)	16	2,590	9,248	13,013

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform “shock” and the medium run would materialize within 12 to 18 months.

5.2.3 TRADE

5.2.3.1 EXPORTS

The impact of reform on exports mirrors that of GDP (see

Figure 25). The greater the degree of reform, the greater the impact on export growth as resources are allocated more efficiently and Jordanian firms, driven by market incentives, are more competitive and able to penetrate export markets.

Based on the benchmark of “No Reform”, it can be expected that the Jordanian exports (in terms of volume) will grow by an average annual rate of 2.7 percent (measured in volume). By Year 2020, such a growth rate would yield an additional JD 1.5 billion in exports over the 2007 base of JD 4.4 billion. Scenario 1, the most moderate reform scenario, would result in an additional JD 1.9 billion in exports, yielding an equivalent average annual growth rate of 3.3 percent. Scenario 2 would result in an additional JD 2.1 billion in exports, yielding an

equivalent average annual growth rate of 3.6 percent. Scenario 3 would result in an additional JD 2.2 billion in exports, yielding an equivalent average annual growth rate of 3.7 percent.

Again, in the short- to medium-run, the results of each of the scenarios mirror the above. The more pronounced the reform, the more pronounced are the immediate benefits of reform in terms of export growth, as existing export firms benefit from a reduction in domestic input prices.

5.2.3.2 IMPORTS

While imports follow a similar trend, with deeper reform promoting higher levels of import growth, the rate of import growth is lower than exports, in terms of volumes, in the short to medium run, but slightly higher in the long run. In the long run, without reform, import volumes are expected to grow 2.8 percent per annum. With reform, imports would grow, instead, 3.4 to 3.7 percent per annum in the long run.

Figure 25—Macroeconomic Impacts: Growth in Exports and Imports (percent change over baseline)

	Short Run (est. 2010)		Medium Run (est. 2011)		Long Run 1 Cumulative (2015)		Long Run 2 Cumulative (2020)	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
No Reform	n/a	n/a	n/a	n/a	26.4	25.3	33.4	35.7
Scenario 1 (0%, 5%, 8%, 15%, 20%)	0.0	2.9	6.9	6.0	35.5	33.2	43.3	44.4
Scenario 2 (0%, 5%, 10%, 15%)	0.0	4.0	9.9	8.6	39.1	36.6	47.6	48.1
Scenario 3 (0%, 5%, 10%)	-4.2	4.4	10.8	9.4	40.3	37.8	48.9	49.3

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform "shock" and the medium run would materialize within 12 to 18 months.

5.2.3.3 TRADE BALANCE

As the above figures for exports and imports are based on trade volumes, the impact on the trade balance is ambiguous without information on the price of imports versus the price of exports. As tariff reform is expected to promote the diversification of Jordan's exports, away from traditional commodities (which make the country vulnerable to adverse terms of trade movements), one can also expect less vulnerability to negative terms of trade effects. This implies that, over time, tariff reform can promote a reduction in the trade deficit.

5.2.4 WAGES

In addition to the overall economic outcomes, tariff reform can have a positive impact on the average wage earnings of Jordanian workers. The observed increase in output associated with import liberalization is expected to be associated with a rise in the demand for labor. Since import protection would have rewarded capital more than labor, import liberalization and the associated resources allocation will raise competitive wages. This is reflected in the

model outcomes. In the case of Non-Reform, it is expected that real wages (wages net of inflation) would increase by an average 1.2 percent per annum over the long run (see Figure 26). Again, Scenario 3 yields the greatest gains, 2.1 percent by 2020, as economic agents adjust to the new incentive regime, moving production toward those activities that will yield higher returns, with a share of these returns reaped by the wage earner. Scenarios 1 and 2 yield, respectively, 1.8 and 2.0 percent per annum by 2020.

Figure 26—Macroeconomic Impacts: Change in Real Wages (percent change)

	Short Run (est. 2010)	Medium Run (est. 2011)	Long Run 1 Cumulative (2015)	Long Run 2 Cumulative (2020)
No Reform	n/a	n/a	11.1	13.8
Scenario 1 (0%, 5%, 8%, 15%, 20%)	0.0	7.1	19.2	21.4
Scenario 2 (0%, 5%, 10%, 15%)	0.0	10.1	22.7	24.6
Scenario 3 (0%, 5%, 10%)	0.0	11.0	23.7	25.5

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform "shock" and the medium run would materialize within 12 to 18 months.

5.2.5 PER CAPITA GDP

Another informative measure of the impact of reform on the average Jordanian is the growth in per capita GDP (in real terms, netting out inflation). Per capita GDP is often used as a proxy measure of the relative level of wealth in a country. The results reflect the both the overall GDP growth and expected increased in output per worker. In the case of Non-Reform, all else being equal, it can be expected that GDP per capita will grow at an average annual rate of 2.4 percent through 2020.

Figure 27—Macroeconomic Impacts: Change in Per Capita GDP (JD millions)

	Short Run (est. 2010)	Medium Run (est. 2011)	Long Run 1 (2015)	Long Run 2 (2020)
No Reform	Baseline = JD 3,006	n/a		
Scenario 1 (0%, 5%, 8%, 15%, 20%)	3,017	3,272	3,506	3,619
Scenario 2 (0%, 5%, 10%, 15%)	3,023	3,387	3,645	3,762
Scenario 3 (0%, 5%, 10%)	3,135	3,421	3,690	3,806

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform "shock" and the medium run would materialize within 12 to 18 months.

With reform, the productivity and overall economic growth will enable GDP per capita to grow substantially faster, at an average rate of 3.4 percent per annum under Scenario 1, 3.6 percent under Scenario 2, and 3.7 percent under Scenario 3. Under Scenario 3, real per capita GDP would be JD 187 higher than in the case of Non-Reform (see Figure 27).

5.2.6 PRICES

Tariff reform is expected to have only a moderate impact on prices, which are partly determined by international price trends (see Figure 28). While the medium run impact of reform can reduce prices (0.1 to 0.2 percent, based on the depth of reform, longer run economic growth dynamics will translate into greater demand by consumers. Therefore, while lower tariffs can put downward pressure on prices, over time, the demand effects will outweigh these short run price changes. Nevertheless, the impact of reform, in the long run, will be very modest with respect to the case of Non-Reform, i.e. the increased demand will not spur an accelerated upward spiral of prices. It is also important to note that, while reform will not reduce prices over the long run, consumers will have much higher spending power, as reflected in higher real wages and per capita GDP.

Figure 28—Macroeconomic Impacts: Change in Prices (percent change)

	Short Run (est. 2010)	Medium Run (est. 2011)	Long Run 1 (2015)	Long Run 2 (2020)
No Reform	n/a	n/a	1.4	-3.8
Scenario 1 (0%, 5%, 8%, 15%, 20%)	0.0	-0.1	1.4	-3.8
Scenario 2 (0%, 5%, 10%, 15%)	0.0	-0.2	1.4	-3.8
Scenario 3 (0%, 5%, 10%)	0.0	-0.2	1.4	-3.8

* Short and medium run are defined by the length of time it takes markets to adjust based on the degree of factor mobility in the economy. In the case of Jordan, based on historical labor market adjustments and advance time required for the installation of new or expanded production capacity (see section 6.2), it is expected that short run effects would materialize within 6 to 12 months of the reform "shock" and the medium run would materialize within 12 to 18 months.

6.IMPACT ANALYSIS: PRODUCTION AND FACTOR EFFECTS

6.1 FIRM- AND SECTOR-LEVEL OUTPUT ADJUSTMENTS TO REFORM

The potential scope of adjustment in the short-term will be assessed using two complementary standard methodologies. In order to understand the micro-level responses to reform, an analysis of the Effective Rates of Protection (ERP) will be utilized. As discussed in section 3.2.2, nominal tariffs do not provide the “true” level of protection faced by individual industries and firms, as the impact of tariffs, in terms of the incentives they provide, vary according to the level of value added and the tariffs paid on any intermediate or raw material imports. ERP analysis enables the quantification of the magnitude of the required tariff-induced adjustment for each tariff scenario, a sense of the “breathing room” for absorbing reductions in rents from protection. The CGE simulation results, in addition to the macro-level indicators presented in the previous chapter, provide quantified estimates on the expected shifts in production and employment across all economic sectors in Jordan.

6.1.1 FIRM-LEVEL IMPACTS OF REFORM

The potential direction of firm-level adjustments resulting from the proposed tariff reform is quantified by recalculating the ERPs under the Phase 3 reform scenario, since that scenario represents the greatest shift in nominal protection. The impacts of Scenarios 1 and 2, then can be expected to be more modest.

The proposed reform is expected to reduce the distortion of the “resource-pull effect” of escalating tariffs by introducing the deepest reductions to the highest tariff rates. This will be mirrored in the impact on ERPs, though, given the heterogeneity found in the initial ERP analysis, the tariff reform will have heterogeneous impacts on different sectors and, in many cases, different firms with the same sector (see Figure 29).

The proposed tariff reductions would result in reducing the mean ERP for manufacturing related sectors from 59 percent to 22 percent, as well as the level of dispersion from 85 percent to 32 percent. In agriculture, the mean ERP is reduced from 45 percent to 22 percent, bring the two broad sectors into parity in terms of effective protection.

Based on the firm-level sample, the proposed reform would reduce effective rates for firms in most sectors by half, reducing the dispersion but retaining a degree of “cushioning” against competition. In only selected product sectors, such as Wood Furniture and Electrical Parts (cables), are post-reform ERPs still relatively high due to the combination of very low value-added and relatively high nominal rates of protection. The agriculture and food processing sectors display a lower level of dispersion between activities. As expected, there is much heterogeneity within most product sectors. For example, in Building Materials, pre-reform ERPs ranged from a low of 38 percent to a high of 115 percent; post-reform, the dispersion, though reduced, remains, ranging from 13 percent to 45 percent.

At the firm-level, it is expected that the resulting downward compression of the effective rate of protection will encourage capable firms of moving toward greater value-added activities, whether through new product innovation, the application of international standards, or movement away from basic assembly operations toward the integration of product/industrial

design and engineering that leverage Jordan's abundant engineering and related skills. Such interventions would enable such firms to be more competitive, either domestically or internationally.

At the same time, it is recognized that there will be some firms that will be unable to adjust and add greater value-added. Even without tariff reform, such firms would find it difficult to sustain their markets; tariff reform will provide a market incentive to adjust toward the new equilibrium. Those that do adjust will be able to absorb many of the human and other resources released, enabling expanding firms to reap the benefits of greater scale and efficiencies that would further promote their competitive positioning in both domestic and export markets.

Figure 29—Microeconomic Impacts: Change in Effective Protection

Sector/Industry	NRP on Output Before Reform	ERP Before Reform	ERP After Reform
Building material (Marble)	30%	85%	45%
Building material (Portland Cement)	30%	38%	13%
Building material (Granite)	30%	115%	17%
Chemical & Rubber (Paint)	30%	59%	21%
Electronic and other equipment (Refrigerator)	22%	34%	15%
Electronic and other equipment (Air conditioning household)	22%	37%	18%
Electronic and other equipment (Air conditioning industrial)	22%	40%	20%
Electronic and other equipment (Microwave)	30%	85%	28%
Electronic and other equipment (Armored power Cable)	27%	238%	88%
Furniture (Wooden)	25%	380%	148%
Furniture (Plastic)	30%	108%	36%
Metal products (Furniture)	23%	35%	15%
Metal products (Aluminum doors)	22%	57%	26%
Other Manufacturing (Chalk)	22%	27%	12%
Other Manufacturing (Garbage bags)	7%	20%	16%
Paper and Printing (Tissue box)	30%	167%	67%
Other Manufacturing (Tissue roll)	30%	82%	27%
Food-Other food (Chicken Luncheon Meat)	27%	38%	20%
Food-Other food (Beef Luncheon Meat)	27%	54%	20%
Food-Other food (Hot Dogs)	22%	44%	20%
Food-Other food (Beef Burger)	22%	63%	29%
Food-Other food (Chicken Burger)	22%	42%	13%
Food-Other food (Confectionary)	22%	61%	28%
Fruit and vegetables (Tomato)	22%	52%	39%
Food-Other food (Jam 1)	22%	73%	33%
Food-Other food (Jam 2)	22%	59%	27%

Sector/Industry	NRP on Output Before Reform	ERP Before Reform	ERP After Reform
Food-Other food (Golden Biscuit)	22%	27%	12%
Food-Other food (Broad Beans)	22%	36%	16%
Food-oils and fat (Olive Oil)	30%	38%	13%

6.1.2 SECTOR-LEVEL OUTPUT RESPONSE TO REFORM

While estimates of effective rates of protection are suggestive of which industries are more or less favored or threatened by current tariffs and proposed reforms, the ERPs are more indicative of the potential direction of change in “resource pull” than of the output magnitudes involved. In this section, using the simulation results, industry-level supply responses to tariff reform are presented for each of the scenarios, over the short, medium and long run.

6.1.2.1 FORCES DRIVING SECTOR-LEVEL IMPACTS

Before proceeding with the sector-level impacts, it is useful to summarize briefly, again, both the underlying assumptions during the different stages of reform and the various forces through which reform is expected to impact the sectors. The underlying assumptions in each stage of the reform process are as follows:

- The **short-run**, when factors of production are expected to have limited mobility within Jordan, represents the first 3 to 9 months following the initial policy “shock”. The short-run results allow us to understand the expected “adjustment costs” in terms of output and labor.
- The **medium-run**, when capital and labor are both more mobile within Jordan, represents months 9 to 18 of the reform process, as economic agents (producers, workers, consumers) are able to adjust to the new incentive environment.
- The **long-run**, in the current analysis is, instead fixed at two points in time, the years 2015 and 2020. The long-run is based on the same assumptions as the medium-run scenarios, such as international capital mobility, while adding long-run projections on growth in the world, including Jordan, allowing us to model the impact of population and capital growth, both in Jordan and in the rest of the world, enabling predictions with respect to the development of Jordan’s respective sectors, both with and without reform.

Throughout these various stages of reform, each of the following transmission mechanisms are likely to generate differing outcomes among sectors:

- **Reduced protection for import-competing sectors.** When tariffs go down, the cost of imports decline relative to the domestic production, making other industries or consumers switch to the relatively cheaper imports. For that reason, import-competing industries are more likely to be negatively impacted by liberalization.
- **Reduced cost of raw materials and intermediate inputs.** However, industries are able to profit from the tariff reduction on their inputs as cheaper inputs allow them to reduce their costs and expand, though only a few sectors face cheaper inputs, given

that many capital and intermediate goods have already been reduced or zero-rated during previous rounds of tariff adjustments.

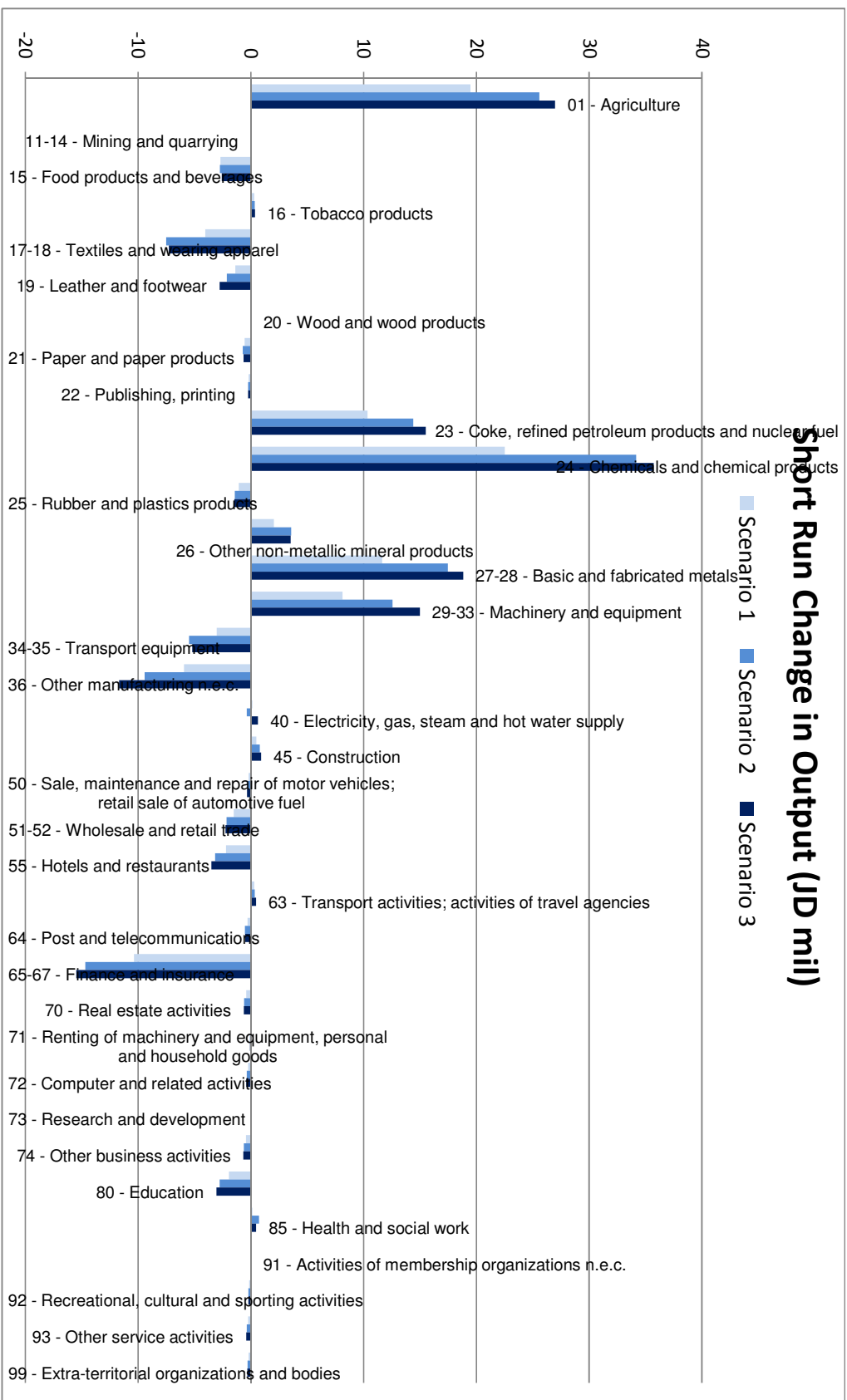
- **Changes in relative prices.** Also, as the relative prices of the commodities change, consumers may also switch their demands, impacting the total output of the domestic industries.
- **Increases in wealth.** Finally, as consumers become more wealthy, consumption patterns are expected to shift away from basic food commodities and toward less “essential” and luxury goods.

6.1.2.2 SHORT RUN IMPACTS ON SECTOR GROWTH

In the short run, it is anticipated that, due to tariff reform, domestically-oriented “import competing” sectors would be negatively impacted by lower effective levels of protection and increased competition from cheaper imports will adjust their production to reflect the changed incentive environment. At the same time, other, more export-oriented sectors will benefit from lower input costs. In aggregate, output in the short run will marginally increase over the case of Non-Reform, between JD 39 million (Scenario 1) and JD 60 million (Scenario 3). The impact is modest, as factors of production only have limited mobility, so that any positive impacts of reform would be greatly muted.

In fact, the simulation results largely confirm this expectation (see Figure 30). Many lower value-added import-competing sectors—such as Processed Foods, Rubber and Plastic Goods, and Other Manufacturing—would adjust production downward in the short run, as would many service sectors that temporarily lose out as consumption adjusts to take advantage of lower prices, particularly in traded goods. On the other hand, higher value-added export-oriented sectors such as Chemicals and Chemical Products, and Machinery and Equipment are likely to benefit from reform, even in the short run.

Figure 30—Microeconomic Impacts: Change in Output in Short Run (JD millions)

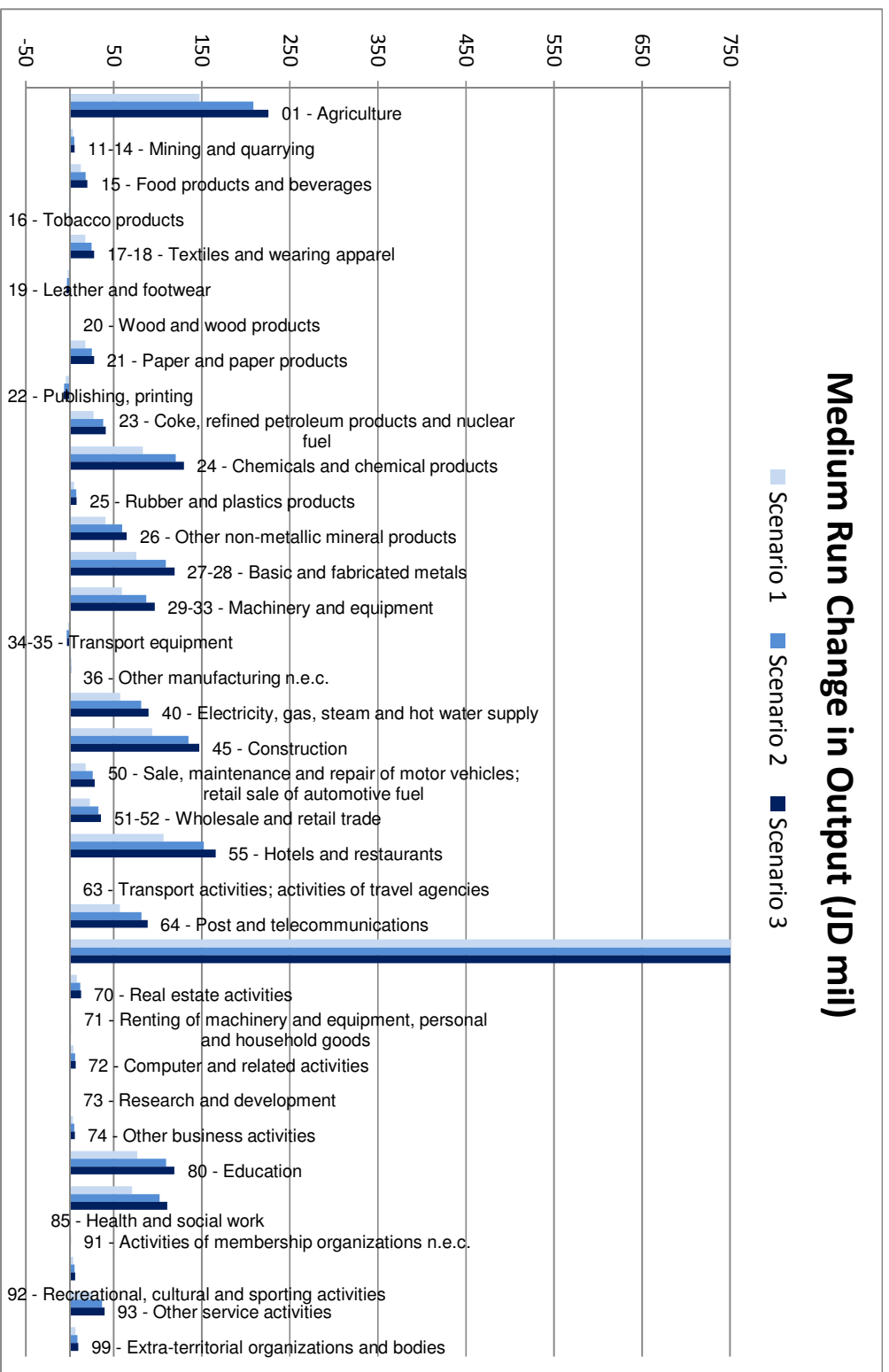


6.1.2.3 MEDIUM RUN IMPACTS ON SECTOR GROWTH

In the medium run, it is expected that the full effects of reform will start to emerge, as economic agents are better able to respond to the new incentive environment, resulting in the shift of resources from less productive to more productive economic activities and, more importantly, Jordan is able to attract new capital to its more competitive sectors. The medium run brings also small increases in productivity, as industries adjust to reform through cost saving measures and investments in improved technology and training in an effort to boost competitiveness, providing for a small compensation in the performance of all sectors that undergo the reform. Furthermore, the additional growth in these sectors, which results in their higher production and output, may in the second round of impacts increase the demand for the remaining, less competitive industries, helping them grow more than otherwise without reform. However, those sectors that lose competitiveness through the reform and whose products are not demanded by the winning industries, may suffer significant reductions in output.

In aggregate, output in the medium run would grow substantially, by JD 2,260 million under Scenario 1 to JD 3,240 million under Scenario 2, and JD 3,530 million under Scenario 3 (see Figure 31). It is expected that, while domestic-oriented “import competing” sectors would continue to feel the effects of increased competitive pressures from imports, many firms in these sectors would be in a position to respond to the challenge through efficiency and other improvements, which would position them to benefit from rising consumer demand. Output in many of the previously contracting sectors—such as Rubber and Plastic Products, Food and Beverages, and Paper and Paper Products—would begin to recover from the initial shock. In the medium run, the aggregated individual sector output losses across the economy will be lower than in the short run phase of reform. The industrial sector would continue to account for the majority of losses, though spread across a smaller number of sectors.

Figure 31—Microeconomic Impacts: Change in Output in Medium Run (JD millions)



At the same time, export-oriented and service sectors would begin to benefit more from reform, as investment responds to the new incentive structure that better promotes higher value-added activities. In the medium run, the aggregated individual sector output gains across the economy will be much higher than in the short run phase of reform. The services sector would account for the large majority of these gains, as the benefits of reform are transmitted through the economy.

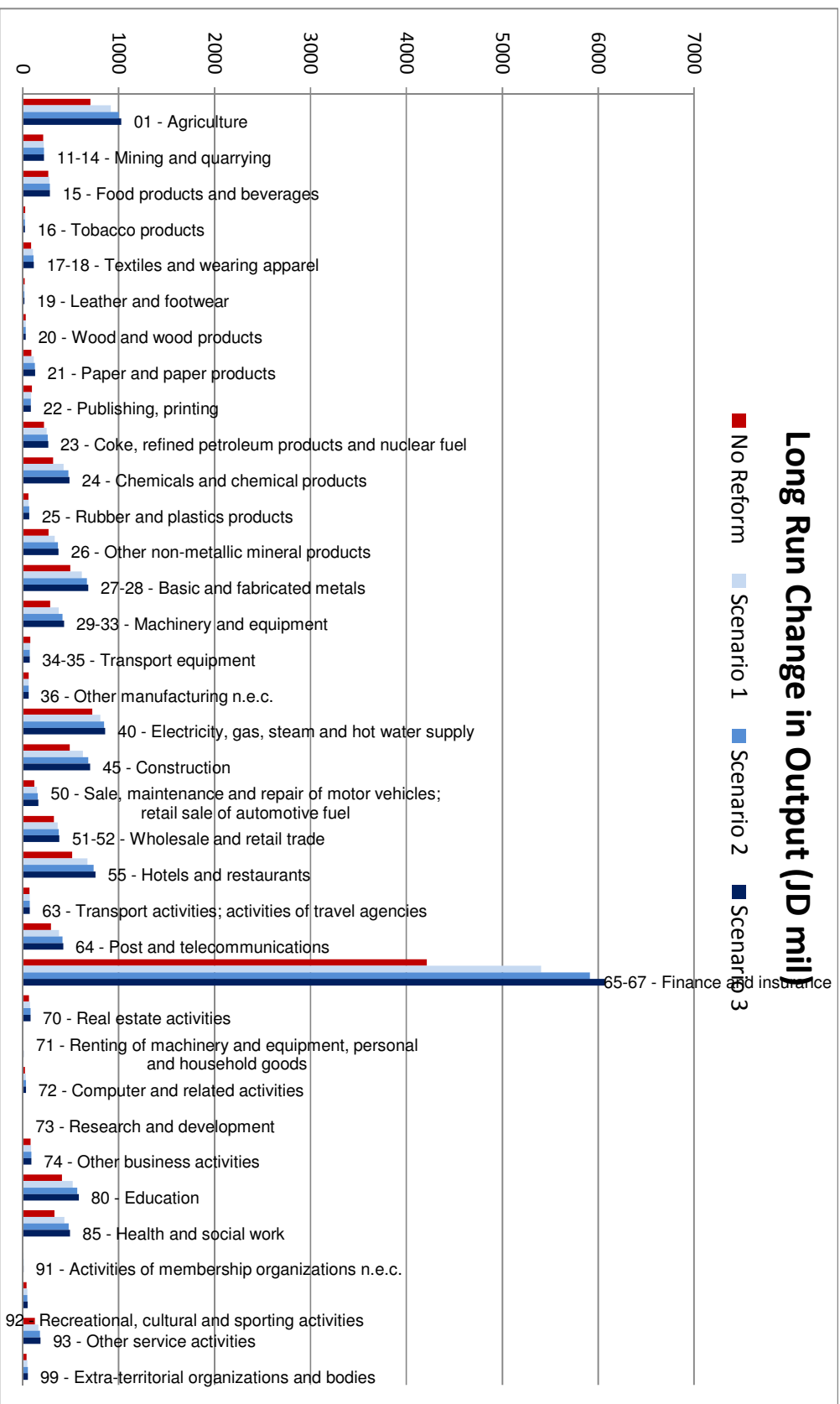
In terms of trade, both imports and exports begin to grow more rapidly in the medium run. Imports of capital equipment and other inputs, alone, would grow 5.7 more than without reform, reflecting the movement of investment toward more efficient and competitive firms and sectors in the economy. Exports also would begin to expand, as export-oriented sectors grow and some of the formerly less efficient producers in the domestic sectors are able to benefit from their investments and find new markets abroad.

6.1.2.4 LONG RUN IMPACTS ON SECTOR GROWTH

The full benefits of reform would emerge, of course, in the long run, as resources are more efficiently allocated and wealth creation drives up standards of living and demand for Jordanian goods and services. In the long run, few sectors stand to lose from reform, though it is expected that the structure and outputs of these sectors would change dramatically over time. In terms of structure, many sectors are expected to right-size themselves, enabling a smaller number of firms to gain scale economies. Jordan's sectors are expected to move away from the production of commodity-type products, in which Jordan lacks a comparative advantage, and toward higher-value added, higher knowledge-content products and services that better reflect Jordan's resources and comparative advantage.

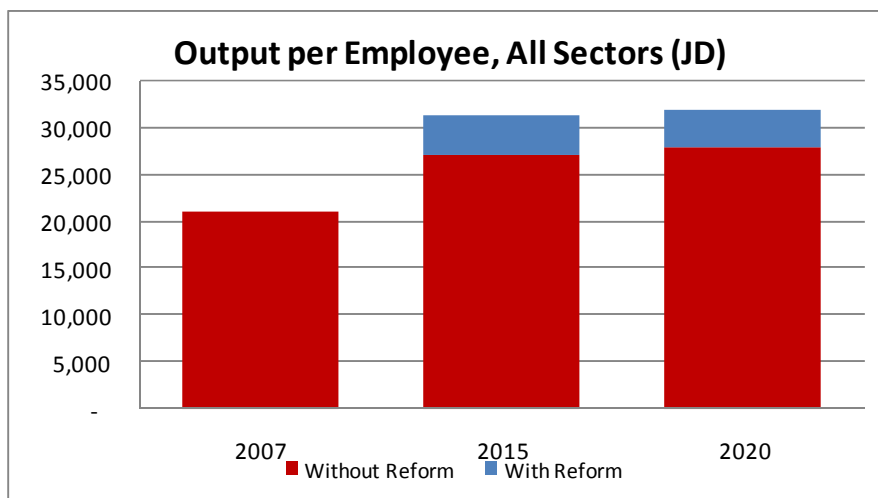
The baseline scenario of the long run simulation assumes significant growth of Jordan's economy, with most sectors taking part in this growth, though at differential rates, depending on both the direct effects of domestic tariff reform and the expected growth trajectories of Jordan's trade partners. The results here suggest that total output in the economy can grow JD 3,270 million (Scenario 1) to JD 5,100 million (Scenario 3) over the case of Non-Reform, as the new incentive regime attracts investment toward export-oriented goods and services sectors (see Figure 32). Total capital would grow a cumulative 14 percent more by 2020 than in the case of Non-Reform, representing a substantial increase in Jordan's productive capacity. Virtually all sectors would benefit over the long run, though a number of domestic-oriented sectors—such as some Food Processing, Leather and Footwear, Printing and Publishing, and Motor Vehicle Parts and Accessories—would experience a marginally smaller increase in output compared to the case of Non-Reform. It is expected that many firms in “losing” sectors would also benefit from reform, as they are encouraged to switch to more competitive products and/or invest in competitiveness-enhancing measures, be it technology, training, or standards to better differentiate their products in the marketplace and gain competitive advantage.

Figure 32—Microeconomic Impacts: Change in Output in Long Run (JD millions)



In the long run, Jordan's industries will be more efficient and productive. Total output per employee would grow by almost 20 percent (see Figure 33), as the capital-to-labor ratio grows and labor becomes more productive, providing greater competitive advantage for Jordan's exports.

Figure 33—Microeconomic Impacts: Change in Output per Employee, All Sectors (JD)



In terms of trade, as demonstrated by international experience, it is expected that those sectors that face the greatest import competition as a result of reform will be the same sectors that become more competitive through the development of higher value-added, differentiated products. Figure 34 provides a snapshot of which sectors will contribute the most to both imports and exports. Four of the top five sectors are, in both cases, the same. While General Purpose Machinery, Furniture, and Fabricated Metal Products will face the greatest influx of imports over time, these same sectors will be in a position to promote greater export growth.

Figure 34—Microeconomic Impacts: Sources of Trade Growth, by Sector

ISIC	Sector	Extra Percentage Points of Growth
Extra Growth in Imports (volume)		
291	Manufacture of general purpose machinery	1.1
181	Manufacture of wearing apparel, except fur apparel	0.8
361	Manufacture of furniture	0.5
171	Spinning, weaving and finishing of textiles	0.5
289	Manufacture of other fabricated metal products; metal working service activities	0.5
	Rest	4.7
Extra Growth in Exports (volume)		
291	Manufacture of general purpose machinery	1.3
181	Manufacture of wearing apparel, except fur apparel	0.9
361	Manufacture of furniture	0.6
289	Manufacture of other fabricated metal products; metal working service activities	0.5

ISIC	Sector	Extra Percentage Points of Growth
155	Manufacture of beverages	0.5
	Others	5.4

6.2 FACTOR MARKET ADJUSTMENTS TO REFORM

Any tariff reform that alters relative prices in the Jordanian economy will be reflected not only in output changes but in the demand for factors of production such as labor and capital. Often, policy-makers may be concerned that, as a result of reform, some workers may lose their jobs and owners of capital will see the value of their investments eroded. The following sections address these concerns and quantify the expected short-run, as well as long-run, impacts of reform on labor and capital.

6.2.1 LABOR MARKET ADJUSTMENTS TO REFORM

Tariff reforms, while benefiting the economy overall, naturally raise two concerns with respect to labor. First, how long will it take for adversely impacted labor to find new jobs following the tariff reform, i.e. what is the duration of the “short-run”? Second, how extensive will be the decrease in demand for labor in the short-run? The CGE framework provides us with useful information on the second point, while the actual historical experience of the Jordanian labor market provides us with information on how long we can expect the short-run adjustment period may last before the “costs” of reform dissipate.

The following analysis demonstrates that the labor dislocations due to any of the reforms are relatively small in light of the size of the overall economy and the apparent fluidity of the Jordanian labor market, contrary to some conventional wisdom about these markets. Labor adjustment would not be very disruptive if the reform package were implemented over a period of two to three years, which would enable the markets to adjust to reform through normal labor turnover, rather than through lay-offs.

Though labor markets adjust in many ways to trade liberalization, depending on the individual country, there are commonly three phases of impacts:

- An **initial trade “shock”** to supply and demand conditions in product markets due to reductions in tariffs;
- **Short-term adjustments** resulting from changes in the demand for labor as a result of the trade shock;
- **Longer-term adjustments** in both labor demand and supply in response to incentives created by trade reform.

The duration of each phase is impacted by structural and institutional factors, including the structure of the overall economy and its labor force, labor market institutions, the business-enabling environment, labor market policies, and cultural factors. Together, these determine the flexibility of labor markets and the time required to respond to the “shock”.

The flexibility of the Jordanian labor market is estimated using historical Employment and Unemployment Survey data from the Department of Statistics. According to historical data, despite rigidities imposed by labor policies in Jordan (related to employment and severance),

labor typically adjusts relatively rapidly, including during years that the economy experienced external shocks (e.g. the absorption of refugees from Iraq).

Between 2001 and 2008, within 6 months, more than 50 percent of unemployed workers find new jobs within 6 months; within 12 months, approximately 80 percent of workers find a new job and, within 24 months, 93 percent of workers find new jobs (see Figure 35). Only a very small share, less than 7 percent, are out of work for more than 2 years. This suggests that labor market turnover is relatively flexible, implying a “short-run” adjustment period of 6 to 12 months, during which most workers can find a new job through normal labor turnover. This is likely to be accelerated with reform, as new job creation will also be promoted in the sectors that have already been liberalized.

Figure 35—Average Time for Job Search

Months	2001	2002	2003	2004	2005	2006	2007	2008	Average
≤ 1	22.6	20.2	20.2	16.1	17.1	18.5	14.1	25.3	19.3
2-3	20.1	17.8	17.8	15.9	17.8	17.1	13.5	13.9	16.7
4-6	15.8	15.9	15.9	21.8	15.6	14.4	13.6	14.7	16.0
7-12	24.6	26.5	26.5	32.6	28.7	27	28.5	26.6	27.6
13 - 24	10.9	12.8	12.8	10.5	14.7	15.5	19.5	13.6	13.8
25 +	6.0	6.8	6.8	3.3	6.2	7.5	10.8	5.8	6.7
1-12	83.1	80.4	80.4	86.4	79.2	77	69.7	80.5	79.6
1-24	94.0	93.2	93.2	96.9	93.9	92.5	89.2	94.1	93.4

While the above defines the expected duration of the “short run” adjustment period, the following provides an indication of the expected number of workers that will face potential job relocation and, in turn, the potential number that may need re-training or other support to make the transition. In terms of adjustment costs, the main source of potential concern would be those workers that are affected by the short run adjustment costs of reform.

In order to estimate the expected adjustment cost in terms of the number of workers that may require some sort of assistance following tariff reform, it is important to first estimate normal labor turnover, which can act as a cushion to absorb any labor shifts. While some labor shifts will necessarily occur between firms within sectors (from less efficient to more efficient firms), these are less of a concern as, again, normal labor turnover and attrition can mitigate these shifts and few, if any, would require re-training above and beyond normal “new hire” training, whether formal or informal. During the latter stages, based on international experience, it is expected that firms will adjust their production and employment plans in advance of the actual tariff reductions, enabling them to adjust their demand for labor through normal labor turnover and attrition.

Average labor turnover is estimated from the Department of Statistics Job Creation Survey. In 2007, some 19,100 workers changed jobs in Jordan, approximately 3.6 percent of the work force, including 3,300 in manufacturing and 550 in agriculture. In 2008, turnover was lower, amounting to 11,800, or 2.2 percent of the work force. As data is not available for earlier years, the average of the two years is utilized here to represent annual labor turnover.

Now, turning to the total number of expected job relocations from these first two stages of reform, the results of the CGE analysis provide the short run shifts in labor demand. As would be expected, the deeper the reform, the somewhat higher are the short run adjustment costs. The expected labor shifts are expected to represent approximately less than 0.5 percent of the labor force, which is only about 10 to 20 percent of the typical annual labor turnover in the Jordanian market. The largest shifts in labor will originate from a handful of manufacturing and other sectors, mirroring the output adjustments presented in section 6.1.2 above.

Given that normal annual labor turnover is substantially greater than the expected job relocations prompted by tariff reform, it can be expected that the relocation of a large majority of workers would be accomplished without additional unemployment and would be absorbed into growing sectors through normal labor turnover. However, given that tariff reform will promote a *structural* shift in employment, it is possible that a share of the workers requiring relocation will need some sort of re-training before being reabsorbed into the employed labor force. Within the manufacturing sector, which is the primary source of potential labor relocations, approximately 16 percent of manufacturing employment is in management or administrative roles, while another 10 percent are unskilled (elementary). These groups are expected to be the most flexible in terms of labor mobility as skill sets are relatively transferable compared to skilled or technical labor. Also, a large share of unskilled jobs is filled by foreign labor, as discussed in section x.x above—this migrant portion of the labor market is more vulnerable to downsizing.

Assuming that 74 percent of the employed labor force possesses some degree of sector-specific or otherwise specialized skills, if one conservatively assumes that at least one-third of these workers will be absorbed through normal labor turnover, it is estimated that less than one percent of the labor force (per annum over the first two years of reform) is expected to require job re-training or new skills development. While some of this re-training may be conducted by the hiring firms, a share of these workers may require additional assistance, beyond normal “new hire” training, to make them employable in the growing sectors. Depending on the depth of reform, the number of affected workers is therefore expected to range between 380 and 570 per annum during the first two years of reform.

Figure 36—Potential Number of Workers Requiring Assistance (per annum, in Years 1 and 2)

Scenario	Short Run (est. 2010)
Scenario 1 (0%, 5%, 8%, 15%, 20%)	380
Scenario 2 (0%, 5%, 10%, 15%)	563
Scenario 3 (0%, 5%, 10%)	568

This analysis and findings here are supported by the findings from international empirical studies on the impacts of tariff reform on labor markets. Evidence from over 50 examples of trade liberalization suggests that adjustment costs are very small and short-term in relation to benefits, which are long-term. The authors found that, in most cases, normal labor

turnover exceeds any liberalization-induced job losses and that manufacturing employment typically increases within one year after liberalization.

6.2.2 CAPITAL MARKET ADJUSTMENTS TO REFORM

It is expected that tariff reform, by increasing the overall attractiveness as an investment destination, will substantially increase the total capital stock (i.e. direct investment) in Jordan. The CGE results suggest that, while capital stock is expected to grow by a cumulative 55.7 percent in the case of Non-Reform, reform will contribute an additional 16.8 percentage points (72.5 percent cumulative growth by 2020).

While the overall level of investment is, then, expected to increase with reform, it is also expected that it will be spread unevenly between the sectors, and that some sectors may see their capital diminish. The value of domestic plant and equipment would be restructured by any tariff reform, penalizing highly protected investments and favoring relatively unprotected assets, such as land. The estimates of changes in ERPs with reform along with the production analysis indicates that some industries that are very protected might see existing capital become less valuable when credible reforms are announced. Investment would, instead, have a strong incentive to redeploy in the Jordanian economy toward currently less protected sectors.

Factors of production which are especially well suited to particular activities—for example, steel mills or vegetable producing land—represent “industry specific factors” and cannot easily find alternative uses in the short run. Typically, as tariff reform alters the demand for these inputs, the factors do not adjust quantitatively, as would less industry specific factors like unskilled labor, but absorb the new economic incentives with changes in the discounted present value of these assets. Thus, if reform increases the demand for land currently used to produce vegetables, then the value of this land will be enhanced. And, if reform dictates a contraction in the steel industry, then the mills need not shut down but they will be less valuable as they produce an output that now sells for less due to the removal of protection.

In the long run, of course, even these industry specific factors are mobile as physical capital like plant and equipment can be depreciated away and not replaced, the financial capital earmarked for upkeep will be diverted to other, more lucrative, investments in the expanding sectors.

However, the ERP estimates and the supply analysis are suggestive. A relatively high ERP for an industry is a rough indicator of industry specific factors receiving extra profits due to the protection of the market. While at the margin, profits will be the same as anywhere else in the economy in equilibrium, the protection will have presented profit opportunities which have lured investment into the industry which otherwise would have gone elsewhere, like to the export sector or other relatively unprotected sectors. Thus, the higher ERP industries of Figure 29, and the more adversely impacted industries of Figure 30, Figure 31, and Figure 32, are likely candidates to have the value of physical capital or land in these sectors written down by the most.

7. RECOMMENDATIONS

7.1 SUMMARY OF FINDINGS

This study of the impacts of a trade reform on the economy of Jordan has shown that any reform that involves graduated reductions in tariffs is likely to be beneficial for Jordan. Even though the immediate impacts of the reform may not be positive for all sectors or for all segments of the economy due to certain adjustment costs, the reform would pay off substantially in the long run by bringing sustainable, export-led growth to the country and most of its industries, and raising the welfare of the consumers and their incomes.

The cost of non-reform is, simply put, the foregone benefits that have been demonstrated here. Whether it is the non-reform of the entire tariff structure, or the exclusion of “sensitive” sectors from reform, temporarily or permanently, the cost to the economy in terms of foregone output and GDP growth, foregone wage benefits and forgone consumer welfare. The current tariff structure, if retained, would continue to exact a substantial toll on the economy due to the distorted incentive environment that drives scarce resources and investment toward low value-added import-substituting activities that are difficult to sustain.

Tariff reform, on the other hand, can play an important role in restructuring the Jordanian economy toward higher value-added, export-oriented activities, whether in manufacturing, agriculture or services.

7.2 RECOMMENDED REFORM

The current tariff structure has, over the years, sustained the development of inefficient and uncompetitive firms, putting the Jordanian economy on an unsustainable development path. Correcting this course will require, among other structural reforms, the re-orientation toward market incentives. The analysis here further demonstrates that, the deeper the reform, the greater the benefits to the Jordanian economy in terms of economic growth, wealth creation, and export development. At the same time, the analysis reveals that all the reforms, even the deepest reform, are manageable in terms of short run adjustment costs related to output and employment. Given that, it is recommended that the Government of Jordan pursue an aggressive reform agenda.

Scenario 3, which provides a simple 3-band structure (0%, 5%, 10%), with a low average tariff and low level of dispersion and escalation, would best promote such an incentive environment. The marginally higher “adjustment costs” will, in the end, yield substantially higher returns to the Jordanian economy, as the private sector begins to compete on value-added/quality and price, founded upon comparative advantage, rather than policy-driven advantage.

7.3 IMPLEMENTATION APPROACH

In terms of the pace and sequencing of reform, there is no single right answer and political economy arguments are, in many cases, the determining factor for reforming governments. In determining the appropriate sequencing and timing of reform, the following issues need to be considered in the context of Jordan:

- **Groups benefiting from the status quo may naturally oppose reform and seek to delay adjustment as long as possible.** This includes industries and individual

firms that perceive that they would lose out if tariffs were reduced. However, it is just those industries that are in the most urgent need of reform to provide a market incentive to improve their own competitiveness and/or for which lower tariffs will generate growth in downstream and other sectors of the economy, wither directly through lower input costs and/or through the efficiency gains associated with the reallocation of resources.

- **If a reform is pre-announced to be implemented over time and is credible, normal market adjustment and labor force attrition can be used to alleviate adjustment costs.** At the same time, a gradual approach faces the risk of reversal or non-implementation, as entrenched interests will have time to mobilize their opposition. As a staged reform that is scheduled to take more than five years is not likely to be credible unless it is anchored in WTO commitments or a far-reaching regional trade agreement, a phased but short timeframe should be targeted.

Should a phased approach to reform be deemed necessary, the following implementation approach should be adopted:

- **Phases of Reform.** If the target is to move toward a 3-band tariff structure as described by Scenario 3, and a “big bang” approach is not deemed to be politically feasible, the other two scenarios provide a logical and structured approach to both lower the average annual tariff rate and the level of distortions and to arrive at a more rational, banded structure. The timing of each phase should be established in advance, but should be no more than one year each.
- **It is important to address high tariff rates as early as possible.** As a general rule in phased reduction, a deeper cut at first phase is advisable so that the benefits of tariff reductions, such as the gains in efficiency, can be realized sooner. Moreover it would signal the government’s commitment to tariff reforms, i.e. its credibility, so that economic agents will not take a wait-and-see approach to adjustment. To guard against the lobbying by special interests and to accelerate the realization of the benefit of reform, the first phase of reform should impose the steepest cuts, as represented by Scenario 1.
- **Tariffs should be cut across-the-board during each stage of reform.** If instead a target is set based on the tariff average, the temptation will be to cut tariffs only where they cause no immediate difficulty, postponing adjustments to the last which would also postpone the benefits, eroding the momentum for reform.
- **No exceptions.** A “no exceptions” rule should be applied to prevent the undoing of reform. Delaying or excepting sectors from reform is a “slippery slope” that will encourage special interests to expend resources to lobby for exceptional treatment rather than spend scarce resources on the types of improvement that will promote their sustainability.
- **Pre-Announcement.** The Government should announce the targeted end-state of reform (Scenario 3) and the first phase of implementation. This would allow economic agents to adjust to the new incentive environment, which would lower the adjustment costs. At the same time, it is important that the reform be carried out in a timeframe that limits the opportunity for special interests to lobby for continued protection.

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ANNEX A. STRUCTURE AND GROWTH OF INDUSTRIAL OUTPUT

The following provides data on Jordan's industrial sectors, including current production levels and the cumulative growth between 2002 and 2007.

Annex Figure 1--Structure and Growth of Industrial Output

ISIC	Economic Activity	Current Production, JD million (2007)	Cumulative Growth (2002-2007)
1110	Extraction of crude petroleum and natural gas	10,956	-12%
1410	Quarrying of stone, sand and clay	29,910	201%
1421	Mining of chemical and fertilizer minerals	556,981	66%
1511	Production, processing and preserving of meat and meat products	184,211	170%
1513	Processing and preserving of fruit and vegetables	41,978	194%
1514	Manufacture of vegetable and animal oils and fats	106,179	9%
1520	Manufacture of dairy products	114,270	74%
1531	Manufacture of grain mill products	93,937	20%
1533	Manufacture of prepared animal feeds	72,337	194%
1541	Manufacture of bakery products	197,550	92%
1543	Manufacture of cocoa, chocolate and sugar confectionery	43,673	167%
1549	Manufacture of other food products n.e.c.	93,298	109%
1551	Distilling, rectifying and blending of spirits; ethyl alcohol production from fermented materials	34,518	49%
1554	Manufacture of soft drinks; production of mineral waters	186,045	143%
1600	Manufacture of tobacco products	295,289	40%
1711	Preparation and spinning of textile fibres; weaving of textiles	11,388	-62%
1721	Manufacture of made-up textile articles, except apparel	7,660	85%
1722	Manufacture of carpets and rugs	38,847	225%
1729	Manufacture of other textiles n.e.c.	4,055	240%
1730	Manufacture of knitted and crocheted fabrics and articles	7,083	112%
1810	Manufacture of wearing apparel, except fur apparel	372,131	196%
1911	Tanning and dressing of leather	1,705	-56%
1912	Manufacture of luggage, handbags and the like, saddlery and harness	1,344	64%
1920	Manufacture of footwear	20,458	28%
2010	Sawmilling and planing of wood	11,782	176%
2022	Manufacture of builders' carpentry and joinery	28,364	143%
2023	Manufacture of wooden containers	2,363	199%
2029	Manufacture of other articles of cork, straw and plaiting materials	4,823	300%

ISIC	Economic Activity	Current Production, JD million (2007)	Cumulative Growth (2002-2007)
2101	Manufacture of pulp, paper and paperboard	34,256	47%
2102	Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	68,836	82%
2109	Manufacture of other articles of paper and paperboard	80,203	81%
2212	Publishing of newspapers, journals and periodicals	89,506	120%
2221	Printing	69,362	95%
2222	Service activities related to printing	2,718	34%
2320	Manufacture of refined petroleum products	1,795,627	204%
2411	Manufacture of basic chemicals, except fertilizers and nitrogen compounds	117,045	27%
2412	Manufacture of fertilizers and nitrogen compounds	247,106	11%
2413	Manufacture of plastics in primary forms and of synthetic rubber	30,587	196%
2421	Manufacture of pesticides and other agro-chemical products	20,581	262%
2422	Manufacture of paints, varnishes and similar coatings, printing ink and mastics	108,128	115%
2423	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	370,765	128%
2424	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	123,975	40%
2429	Manufacture of other chemical products n.e.c.	15,270	101%
2511	Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	4,008	107%
2519	Manufacture of other rubber products	849	-35%
2520	Manufacture of plastics products	199,284	92%
2610	Manufacture of glass and glass products	14,814	197%
2691	Manufacture of non-structural non-refractory ceramic ware	4,094	-35%
2693	Manufacture of structural non-refractory clay and ceramic products	17,487	24%
2694	Manufacture of cement, lime and plaster	330,652	111%
2695	Manufacture of articles of concrete, cement and plaster	253,877	205%
2696	Cutting, shaping and finishing of stone	91,059	170%
2699	Manufacture of other non-metallic mineral products n.e.c.	8,170	77%
2710	Manufacture of basic iron and steel	394,798	276%
2720	Manufacture of basic precious and non-ferrous metals	63,207	125%
2731	Casting of iron and steel	16,806	117%
2811	Manufacture of structural metal products	121,414	105%
2812	Manufacture of tanks, reservoirs and containers of metal	1,903	-13%
2892	Treatment and coating of metals; general mechanical engineering on a fee or contract basis	11,254	340%
2893	Manufacture of cutlery, hand tools and general hardware	21,921	324%

ISIC	Economic Activity	Current Production, JD million (2007)	Cumulative Growth (2002-2007)
2899	Manufacture of other fabricated metal products n.e.c.	146,495	122%
2915	Manufacture of lifting and handling equipment	15,819	160%
2919	Manufacture of other general purpose machinery	46,813	87%
2921	Manufacture of agricultural and forestry machinery	16,813	94%
2922	Manufacture of machine-tools	4,962	70%
2924	Manufacture of machinery for mining, quarrying and construction	7,751	348%
2925	Manufacture of machinery for food, beverage and tobacco processing	3,849	153%
2929	Manufacture of other special purpose machinery	5,739	241%
2930	Manufacture of domestic appliances n.e.c.	47,227	111%
3110	Manufacture of electric motors, generators and transformers	16,682	269%
3120	Manufacture of electricity distribution and control apparatus	19,023	318%
3130	Manufacture of insulated wire and cable	250,345	264%
3150	Manufacture of electric lamps and lighting equipment	28,300	174%
3311	Manufacture of medical and surgical equipment and orthopedic appliances	19,006	75%
3410; 3420	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	26,242	9%
3430	Manufacture of parts and accessories for motor vehicles and their engines	13,617	68%
3512	Building and repairing of pleasure and sporting boats	6,218	4209%
3610	Manufacture of furniture	138,594	100%
3691	Manufacture of jewelry and related articles	14,215	69%
3699	Other manufacturing n.e.c.	16,198	62%
4010	Production, collection and distribution of electricity	399,684	44%
	Total Industry	8,544,279	112%

ANNEX B. OVERVIEW OF GTAP CGE MODEL, STRUCTURE AND BEHAVIORAL PARAMETERS

The GTAP model is a comparative static, multi-sector, and multi-region general equilibrium model. CGE models are based on the social accounting matrix (SAM), a comprehensive, economy-wide national database presented in a square matrix containing information about the flow of resources associated with transactions taking place between economic agents in a certain economy during a certain period. CGE models enable a comprehensive framework to simulate the impact of reform on three main “agents” in a market-oriented economy, namely the consumer, the producer, and markets, incorporating the relationships between them:

- Consumers maximize “utility” (representative of their welfare), depending on their endowments and demand decision for goods and services.
- Producers maximize profits based on their demand for inputs and supply of outputs.
- Consumers’ demand for and producers’ supply of goods and services clear the market by equilibrium prices.

CGE models are specifically designed to answer how a change in policy affects the allocation of resources over alternative uses. International trade policy, including tariff reform, is typically an area where such induced effects are important consequences of policy choices. In the face of changing international prices, resources will move between alternative uses within the domestic economy, or even between economies if production factors are internationally mobile.

The current analysis utilizes the model and database developed through the Global Trade Analysis Project (GTAP), which is coordinated by the Center for Global Trade Analysis housed at Purdue University (Indiana). GTAP is a global network of researchers and policy makers conducting quantitative analysis of international policy issues. The model is implemented in GEMPACK, a software package designed for solving large applied general equilibrium models.

The current analysis also utilizes the GTAP Database, a fully documented, publicly available global data base which contains complete input-output data, bilateral trade information, transport, and protection linkages among regions for all GTAP commodities. The current version 7, utilized here, includes data from 113 countries and regions, covering 57 economic sectors, providing access to transparent and standardized data.

While the GTAP database consists of 57 sectors only, the study’s focus was on the more disaggregate ISIC sectors. To fulfill this goal, it was necessary to break the 57 GTAP sectors into the respective ISIC 3-digit sectors. This was achieved by first creating a mapping between GTAP sectors and the ISIC 3-digit sectors and then using this mapping to break each GTAP sector into a number of ISIC 3-digit sectors. The weights used to break the original GTAP sectors came from two sources: UN COMTRADE trade data at HS 6-digit level, aggregated into ISIC 3-digit level and the Jordan’s industrial output data aggregated from ISIC 4-digit level to ISIC 3-digit level. While no production data at ISIC 3-digit level were

available for regions other than Jordan, their output split was mainly driven by the observed trade data.

The Jordanian economy was incorporated into the GTAP data base through a two-step approach. First, Jordan's input-output table was extracted from GTAP, using an optimization software package (GAMS) that enables the estimation of factor and other input use.⁷ In the end of the separation, a database was obtained that reflected correctly the level of imports, factor use, consumption and exports in Jordan. The input composition of the separated database matches the input structure of the West Asia region well, as it is expected that factor-use not vary greatly from country to country. This suggests a successful split and an overall consistency of the underlying data.

[Note: The data analysis above was used to generate an estimate of Jordan's real GDP, which arrived at JD 17 billion (including income taxes). While this number is about 15 percent higher than most of the estimates of Jordan's GDP, it remains plausible, given that the information on income taxes is incomplete and that international estimates of Jordan's GDP vary. Excluding the likely exaggerated level of income taxes (given that many Jordanian industries are exempt of income tax through exemption schemes or export subsidies), one would arrive at the value of Jordan's GDP of JD 12 billion, which is somewhat below the World Bank's estimate of JD 14 billion USD.]

While a detailed discussion of the basic algebraic model structure of the GTAP model can be found in Hertel (1997), chapter 2, the following, together with the graphical summary in Annex Figure 2, provides a brief overview of the relationships and assumptions embedded in the model. The specific behavioral parameters adopted in GTAP version 7, which was utilized in the current study, can be found in Narayanan and Walmsley (2008), chapter 14.

Each country or region is depicted within the same structural model:

- **Consumption.** Consumers are represented by a regional household. The regional household allocates its income to three expenditure categories: private household expenditures, government expenditures and savings. Private household expenditures are depicted using a Constant Difference of Elasticities (CDE) function that allows budget shares for different types of goods vary with changes in income (for example, the portion of income spent on food items declines as income rises). Elasticities are based on the work done by Reimer and Hertel (2004) who estimated an implicit, directly additive demand system using cross-country data on consumer expenditures

⁷ The separation of Jordan's data from the GTAP data happened at several stages, using an optimization software package GAMS. The separation of the data was defined as a series of the following non-linear programs:

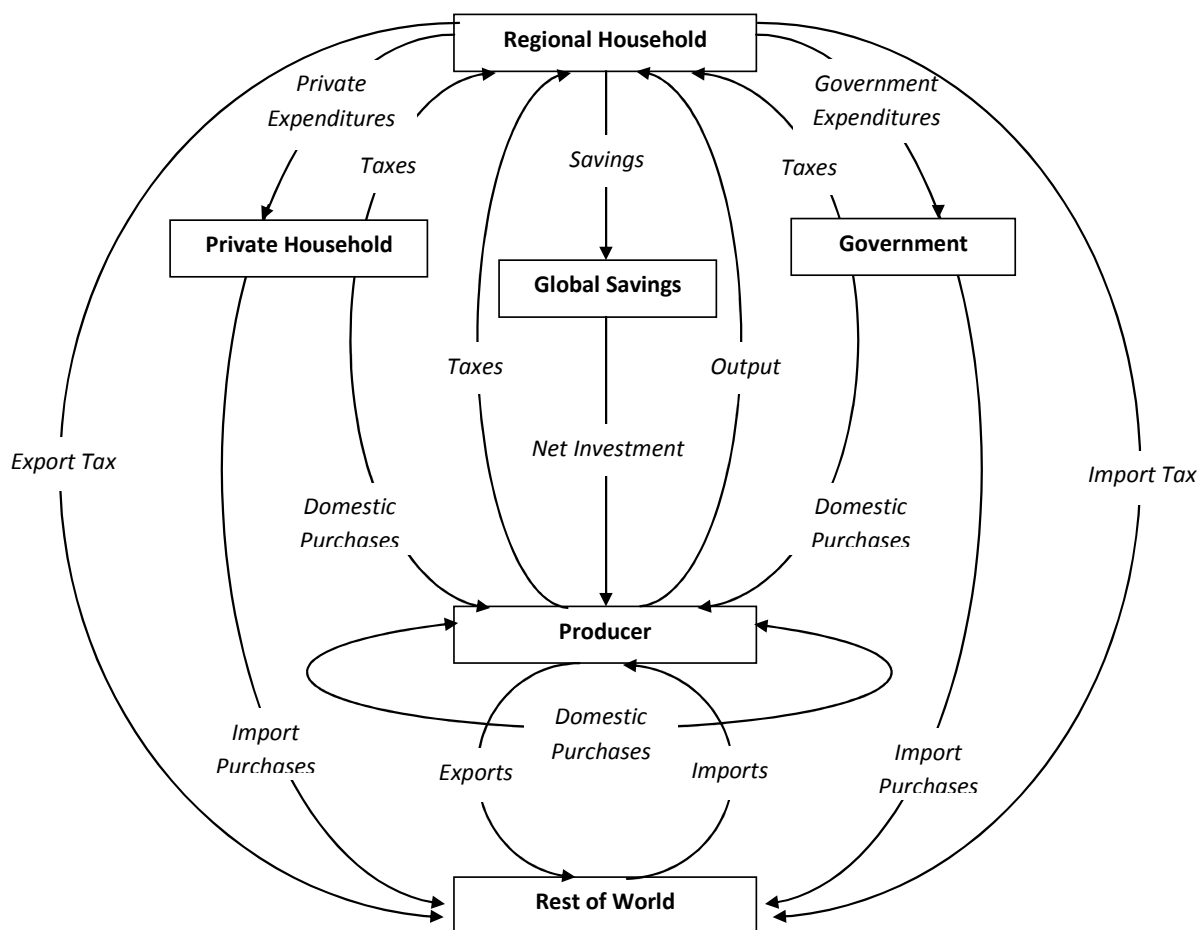
- a) Minimize the sum of the squares of the errors between the separated database and the observed factor use (and income taxes), subject to given level of imports.
- b) Minimize the sum of the squares of the errors between the separated database and the observed water, electricity and fuel use, subject to given level of imports and factor use.
- c) Minimize the sum of the squares of the errors between the separated database and the observed consumption, subject to given level of imports, factor use and water/electricity/fuel use.
- d) Minimize the sum of the squares of the errors between the separated database and the observed exports, subject to given level of imports, factor use and water/electricity/fuel use, and consumption. And finally,
- e) Minimize the sum of the squares of the errors between the separated database and the regional input shares, subject to given level of imports, factor use and water/electricity/fuel use, consumption and exports.

from the GTAP data base and validated through an alternative data set from the International Comparison Project (ICP).

- **Sourcing.** Internationally traded commodities are assumed to be distinguished according to the region of origin. The GTAP Data Base contains two sets of source substitution elasticities. One relates to the substitution between domestic products and imports, and the other to the substitution between imports from different regions. The source substitution elasticities are defined separately for each of the representative agents within each region. This means that for each commodity within each region, the domestic-import mix is determined separately for each industry, and for each of the final demand categories, namely investment, household consumption, and government consumption. The sourcing of imports is also determined separately for intermediate usage (for all industries together) and for each of the final demand category. The import-substitution elasticity, also known as the Armington assumption, implies that, for example, a car imported from the US is different from a car imported from the EU, and trade flows in both varieties have their own price tag. A great advantage of the Armington assumption is that it allows us to model bilateral trade flows and bilateral trade policies. The estimates of the elasticities of substitution between domestic and imported commodities are taken from the SALTER model (Jomini *et al.* 1991). The estimates of the elasticities of substitution among imports from different sources, the Armington assumption, are obtained by Hertel, Hummels, Ivanic, and Keeney (2004).
- **Factor Substitution.** A representative producer for each sector of a country or region makes production decisions to maximize profits by choosing inputs of labor, capital, and intermediates to produce an output under constant returns to scale. Producers can substitute primary factors (labor and capital) for each other, and this substitution possibility is captured using a Constant Elasticity of Substitution (CES) functional form. In the case of crop production, farmers also make decisions on land allocation. In addition, it is assumed that intermediate goods (goods produced by other sectors) are used in fixed proportions in manufacturing. Intermediate inputs are produced domestically or imported, while primary factors cannot move across countries. The elasticities are taken from the SALTER project (Jomini *et al.* 1991) and are based on a review of the international cross-section studies which estimated this parameter, for various industries, using data from a wide range of countries.
- **Factor Transformation.** Another class of behavioral parameters in GTAP describes the degree of primary factor mobility between the sectors. Within each region, the model distinguishes between primary factors that are perfectly mobile across productive sectors and those that are sluggish. In the default setting which is generated from a standard aggregation of the data base, skilled and unskilled labor and capital are treated as perfectly mobile, whereas natural resources and agricultural land are treated as sluggish factors of production. The degree of labor and capital mobility are adjusted to generate short, medium and long run simulations.
- **Transportation.** All transports between regions are carried out by an international transport sector. The trading costs reflect the transaction costs involved in international trade, as well as the physical activity of transportation itself. Using transport inputs from all regions the international transport sector minimizes its costs.

- **Investment.** The second global institution is the global bank, which takes the savings from all regions and purchases investment goods in all regions depending on the expected rates of return. The global bank guarantees that global savings are equal to global investments. The standard GTAP model was adapted here to take into account the relationship between the level of protection in each sector and perceived investment risk. Using the GTAP data base, we estimate that a one percentage decline in overall protection lowers the investment risk by three percent (thereby raising the effective return to capital).
- **Taxation.** Taxes are included in the model at several levels. Production taxes are placed on intermediate or primary inputs, or on output. Some trade taxes are modeled at the border. Additional internal taxes can be placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Trade policy instruments are represented as import or export taxes/subsidies.

Annex Figure 2—Economic Relationships Embodied in GTAP CGE Model



ANNEX C. CLASSIFICATION OF SECTORS BY SKILL-INTENSITY

The following provides the classification of sectors by skill-intensity is derived from Peneder (2007).

Annex Figure 3—Sectoral Taxonomies of Education Intensity (ISIC Rev. 3)

ISIC	Economic Activity
Very Low Education Intensity	
01-05	Agriculture, forestry, fishing
17	Textiles
18-19	Leather, footwear & clothing
20	Wood & products of wood and cork
55	Hotels & catering
95	Private households with employed persons
Low Education Intensity	
15-16	Food, drink & tobacco
26	Non-metallic mineral products
45	Construction
50	Sale & repair of motor vehicles; retail of fuel
27	Basic metals
28	Fabricated metal products
Medium Low Education Intensity	
25	Rubber & plastics
36-37	Furniture, miscellaneous manuf.; recycling
52	Retail trade; repair (exc. 50)
60	Railways & other inland transport
61	Water transport
Intermediate Education Intensity	
21	Pulp, paper & paper products
22	Printing & publishing
29	Mechanical engineering
31	Electrical machinery & apparatus, nec
34	Motor vehicles
40	Electricity & gas
41	Water supply
51	Wholesale trade and commission trade

ISIC	Economic Activity
63	Auxiliary transport activities; travel agencies
641	Post and courier activities
70	Real estate activities
71	Renting of machinery & equipment
Medium High Education Intensity	
23	Mineral oil refining, coke & nuclear fuel
24	Chemicals
32	Audiovisual apparatus
33	Instrument engineering
35	Other transport equipment
62	Air transport
642	Telecommunications
66	Insurance and pension funding
67	Activities auxiliary to financial intermediation
75	Public admin., defence; social security
85	Health, social work
90-93	Other community, social or personal services
High Education Intensity	
30	Computers, office machinery
65	Financial intermediation (except 66)
74	Other business activities
Very High Education Intensity	
72	Computer and related activities
73	Research & development
80	Education
99	Extra-territorial organizations and bodies

USAID Jordan Economic Development Program (SABEQ)
Deloitte Consulting LLP
Salem Center, Sequleyah Street, Al-Rabiyeh
Amman, 11194 Jordan
Phone: + 962-6 550-3050
Web address: <http://www.SABEQ-Jordan.org>