View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by Research Papers in Economics

Public Disclosure Authorized

Public Disclosure Authorized

Policy Research Working Paper 5685

A Profile of Border Protection in Egypt

An Effective Rate of Protection Approach Adjusting for Energy Subsidies

Alberto Valdés
William Foster

The World Bank
Middle East and North Africa Region
Poverty Reduction and Economic Management Unit
June 2011

Policy Research Working Paper 5685

Abstract

This study examines recent effective rates of protection across the Egyptian economy, using an ad valorem price wedge introduced by nontariff barriers and energy subsidies, and compares today's effective rates of protection with those of a decade ago. The study uses 23 aggregated sectors from input-output matrix information. Although trade liberalization since the late-1990s has had a considerable impact in reducing protection of some industries, some sectors, such as the food and tobacco sector, remain relatively highly protected, due to tariff escalation and nontariff barriers, and due to energy subsidies. Energy subsidies are not formally sector specific but do favor sectors that are energy intensive (of particular note is the electricity sector).

It appears that energy pricing is part of a strategy to subsidize and promote certain industries and in effect offset the *dis*-protection or taxation that results from tariffs on intermediate inputs. The case of the cement sector is notable because energy subsidies appear to almost exactly offset the negative impacts of tariffs and indirect taxes. The fertilizer sector has zero nominal tariffs, benefiting agriculture, and so a negative effective rate of protection due simply to tariffs on intermediate inputs. However, the fertilizer sector ends up with a very high a positive total effective rate of protection due to energy subsidies.

This paper is a product of the Poverty Reduction and Economic Management Unit, Middle East and North Africa Region. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at avaldese@uc.cl and wfoster@uc.cl.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Produced by the Research Support Team

A profile of border protection in Egypt:
An Effective Rate of Protection approach adjusting for energy subsidies

Alberto Valdés and William Foster

.

A profile of border protection in Egypt: An Effective Rate of Protection approach adjusting for energy subsidies

Alberto Valdés and William Foster

The authors would like to thank Santiago Herrera and the Cairo-based staff of the World Bank for their assistance in obtaining data. Also thanks to Nabila Al Iskandarani for making available her study of 2000 and her willingness to respond to various inquiries, and to Professor Soheir Abouleinein for providing useful information. Special thanks to Dr. Khaled Hanafy for his work on non-tariff barriers, which is presented in Annex 3. Correspondence: avaldese@uc.cl; wfoster@uc.cl

A profile of border protection in Egypt: An Effective Rate of Protection approach adjusting for energy subsidies

Alberto Valdés and William Foster

1. Introduction

Since the mid-1980s the Egyptian government has moved from an emphasis on state planning and high level of protection towards a reliance on private economic activity and trade openness. Especially since the late 1990s, Egypt has been committed to macroeconomic stability and private sector development; it has privatized several state-owned firms, and made legal reforms to spur private investment. In addition, the government has also pursued a policy of trade liberalization, the elimination of quantitative restrictions on imports, and the reduction in tariffs overall. Egypt made significant unilateral reforms to reduce border protection in 2004 and 2007, and has participated in regional and global negotiations in the WTO.

These reforms, especially the greater openness to trade, would imply significant reduction in the levels of protection of Egyptian industries, and perhaps a lower dispersion of protections across industries, treating economic sectors more uniformly. One simple method of measuring protection to industries is to observe applied tariffs. But tariffs by themselves do not reveal all of the practical incentives arising from the trade regime that face real-world investors. One should look at the effects of trade policy on the net income – value added – generated by industries. A more accurate measure for practical policy analysis should account for both protections on the output side as well as tariff effects on the costs of tradable inputs. This is the effective rate of protection approach used in the present study to capture the incentives for resource flows between various sectors. The same nominal tariffs on final products can imply large differences in effective protection of industries, because industries differ with respect to their use of import-competing inputs and their cost structures are impacted differently depending on how such inputs are taxed at the border. In addition there could be non-tariff barriers (NTBs) related to policies that effectively raise the price wedge between a domestically sold good and its price at the border.

When assessing levels of industry protection in Egypt, one faces the additional major complications that the government has maintained subsidies on the provision of some goods and high levels of subsidies on energy sources that impact across many industries. So one should not only account for the effect of the trade regime at the border but also internal advantages to certain industries that result from these two sources of subsidies. This study takes care to separate two effects: that of the tariff schedule and output subsidies and that of energy subsidies. As a practical matter, we make use of information from the 2006/2007 input-output matrix that indentifies five fuel-energy sectors (natural gas, industrial and diesel fuels, LPG and gasoline) and estimates of price subsidies associated with these energy sources.

After several years of economic reforms and trade liberalization, this is a good moment to assess the level of protection of various Egyptian industries, and to discuss the implications of the current profile of protection and subsidies for the at-least implicit (and perhaps unintended) discrimination between sectors, privileging some and

implicitly taxing others. Differential treatment of sectors via tariffs and subsidies is a form of industrial policy, and a benefit of a study of protection rates and subsidies is that it helps make explicit at least the contours of such a policy. This type of evidence aids in examining whether or not the set of policies now in place conforms to the current objectives of the government. The study examines effective rates of protection, capturing the effects of tariffs following trade reforms and identifying those activities (industries) that are still subject to (or still enjoy) significant degrees of border protection and direct subsidies (and where possible NTBs). There is the possibility that some activities have negative value added, when valued at border prices and in the absence of subsidies, which could merit special attention for policy makers.

This study has three objectives. First, it examines recent effective rates of protection across the Egyptian economy. These ERPs are calculated first using formal, applied tariffs, and, where possible, using estimates of the ad valorem price wedge introduced by NTBs. Second, it incorporates energy subsidies into ERP estimates at the aggregated sectoral level. Third, it compares today's ERPs due to applied tariffs for several disaggregated industries with those of a decade ago when trade reforms began.

This report is structured in the following way: The next section discusses in general terms the effective rate of protection (ERPs) as a policy indicator, the previous information that we have regarding ERPs in Egypt, and data sources for estimating current ERPs, including the component related to NTBs. The third section reviews the formula by which we implement numerically the effective protection approach, first incorporating the adjustments due to tariffs (and the tariff equivalent of NTBs) and net output subsidies. Section 3.b. demonstrates how we incorporate subsidies to energy inputs and estimate their relative impact on total ERPs. Section 4 discusses specific data issues and the level of disaggregation possible.

Section 5 discusses briefly the methods used to estimate the ad valorem tariff equivalent of NTBs. The estimates for selected industries were estimated by Dr. Khaled Hanafy, and his approach is detailed in Annex 3. Section 6 presents the results of the ERP calculations using 2009 Egyptian applied tariffs at a fairly disaggregated industrial level making use of cost structure information for selected industries available from a previous study done a decade ago. We then compare our results to those of the previous study that used 1998/1999 applied tariff levels. We also present for some industries the ERPs for 2009 including NTB price-wedge estimates where available.

But these disaggregated cost data do not adjust for energy subsidies and so Section 7 presents the applied nominal tariffs and the levels and dispersion of ERPs for 23 industrial sectors where energy input cost shares for the five fuel sources mentioned above are available from a recent input-output matrix of the Egyptian economy. These ERPs adjust for tariffs, output subsidies and energy subsidies. In addition, the ERPs are also estimated adding the estimated tariff equivalent for NTBs. In presenting the results, non-tradables and food and agriculture are underlined, and one is led to conjecture to what degree energy subsidies could be considered partial compensation for the implicit taxes on the sectors from tariffs on tradable inputs. In addition to discussing these results, we identify some differences with those of Lederman (2007), who also used an approach based on input-output coefficients but with less information on the participation of energy inputs in sectors' cost structures. Section 8 concludes with a discussion of the policy implications of the results.

2. Effective Rates of Protection in Egypt: Cost-share Data Sources and Previous Studies

Effective rates of protection are measures of the impact on an industry's or economic sector's net returns due to border protection. Nominal tariffs are relevant for consumer welfare and the analysis of patterns of consumption. ERPs are relevant for analyzing the impact of commercial policies on incentives for resource allocations. Without making normative assessment of the desirability of interventions in the form of tariffs and subsidies, ERP estimates aid in understanding the effects of these policies on the incentive framework for production, and so provide a quantitative measure of economic signals guiding investments and factor use. In calculating effective rates of protection (ERPs) of industries for any country, there are two technical decisions to make. First, what is the most appropriate level of disaggregation to use? Second, based on the disaggregation level, how does one incorporate non-tariff barriers? Given the information available at the present date for Egypt, the following calculations of ERPs focus mainly on the effects of tariffs and energy subsidies, but ERPs are also presented that adjust for the estimated effects of NTBs for activities where estimates are available.

The question regarding the level of aggregation is addressed using two sources of cost-share information at different levels of aggregation. The most detailed cost share data available were obtained for a study by Cassing, et al., which was done for a larger Nathan Associates project on tariff reforms in Egypt for US AID, completed in October 2000. (Hereinafter we will refer to this as the Nathan study.) Although ERPs were reported in this study, the cost share data on which the ERPs were based are reported in greater detail by Nabila Al Iskandarani.[1] These cost-share data cover 20 specific industries in the private sector and 17 industries in the public sector. A list of these industries and their intermediate inputs are found in Annex Table 1. These industries are identified by their 4-digit ISIC code (rev. 3.1).[2] These disaggregated industries served as the basis for estimating ad valorem equivalents of non-tariff barriers, presented in Annex 3. Note that although most of the public industries in the list continue today, they might be much reduced in importance after a decade of economic reforms. Some industries that were in the earlier 1999 list are not found in the latest CAPMAS list of public industries for 2007/2008: household appliances, carpets and rugs, containers and boxes, cutlery and hand tools, agricultural machinery, and pottery.

The other source of cost-share data is the inter-industry intermediate input costs from the latest available Egyptian input-output matrix (2006/2007), supplied by the World Bank office in Cairo. (See Annex Table 2 for a list of industries. The matrix is available upon request.) This particular input-output matrix has 23 industrial sectors, with more disaggregation of energy sectors. In his 2007 report, D. Lederman also uses an input-output matrix from 2005 with 21 sectors, but with more detail in some industries, such as agriculture and food, and less in others. (The accompanying Annex Table 2 also includes a list of sectors available to Lederman.)

[1] Her Masters thesis was completed at the American University in Cairo in spring 2001

[2] Given the current ISIC version, in some cases the industries reported in Nathan and Al Isakandarani are further disaggregated into more specific industries in the information available from CAPMAS. See the web site http://www.msrintranet.capmas.gov.eg/pls/fdl/bkr2_e?lang=0&lname= ECS .

Regardless of the level of aggregation or source of cost-shares, a practical problem is the appropriate correspondence between products and inputs on one side and tariff lines and levels on the other. For this study the basic source of *applied* tariff data is that which the Egyptian government reports to the WTO. The latest such data for 2009 are available in the Integrated Data Base at the six-digit level. Tariff information adjusted for preferential trade agreements is also available from Bouet et al., although their data have not been updated since 2004; and it appears that trade-weighted average tariffs that account for preferences differ very little. In fact those lines where preferences and applied tariffs differ by more than 10 percent are small, fewer than 7 percent of tariff lines for products of any appreciable total import value. Therefore, the decision was made to use the updated tariff schedule for 2009, without preference adjustments, considering that such an adjustment in the case of Egypt would be highly unlikely to alter the results.[3] The reader should note that specific duties appear only to apply to tobacco products: there are 11 tariff lines with non-AV duties according to the WTO integrated data base. (For the Bouet et al. data base for 2004, these non-AV duties are converted to an ad valorem equivalent.) Also note that between the WTO for the years 2005 and 2006 use the 2002 HS codes, and 2007 and beyond use the 2007 HS codes. At least in the case of Egypt, the differences between the code years appears only apply to the telephony group (cell phones).

Returning to the topic of aggregation, within each of the 23 sectors in the I-O matrix available to this present study, there are, of course, likely to be some subsectors more protected than others; and so one would ideally like to see even more detail. The risk of a high level of aggregation is that it would hide large disparities between industries grouped under the same broad heading. For example, in the tariff data for the food industry (the HS 2-digit codes 16 to 24) the simple average is over 200 percent, and Lederman reports ERPs for beverages based on average tariffs of 1600 percent. The reason for such large average tariffs at this level of aggregation is seen in Table 1, where imported alcoholic beverages are taxed at an almost prohibitively high rate. The highest tariff for non-alcoholic and non-automobile products is 30 percent, and is usually reserved for finished products produced in Egypt. But within industry groupings tariffs range from lows of zero and 2 percent to 10, 20 and 30 percent based on the degree of valued added that might be done in Egypt; several sectors show clear cases of tariff escalation. When reading the ERP estimates reported below, the reader should be aware of this aggregation problem and interpret the result appropriately.

3. A Quick Review of the Algebra of Effective Protection

Because subsidies are important in the case of Egypt, both on outputs and especially on energy inputs, the algebra for estimating effective rates of protection requires an extension to that usually found in textbooks. We quickly review below the manner by which we calculate effective rates of protection, first incorporating output subsidies, then input (energy) subsidies. The ERP is defined in terms of the percent deviation of an industry's value added from what it would otherwise be in the absence of protection (both formal applied tariffs and NTBs). (See, for example, Corden, 1971, Vousden,

[3] Two cases where preferences might make a difference among most-traded goods are HS 270900 (Petroleum oils and oils obtained from bituminous minerals, crude) and HS 090240 (Black fermented tea and partly fermented tea, whether or not flavoured, in immediate packings of > 3 kg).

1990[4]). This definition accounts for both protection on the product side that might increase gross revenues, as well protection on the input side that might increase costs. The following algebraic presentation is meant to arrive at a final, practical equation for the calculation of ERPs from observed cost-share data and applied tariffs (and where available ad valorem equivalents of NTBs).

a. Deriving the basic ERP formula

The observed value added in some industry g, VA_g, is defined as gross revenues less the costs of tradable inputs; and this net is therefore the fund available for payments to non-tradable inputs (labor and capital) used in the industry. Gross revenues in industry g, R_g, are simply the quantity produced of the good, y_g, sold at its domestic price, which is the unprotected price, p_g, (referred to as the border price) adjusted by the ad valorem equivalent of domestic protection, $(1+t_g)$, and any net subsidies per unit of output, $(1+s_g)$; that is, value added at exchange prices might be less to the degree subsidies are positive (a negative subsidy would be a tax). The tariff could be the "formal" as stated in the tariff schedules, and should be distinguished from the nominal tariff rate (or nominal rate of protection) usually defined as the ad valorem equivalent of tariffs and non-tariff barriers expressed in relation to the CIF price of imports.[5] (In addition, the two tariffs differ if the formal rate is applied to FOB prices, as some countries do.) In what follows the tariff adjustment factors $(1+t_i)$ includes the formal applied tariffs on output and inputs and the ad valorem tariff equivalents due to NTBs. Annex 3 discusses the estimation of the additional component of the t_i's due to NTBs.

The costs of tradable inputs are similarly obtained by summing over the individual costs, C_{gi}, of inputs i used in the industry g ($i \in I_g$); the cost of a specific tradable input, i, is its quantity used in the industry, x_{gi}, purchased at its unprotected price, p_i, adjusted by an appropriate ad valorem protection $(1+t_i)$. That is,

$$VA_g = p_g(1+t_g)(1+s_g)y_g - \sum_{i\in I_g} p_i(1+t_i)x_{gi} = R_g - \sum_{i\in I_g} C_{gi}$$

which can be rewritten in terms of tradable input costs as shares of gross revenue, a_{gi}:

$$VA_g = p_g(1+t_g)(1+s_g)y_g\left(1-\sum_{i\in I_g}\frac{p_i(1+t_i)x_{gi}}{p_g(1+t_g)(1+s_g)y_g}\right) = R_g\left(1-\sum_{i\in I_g}\frac{C_{gi}}{R_g}\right) = R_g\left(1-\sum_{i\in I_g}a_{gi}\right)$$

.

The hypothetical value added for the industry – the value added which would otherwise prevail without any protections and subsidies whatsoever on the revenue or cost sides – can be at least approximated under the assumption that the industry technology is of the

[4] The theory of effective protection has been well established since Johnson, H.G. 1965. "The theory tariff structures with special reference to world trade and development," in H.G. Johnson and P.B. Kenen, eds., *Trade and Development*, Geneva, 1965. Balassa, B. 1965. "Tariff protection in industrial countries, an evaluation." *Journal of Political Economy*, v. 73 (December): 573-94.

[5] Note that tobacco in Egypt has a specific duty applied per weight, rather than a tariff applied against unit value.

fixed-coefficient type (that is, the average input use is unresponsive to marginal relative price changes). In that case, the cost share of gross revenues that would otherwise prevail without protection for an individual input, a_{gi}^{H}, can be written in terms of the observed cost share, a_{gi}, and the ad valorem protection rates:

$$a_{gi} = \frac{p_i x_{gi}(1+t_i)}{p_g y_g (1+t_g)(1+s_g)} = a_{gi}^{H} \frac{(1+t_i)}{(1+t_g)(1+s_g)} \Leftrightarrow a_{gi}^{H} = a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)$$

And so, from observed costs as shares of gross revenues, a_{gi}, and ad valorem protection rates – usually observed tariff levels – one can estimate the hypothetical cost shares that would prevail without protection. Using the notation defined above, the hypothetical value added for industry g without protection and subsidies can be written (with the superscript indicating the hypothetical):

$$VA_g^H = p_g y_g\left(1-\sum_{i\in I_g}\frac{p_i x_i}{p_g y_g}\right) = R_g^H\left(1-\sum_{i\in I_g} a_{gi}^H\right) = R_g^H\left(1-\sum_{i\in I_g} a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)\right)$$

The ERP is then estimated as the percent difference of the observed value added from the hypothetical (for details, see the Annex):

$$ERP_g = \frac{VA_g}{VA_g^H} - 1 = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}^H t_i}{(1-\sum a_{gi}^H)}$$

Note, that without subsidies on the output side, the ERP calculation distills into a simpler, more familiar form found in other studies (e.g., the Nathan study and Al Iskandarani): [6]

$$ERP_g = \frac{VA_g}{VA_g^H} - 1 = \frac{t_g - \sum a_{gi}^H t_i}{(1-\sum a_{gi}^H)}$$

It is this last equation that is applied in Section 5 to the disaggregated industries used in the Nathan study. But in the case of Egypt there is another important source of intervention, energy subsidies, which interact with the tariff regime to impact the profitability of economic sectors.

b. Adding input subsidies – reduced energy costs – to the ERP calculation

In the case of Egypt energy subsidies are significant and can influence the effective rates of protection of particular industries, depending on their use of various energy sources. See for example, the 2009 World Bank report "Transforming Egypt: A Development Policy Review"; Lederman, 2005; and notably the April 2009 study by

[6] At this point, one should note that this present study estimates the hypothetical costs as shares of gross revenue from observed cost shares and observed tariffs, a methodological strategy that relies on the assumption that input substitution elasticities are small. (See Sampson, 1974, for a critique of this assumption.) Alternatively one could estimate the hypothetical cost shares from other sources; one strategy in the literature has been to use benchmark cost shares from other countries with similar technologies but much less protection (e.g., Sampson and Yeats, 1979).

Abouleinein, El-Laithy and Kheir-El-Din, which makes use of the same input-output information made available for this present study. The importance of subsidies can be appreciated by comparing for various energy sectors the value added at factor cost and value added at market prices (exchange prices paid by buyers). As seen in Table 2, subsidies account for a large percent of value added at factor prices, especially in the case of LPG. These subsidies are in exchange for lower energy prices to other industries, which to some degree translate into lower prices generally for consumers. Abouleinein, El-Laithy and Kheir-El-Din examine in some detail simulated impacts on the consumer price index of various scenarios for reducing energy subsidies; the effects on consumer prices of removing subsidies appear to be considerable. In this present study, we examine the impact of removing the subsidy at the industry level through the subsidies contribution to the ERPs.

Lederman (2005) presents rough estimates of the impacts of energy subsidies on ERPs for selected industries taken from the 2005 input-output information and the 2007 Egyptian tariff schedule. Although recognizing that energy subsidies enter the value-added equation via costs, the basic formula used by Lederman for the ERP of an industry g takes the form

$$\mathrm{ERP}_g = \frac{(1+t_g)(1+S_g) - a_I}{(1-a_I)} - 1$$

where the a_I is the share of intermediate factors (ideally in terms of prices without intervention) and S_g are net subsidies: indirect taxes and other subsidies plus energy subsidies estimated in terms of an ad valorem equivalent addition to output price. In his appendix, Lederman does discuss the ERP accounting for an adjustment in the price of tradable inputs by both tariffs and a subsidy rate on inputs, S_I:

$$\mathrm{ERP}_g = \frac{(1+t_g)(1+S_g) - a_I(1+t_I)(1-S_I)}{(1-a_I)} - 1 \ ,$$

which is the approach we take here.[7]

For those five inputs with subsidies of interest – namely, natural gas, fuel oil (mazot), diesel oil (solar), LPG and gasoline – the cost shares of gross revenues that would otherwise prevail without both protection and subsidies for an individual input, a_{gi}^H, can again be written in terms of the currently observed cost share, a_{gi}, and the ad valorem protection rates:

$$a_{gi} = \frac{p_i x_{gi}(1+t_i)(1-S_i)}{p_g y_g (1+t_g)(1+s_g)} = a_{gi}^H \frac{(1+t_i)(1-S_i)}{(1+t_g)(1+s_g)} \Leftrightarrow a_{gi}^H = a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)$$

And so the practical ERP formula above in Section 3.a. above for applied tariffs and the ad valorem tariff equivalents due to NTBs should be modified somewhat to account for

[7] Lederman (2005) does not appear to apply the energy subsidies per unit of energy use from a particular source, S_I, likely due to lack of appropriate detail in the input-cost-share data. As discussed further on, such source-specific subsidy data is now available from Abouleinein, , El-Laithy and Kheir-El-Din (2009).

subsidies for energy inputs. Again the ERP with subsidies is estimated as the percent difference of the observed value added from the hypothetical:

$$ERP_g = \frac{VA_g}{VA_g^H} - 1 = \frac{\left(\left(t_g + (1+t_g)s_g\right) - \sum_{i \in I_g} a_{gi}^H t_i\right) + \sum_{i \in I_g} a_{gi}^H S_i (1+t_i)}{(1 - \sum a_{gi}^H)} =$$

$$ERP_g = \frac{\left(\left(t_g + (1+t_g)s_g\right) - \sum_{i \in I_g} a_{gi}^H t_i\right)}{(1 - \sum a_{gi}^H)} + \frac{\sum_{i \in I_g} a_{gi}^H S_i (1+t_i)}{(1 - \sum a_{gi}^H)}$$

The innovation of the last equation above is that, with subsidies there are two effects: that of the tariff schedule, NTBs and output subsidies (the first term on the right hand side of the above equation) and that of the input subsidy (the second term), in the present due to energy subsidies.

As a practical matter in this present study, using information from the 2006/2007 input-output matrix, the ERPs with input subsidies on five energy input are estimated using adjusted, *observed* cost shares (the a_{gi}) relative to gross revenue:

$$ERP_g = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)t_i}{\left[1 - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)\right]} + \frac{\sum a_{gi}\left(\frac{S_i(1+t_g)}{(1-S_i)}\right)}{\left[1 - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)\right]}$$

The above is the "programmable" equation for practical calculations. Note that reference hypothetical value added is that of no interventions at all: the cost-share coefficients are changing due to changes in relative prices arising from both applied tariffs (and NTBs) and input subsidies. An additional note of caution is that the ERP approach does not account for possible factor substitution that could occur as the results of a different trade and subsidy regime. It is an approach based on a fixed-coefficient technology, the costs of which are adjusted by changes in tariffs of inputs and outputs. It is hard to anticipate what would be an industry's response to new relative price situations in its choice of technology. It would be even more difficult to anticipate the final impacts of a simultaneous change in many industries (23 in the input-output matrix used below). (Some simulation approaches pretend to adjust for input substitutability via assuming predetermined values for elasticities of substitution, often the same values across heterogeneous industries.) So we interpret the results of the ERP approach as described in the above equations as first-order approximations of the impacts of interventions on the net income of individual industries and sectors.

4. A Discussion of Energy Subsidies and Tariff Data Sources and Implications for the Level of Disaggregation

Energy subsidies rates for calculating ERPs from the I-O matrix: sources.

For this present study the subsidy rates for the various energy sources are derived from the "best-guess" estimates of Abouleinein, El-Laithy and Kheir-El-Din (2009) of the percentage adjustments that would have to be made to observed prices to reach per-unit actual domestic costs (presented in the fourth column of their Table 4, p. 16). These percentage increases – and their translation into the ad valorem subsidy rates used in the above formula (the S_i) – are shown in Table 3. In fact these energy subsidy estimates match the fuel energy sectors available in the input-output matrix of 2006/2007.[8]

Applied (formal) tariff levels for selected industries, products and intermediate inputs.

The 2009 tariff levels from the WTO used in the present calculations of the ERPs for the selected sectors, plus those used by Nathan Associates and Al Iskandarani from the late 1990s, are presented in Annex Table 1. Note that the sectors are ISIC codes (rev. 3), while the activities are from the US SIC, as used in the Nathan study. And so, the final column of the Annex Table 1 includes notes and references to the correspondences, which this present study uses, between products (and inputs) and the HS 6-digit tariff schedule as found in the WTO Integrated Database for Egypt.

One alternative for selecting tariff levels for industries is to simply average over the lines associated with some aggregate activity, such as textiles or agriculture. In fact this is what is done in the following section at the HS 2-digit level when assessing protection of industrial groups in the 23-sector input-output table for Egypt (see also Lederman, 2005). Instead of averaging many tariff lines across the 2-digit level, however, in the case of the specific industries available, we have differentiated activities according to the level of processing and delved into tariffs at the 4 and 6-digit level.

This disaggregation is important because the degree of tariff escalation in Egypt emerges clearly on observing how the formal tariff levels increase with the level of processing. For example in cotton textiles (HS2 56s), the raw cotton enters at a zero tariff, but carded cotton and any processing to threads, enters at 5 percent. For woven cotton materials, the tariff jumps to 10 percent; and for articles of clothing (HS2 61s), that is, final products, the tariff jumps to 30 percent. The dispersion around the 2-digit level averages is much higher than those around the average for a particular 4-digit level grouping of products. In fact, Egyptian tariffs tend to be uniform at any particular 4-digit level group, and it is very difficult to encounter more than one-line tariffs at the 6-digit level.

After considerable examination, we conclude that the 4-digit (and sometimes 6-digit) levels are more appropriate to capture more homogeneous groups. The degree to which product processing is associated with higher tariffs is well observed at the 4-digit level.

[8] There appear to be no statistically constructed IO tables since 1992, and all available tables are updates.

As can be seen in Annex Table 1, for each sector we have attempted to select appropriate tariff levels rather than averages over many, disparate tariff lines. That is, for a specific industry we have tended to choose a specific tariff, or an average over a few appropriate tariffs lines associated with more-processed products. For the tradable inputs used by the sector, we have tended to choose tariff lines associated with raw products or lower processed products. Note that Annex Table 1 also includes, for each industry, the share of total tradable input costs associated with specific inputs. The list of inputs is specific to each industry.

5. Estimating Non-tariff Barriers for Selected Activities

By their nature, non-tariff barriers are not established by policy makers in terms of ad valorem equivalents. They involve, therefore, some detective work to estimate them. The case of purely quantitative restrictions (QRs) is a special case, because with some information of relevant supply and demand elasticities, the NTB can be extracted in terms of a price wedge. Unfortunately many NTBs, however, are not so explicit as QRs. One source of NTBs, for example, might simply be administrative delays that raise the local component of the costs of imported goods. Other NTBs can be import licenses to be negotiated with trade authorities, testing protocols for food and drugs,and sanitary and phyto-sanitary restrictions, which – while in themselves might not be formal trade restrictions – can be used as instruments for protection against import competition. Annex 3 presents some NTBs that are noteworthy to market participants in Egypt.

For this present report, Dr. Khaled Hanafy prepared estimates of price wedges between domestic prices of imported goods and their border prices, adjusting for applied tariffs, transport costs and, where appropriate, marketing margins. Annex 3 discusses the details of the NTB tariff-equivalent estimation for selected industries for which we have more detailed cost-share estimate from the Nathan study from 1999. It is important to point out that although the price wedge approach used here gives an estimate of the tariff equivalent of NTBs, it says nothing about the exact policies or policy instruments acting as NTBs, nor does it reflect their respective contributions.

The NTB estimates, as seen in Annex Table 3, cover a heterogeneous group of goods, but only where a CIF price is available. The reader will note that some products have explicit marketing margin estimates, some without. Even in the case of explicit marketing margin estimates, the NTB ad valorem estimates might be implicitly incorporating domestic marketing costs, including inventory costs, distribution and maintenance costs, advertising cost, and so on. If one takes all products in Annex Table 3, the average of all NTB ad valorem estimates is slightly less than 26 percent. Perhaps more representative for inputs used in manufacturing is to take the average NTB ad valorem estimates over the products that are of lower value added. That is, to take an average excluding jewelry, autos, soaps and cosmetics, table spreads, drinking glasses and cups, hand drills and refrigerators, all of which have high estimated price wedges due to NTBs. After excluding these high value-added goods, the average NTB ad valorem is slightly more than 9 percent.

What the tariff equivalent estimates of the NTBs emphasize is that there are sectors for which the ad valorem equivalents of barriers are apparently very high, and that there is a large dispersion among all NTB estimates. On the surface, this is puzzling, but certainly

possible. One would have to investigate the institutional arrangements in some of these markets to see if these high NTB estimates are reflecting true policy-related barriers to imports, or are reflecting missing costs that would raise marketing margins and so reduce the true NTB wedge. Another question regards the specific policy instruments that are generating these barriers. If these NTB estimates are approximately true, it would indicate a rather aggressive industrial policy, favoring certain activities (firms) relative to others. We note that there is a correlation between higher NTB ad valorem wedges and formal tariffs. From the subset of activities for which we have estimates, the price impacts of NTBs tend to increase with the domestic share of value added, which suggests that NTB might be protecting activities involving high levels of employment. This hypothesis could not be test in this study.

For the estimation of ERPs with NTB effects in the case of specific industries (Section 6), we use the ad valorem estimates of Dr. Hanafy for the outputs, and for tradable inputs we use the average of 9 percent NTB equivalent associated with low-value added products. (Cement is the only exception, where there appears to be little applied tariff or NTB restrictions on product or raw materials.) For ERP estimates for the aggregate sectors from the input-output matrix (Section 7), there are only six sectors to which we add to the applied tariffs the estimates of the ad valorem effects of NTBs (see Table 5b). The sectors to which were applied NTB estimates were those that corresponded most closely to the specific industries and products for which tariff-equivalent estimates were available at the disaggregated industry level from Dr. Hanafy. There are three sectors to which we applied the average tariff-equivalent of 9 percent (i.e., excluding the high-value-added goods mentioned above); and there are three sectors that closely matched the industries for which we apply the NTB estimates directly (textiles, fertilizers, and iron and steel).[9] For the five non-tradable sectors NTB, tariff equivalents are not applicable. For other tradable sectors to which are applied zero NTB equivalents, no information is available and no significant NTB effects were assumed. Nevertheless, the ERPs of those sectors will also be indirectly affected by NTB through changes in the cost shares of inputs directly impacted by NTBs.

6. Results: Levels and Dispersion of ERPs across Selected Industries, Tariffs Only (without Energy Subsidies), Comparing 2009 with the Late 1990s

Table 4a presents the ERP results for private and public industries, comparing ERPs using 2009 applied tariff data and the tariffs used in the Nathan study of the late 1990s (which did not include NTB adjustments). ERPs for 2009 that include estimated NTB effects are discussed below.

We first concentrate our discussion of the private sector results in Table 4a. On average, ERPs in the private sector declined from 86 percent to 45 percent (excluding sector 2102 – boxes and container, which as discussed below is a special case). And as can be seen in Annex Table 1, applied tariffs – that is, nominal rates of protection – also declined generally across the board. In addition, the dispersion of ERPs, as measured by the standard deviation, fell from 1999 to 2009 (from 192 to 57 percent, excluding sector 2102).

[9] The sector "textiles" matches with ISIC #1711 (spinning, weaving and finishing), the sector "fertilizers" matches with ISIC #2412 (manufacture of fertilizers and pesticides), and the sector iron and steel matches with ISIC #2710 (manufacture of iron and steel basic industries).

Note, however, that certain industries had large increases in their ERPs relative to the late 1990s. Although the level of tariff protection on the final product declined, the levels of protection on the inputs fell even more, so that the effective protection on the industry increased. The example of textiles (except garments, which are not reported separately) is notable (see Annex Table 1). With the 1998 tariff levels, this product was protected at an average tariff of 36%, and the tariff fell to 30% in 2009. But some of the inputs in 1998 were protected at a high rate as well (e.g., nonwoven fabrics at 28% and fabricated textiles n.e.c. at 39%), these tariffs falling to 5% by 2009. So the ERP on this textile industry rises from 84% to 229%! So while the consumer benefits from the price decline in the final product on the order of about 6 percentage points, the returns to domestic value added in the industry increases by 145 percentage points!

For many industries there were declines in ERPs, some significant, over the past decade, due to the decline in output tariffs relative to input tariffs. Consider the case of motor vehicles: there were significant declines in the tariffs of the inputs, falling from a range of 20 to 30 percent to a range of 5 to 10 percent (with the exception of tires, with a 20 percent tariff). But the product tariff - which is the one that matters for the consumer - also decreased significantly from 35 to 10 percent. The reader should note that this ERP is relevant only for relatively inexpensive cars, because expensive cars are not manufactured in Egypt. Consumers of expensive automobiles still face nominal tariffs of 40 percent, up to 135 percent.

In two private sector industries in Table 4a, fertilizers and cement, the ERPs with 2009 tariffs decline and turn slightly negative. That is the decrease in output tariffs for these important inputs for other industries (agriculture and construction) fell considerable. Fertilizers (HS 31s) enter the country with a zero tariff, but use tradable inputs with positive tariffs. Similarly, cement (HS 25s), the most representative material for construction being Portland cement, can be imported at a 2 percent tariff, but again makes use of other tradable inputs with higher tariffs. Not adjusting for energy subsidies, the tariff profile alone stimulates the consumption of these products by making domestic prices practically at import parity, but discourages to some degree the production of the product by raising the cost of tradable inputs. The result is a slight dis-protection or taxing of these industries reflected in negative ERPs. We shall see in the next section discussing Table 5a, where we examine the sectors “fertilizer” and “cement” as classified in the input-output matrix, that these two sectors without any interventions – importantly energy subsidies – would have negative value addeds; their economic survival appears to be dependent on energy subsidies.

One should also note in Table 4a the special case of industry 2102, manufacture of containers, paper boxes, etc., which has very large ERPs due to the large share of tradable inputs, which makes the denominator of the ERP formula very small. Small changes in tariffs can cause large proportional changes in value added and large swings in the ERP. Interestingly, using the 1998 tariffs, the unprotected value added of the industry would have been negative, and so industry only existed due to the tariff profile at the time. With the 2009 tariff profile, the industry still has a cost of tradable inputs relative to output value that represents 92 percent at border prices; that is, at border prices there would be apparently very little value added. At current prices, after interventions, CAPMAS reports for 2007 that “paper pulps, paperboard carton industry” has a value added of about 22 percent of gross value of output. The industry appears to

be an assembly of tradable inputs. In fact, raw material represents about 60 percent of the products value.

A note on the public sector

According to CAPMAS data for 2007/2008 the public sector represents 35 percent of the gross value of output, which might appear large except that petroleum products and derivatives represent 75 percent of the total public sector output. Thus the share of the public sector in the non-oil-related sector is now about 9 percent. Moreover, the net value added of the private sector – even including petroleum – is five times that of the public. The government maintains a role in industries outside of extraction and refinement of oil, which might be considered "strategic": spinning and fiber textiles, sugar and refining, tobacco, coke, steel, and non-ferrous metals. These six sectors, plus petroleum extraction and refining, make up 91 percent of the gross output of the public sector.

The ERPs in the public sector have fallen between 1999 and 2009, except for the case of glass and glass products.[10] The average for those industries still public fell to 37 percent from 122 percent across public industries in 1999. And the dispersion of ERPs also fell notably: from 145 to 63 percent. The reader will note that in Table 4a one public sector activity has a high and negative ERP using the 2009 tariff data (soap, perfume and cosmetics). This is because under some conditions, value added without intervention is *negative* – the cost of importing these goods (at social costs for tradables) would be less than the cost of domestic production. That is, using the notation of the formulas above, $V_g^H < 0$. For example if value added with interventions is positive, say 100, and without interventions is negative, say –10, then interventions would be benefiting the sector by a positive 110, But the ERP would be negative – in this example, *minus* 11. This is a quite different situation from the case of interventions *dis*protecting or net-taxing a sector, as is observed for fertilizers and cement. The ERP in the latter case of taxation would be negative, but due to the numerator being negative: the value added without "protection" would be greater than the actual, observed value added. For this public sector industry, the high negative value is actually signaling very high protection rates.

ERPs by selected industries for 2009, including estimated NTB equivalents

The Nathan and Al Iskandarani studies for the late 1990s did not include NTBs. For the present study, as discussed above, the tariff-equivalents of NTBs were estimated for 16 industries using comparisons of domestic and border prices (as detailed in Annex 3). Table 4b presents the ERP estimates that include the NTB ad valorem equivalents for both outputs and inputs (as discussed in Section 5) for both public and private industries. The inclusion of the tariff-equivalent NTB estimates increases the dispersion of ERPs, increasing the standard deviation in the private sector from 71.7 percent without NTBs to over 5000 percent with NTBs. This increase in the dispersion of ERPs is because the ad valorem addition to protection of industries due to NTBs ranges from

[10] Note that by 2009, there were five industries with no public sector involvement that did have involvement in 1998: #1722, 2102, 2893, 2921, and 2930.

almost zero in the case of cement to over 120 percent in the case of motor vehicles, with rates of over 40 percent for finished textiles, jewelry, and soaps and cosmetics.

The impact of the NTB equivalents for several sectors appears very large, but for others the impact is relative small. For example, as can be seen by comparing Tables 4a and 4b in the case of private industries in 2009 the inclusion of NTB estimates on ERPs are small for ISIC #1711 (spinning and finishing textiles), #2423 (drugs and medicine), #2610 (glass products), #2694 (cement), and #2710 (iron and steel).

The inclusion of NTBs estimates affect the ERPs notably (in the private sector) for industries #2101 (pulp and paper), #2412 (fertilizers and pesticides), #2893 (cutlery and hand tools), #2921 (agricultural machinery), and #3110 (electrical appliances); the impact is extremely high in the cases of industries #1721 (textiles except garments), #2424 (soap and cosmetics), #2511 (tires and tubes), #3410 (automobiles) and #3811 (jewelry). For these latter industries, the estimated tariff equivalents of the NTBs are high as seen in Annex Table 3, reaching 120 percent in the case of automobiles.

The tire and tube industry (#2511) is an interesting case to compare private and public firms. With the addition of the NTB tariff equivalent estimate to the ERP, the value added of the private sector industry becomes negative (i.e., the industry would not exist without interventions), and so its ERP becomes high and negative. Interestingly, the same industry in the public sector maintains a positive ERP, after adjusting for NTBs, because it employs relatively more domestic resources (mainly labor) and the resulting share of tradable inputs relative to gross output is much smaller. While the value added over tradable inputs is reduced in the public industry with the removal of interventions, it still remains positive, unlike the industry in the private sector. In fact, using the CAPMAS 2006/2007 Annual Bulletin of Industrial Production Statistics, the wage bill for the private and public tire and tube industries are practically the same, but the wage bill represents only 5 percent in the private sector and 20 percent in the public. (We note also that the public industry represent about one-fifth of the gross output of the private tire and tube industry.) Intuitively, one would think that there must be a subsidy to the public firm in this industry, but no explicit subsidy appears in the CAPMAS statistics going to the public enterprise, although the statistics show a subsidy to the private firms in this industry. The inference is that returns to capital in the public industry is very low, representing an implicit subsidy.

7. Results: ERPs Incorporating Energy Subsidies for 23 Sectors from 2006/2007 Input-Output Information

Table 5a shows the ERP calculations for 23 industrial sectors in Egypt, using applied tariffs, net output subsidies and subsidies on energy inputs. Table 5b shows the ERP calculations including the NTB estimates. Table 6 shows the industrial categories used to construct the average tariffs associated with each sector. In some cases, for example LPG, specific tariff lines are available. Where specific tariff lines are not used, sector tariff are calculated by using averages over tariff lines in the appropriate category. Sector-level tariffs are shown in the first column of figures in Tables 5a and 5b. The second column of figures in Table 5b shows the ad valorem addition due to NTBs. The reader should note that due to the extremely high tariffs on alcoholic beverages (as seen

in Table 1), the sector-level tariff of 25.8 percent on "food and tobacco" excludes that specific beverage group from calculating the average.[11]

Because of the more speculative nature of estimation of NTB equivalents, we concentrate here on the ERPs in Table 5a using applied tariff and information on energy subsidies. There are a many interesting results in Table 5a, but we will focus on a few that raise relevant policy issues. Note first that the dispersion of nominal protection on tradables is not very high, the levels of tariffs ranging between zero on fertilizers to 25.8% on food, with an average of 8 percent. The sectors with the relatively highest tariffs are food and tobacco, textiles, aluminum products, other industries and non-metal industries, in that order. Despite the relatively low dispersion of nominal tariffs, the effective rates of protection have a very wide range, from high positive to high negatives. Excluding the three sectors with negative value added in the absence of intervention, the standard deviation of total ERPs is 373 percent in comparison to an average of 190 percent. Note that most of the dispersion and most of the average is due to tariffs and output subsidies, not the energy subsidies. The average ERP due to energy subsidies over these 20 sectors is 53 percent with a standard deviation of 82 percent.

It is interesting to compare these results with those of D. Lederman's draft report of 2007. As seen in Annex Table 2, he used a different breakdown of 21 aggregated sectors, focusing on downstream, natural resource sectors, (e.g., separating food, from tobacco, from beverages, including wood and paper as separate sectors, subdividing agriculture into two subsectors, and explicitly including cotton). In addition, given the level of cost share detail available, Lederman could not adjust cost share coefficients for border prices and no subsidies, importantly energy subsidies. This implies that the factor costs as shares of gross output (the denominator in the ERP formula) would differ between Lederman's approach and that of the present study. For example, for non-metal industries, Lederman reports factor costs as a share of gross output equal to 72 percent, while this present study finds this share in the absence of intervention equal to 42 percent.

Therefore, when there is an overlap between studies in the aggregated sectors, some of the ERPs estimates in this present study differ considerably from those of Lederman. For example, for textiles, although he reports similar levels of applied product tariffs, Lederman finds an ERP of 95.6 percent (84 percent, without subsidies), while this present study finds a total ERP of about 20 percent (and a slightly negative ERP due only to tariffs and output subsidies). For non-metal industries, Lederman finds a total ERP of 23.6 percent, and this present study finds 3 percent. In the case of agriculture, however the Lederman ERPs are similar to those of the present study. Both studies report similar applied nominal tariffs, high ERPs for many sectors, high dispersions of ERPs across sectors, and both find that energy subsidies in some sectors contribute significantly to total ERPs.

As discussed in the previous section, there are tradable sectors which have high and negative ERPs because the value added without intervention is *negative* ($V_g^H < 0$). That is, without the total package of interventions, these activities would be replaced by

[11] In comparing the results in this study to those of Lederman (2005) , an additional source of differences in the ERPs is due to the inclusion of alcoholic beverages in the Lederman results, which raises average tariffs in his Beverages sector to over 1600 percent.

imports (without significant restructuring). This is the case for "other chemicals," "fuel oil (mazot)."

First, consider "other chemicals." This sector benefits by modest output tariffs (8.4%) and the tariffs associated with the sector's main domestic intermediate inputs are also modest. Where the sector is taxed on the input side is in the level of duties on imported intermediate inputs (over 15%), which suggests that the sector is purchasing from abroad more highly processed products, given the escalation of the Egyptian tariff schedule. So the net impact on value added of the tariff regime is relatively small. Where the sector benefits most highly is from the input subsidy on fuel oil, the cost of which represents 16% of gross revenues. Eliminating all intervention – most importantly the energy subsidy – would make the sector, given current prices, unprofitable. The ERP estimates would be negative due to the negative denominator, not due to a negative numerator. That is, the true rate of protection is given by the absolute value of the ERPs, which we indicate by placing the estimates associated with this sector in parentheses. This is the same with fuel oil, the value added of which without intervention is near zero, but slightly negative (–2.8 percent of gross revenues). The observed value added is much higher than the hypothetical value added without interventions.

Impact of intervention on non-tradables

In the case of the five non-tradable sectors, given that these sectors use tradable inputs, the ERPs are influenced only by output subsidies, and tariffs and subsidies on inputs. The estimates of the ERP component due to tariffs and output subsidies are all negative, mainly due to tariffs on tradable inputs. But for two sectors (transport and other services) total ERPs turn positive due to large energy subsidies. For the restaurants and electricity sectors, energy subsidies mitigate but do not completely compensate for the negative effects of input tariffs. The construction sector uses little of the subsidized energy sources, and so it suffers a negative ERP of -15 percent. This sector does, however, make use of a large amount of electricity, the price of which is indirectly subsidized via the subsidy on natural gas.

The case of negative value added for electricity without subsidies – a non-tradable – is clear: although protective tariffs on the product are nonexistent, the industry relies heavily on subsidized natural gas. In the absence of such subsidies, electricity prices would have to rise. Transport and communications, another non-tradable, is taxed indirectly through imported inputs, as seen in the ERP calculation due only to tariffs and output subsidies (the third column of figures), but it is benefited greatly by energy subsidies, which produce a positive relatively high total ERP. In fact, energy subsidies (mainly on diesel and gasoline) represent 121 percent of the sectors total ERP. The sector "hotels and restaurants" is an interesting case, because it is also a non-tradable, suffering from tariff protection of inputs, but energy subsidies, while positive, do not fully mitigate border policies and indirect taxes. Thus the net ERP for this sector is slightly negative (–4.7 percent).

Energy subsidies as compensation for input tariffs?

Another notable feature of Table 5 is the case of industries with negative partial ERPs due to just tariffs and net output, but with positive total ERPs. They are taxed on the

trade policy side, but being compensated with energy subsidies. It appears that energy pricing is part of a strategy to subsidize and promote certain industries and in effect offset the *dis*-protection or taxation that results from tariffs on intermediate inputs. From Table 5, cases where negative ERPs without considering energy subsidies switch to positive ERPs after adjusting for energy subsidies are: textiles, fertilizers, non-metal industries, engineering and machinery, and transport and communication.

The case of the cement sector is notable because energy subsidies appear to almost exactly offset the negative impacts of tariffs and indirect taxes. The total ERP for cement, accounting for tariffs, output subsidies less indirect taxes, and energy subsidies results in an ERP practically zero (-1.6 percent). The fertilizer sector has zero nominal tariffs, benefiting agriculture, and so a negative ERP due simply to tariffs on intermediate inputs, but ends up with a very high a positive total ERP due to energy subsidies.

Another case of note is construction, which consumes a large amount of competitively price cement and moderately-taxed iron and steel. But it is a non-traded sector and so the net effect of the tariff regime is a tax to the sector. Because construction does not consume an appreciable amount of the fuel-related energy products that are subsidized, its total ERP remains negative. Nevertheless, the sector uses significant amount of electricity (about 15 percent of gross revenue or 27 percent of the total intermediate input costs).[12] And the electricity sector gains notably by the subsidy on natural gas. Simulations in a general equilibrium framework, where removal of energy subsidies would result in an increase in electricity prices, would likely show substantial reductions in the profit margins of construction.

Food and agriculture

Finally, consider the two sectors agriculture and food. Agriculture as a whole has a relatively low nominal protection (8.3 percent), and enjoys small energy subsidies. (For individual activities, however, there might be considerable differences.) Agriculture's ERP is relatively low, in part due to its low share of intermediate inputs in its cost structure – i.e., it is not taxed much through intermediate inputs. The partial ERP due to just tariffs and indirect taxes (9.7 percent) is close to the nominal rate of protection, Moreover, agriculture does not benefit directly to a significant degree from energy subsidies. (Again, electricity might be a factor.) An interesting case relevant to agriculture is that of fertilizers. Fertilizers have entered with very low tariffs, and now come in at zero percent. As seen above, due to tariffs on their tradable inputs they are dis-protected if one does not account for energy subsidies. But adding energy subsidies gives a final effective rate of protection of 120 percent. Agriculture is enjoying an unprotected price of fertilizers, the local production of which is subsidized by cheap energy. Eliminating the energy subsidies might increase the dependence on imported fertilizer, but unlikely to change much the price of the input to farmers (unlike electricity).

[12] The reader should perhaps be cautious of the figures for construction in the input-output matrix. Electricity costs for the construction sector are approximately equal to the sum of the costs on domestically produced cement, and iron and steel. Imported inputs represent 18 percent of intermediate input costs, but the matrix shows import duties of zero.

In contrast, the food and tobacco sector has several benefits from the current policy regime. It buys raw materials from agriculture (representing over a third of share in costs) at fairly competitive domestic prices, and benefits from tariffs on food products that are the highest nominal protection level across all sectors (25.8 percent). Thus, the sector enjoys a very high and positive (partial) ERP due to tariffs and output subsidies, reaching 481 percent. Note that our ERP includes food subsidies – mainly on wheat products – on the order of 9500 million LE – which represents 1.3 percent of total national value added (almost 2 percent of GDP according to Cassing et al., 2007).

Adding energy subsidies increases the protection (subsidy) to the food sector by even more; such subsidies represent more than a third of a total ERP for the food sector of well over 700 percent. One reason why the ERP on food is so high is that, after removing all interventions, its share of value added as a proportion of gross output in this sector would fall to a very low level (4.9 percent). This implies that the sector is very tradable and thus sensitive to tariff changes. This high level of protection for the food sector can indirectly benefit domestic agriculture in activities competitive with imports, because it demands more raw materials from the farm sector. But in the absence of the explicit and implicit subsidies to the food sector, this sector would likely contract, perhaps substantially, resulting in a higher level of imports. Production agriculture might lose domestic demand, but the impact on specific farm activities could be diverse and beyond the scope of this analysis.

What is missing in the ERP for agriculture is the cost of water. According to the recent study by Cassing et al. (2007. p. 91), "the marginal cost of water to farmers is zero, which has encouraged water-intensive crops, such as rice, banana, and sugar cane." (Other studies for Egypt have tried to incorporate the shadow price of water into an ERP, but this was very "preliminary" analysis.)

From the same source, we have for Egyptian agricultural products some nominal rates of assistance from direct price comparisons. The authors conclude that the direct disincentives in farming overall in the mid-2000s were not large. They concluded, however, that milk, cotton and rice continued to suffer significantly negative NRAs (-19.3%, -23.8, and -34.1%., respectively) In contrast, there were some significantly positive NRAs: maize (17.8%), wheat (6.0%) and sugar (7.2%). But to judge the practical effects of the trade regime on incentives at the product level one would have to examine effective rates of protection, which in turn requires estimates of the cost structure of each activities (not available in the Cassing et al. study).

Adding NTB equivalents to the ERP estimates by sector using the 2006/2007 I-O matrix

Tariff equivalents of NTBs by sector were not available for this study, and so to assess the impact of NTBs on ERPs at the sectoral level, the industry estimates from Dr. Hanafy were applied where appropriate. The six sectors to which we add to the applied tariffs the estimates of the ad valorem effects of NTBs are food and tobacco, textiles, fertilizers, non-metal industries, iron and steel, and "other industries" (which include motor vehicles). As mentioned in Section 5, the textiles, fertilizer, iron and steel sectors closely match the industries for which NTB estimates were available, and so these estimates were applied directly. We applied the average NTB tariff-equivalent of 9 percent (i.e., excluding the high-value-added goods with extremely high NTB

equivalent estimates) to food and tobacco, non-metal industries and other industries. It was considered that these sectors would enjoy the type of NTB protection characteristic of the manufacturing industries addressed in the Hanafy estimates; and for other tradables no NTB effects were applied. This is, of course, an assumption, which we consider not unreasonable. For the five non-tradable sectors NTB, tariff equivalents are not applicable.

The results for the ERPs by sector, including NTBs, are reported in Table 5b. The sixth column of the Table sums up the total ERP results. The reader should note that, for those sectors that maintain positive value-added without interventions, the ERPs due to trade policy (applied tariffs and NTBs) remain highly dispersed, as is the case found in Table 5a ignoring NTB effects. A notably result is that, as seen in the third column of figures in Table 5b, there are five sectors with negative value added without intervention, two more than in the case of the exclusion of NTB estimates in Table 5a. Electricity is a special case, heavily dependent on subsidized energy; and so is fuel oil (mazot). More relevant to trade policy makers are the other three sectors. The sector "other chemicals" appears with a negative value added, with and without the inclusion of NTB equivalents in the estimation of ERPs – this sector appears dependent on energy subsidies and to a lesser extent on tariff protection. Including the NTB estimates in the ERPs adds two sectors to the negative-value-added group: food and tobacco, and fertilizers, both with very high ERPs even excluding NTB effects. These are suspect sectors, in terms of their economic sustainability. In addition, outside of the fuel sectors, "iron and steel" and "other industries" enjoy even higher ERPs when including NTB effects, but a large percentage of their ERPs derives from energy subsidies (58 percent in the case of iron and steel, and 73 percent for other industries).

With respect to the estimates of ERPs in tables 5a and 5b, you ask what is the logic for a "lower" ERP when considering NTBs.

First, note that 5a reports ERPs as if NTBs did not exist and the only distortions to prices were from tariffs and energy subsidies. The ERP estimate is based on a hypothetical value added without these two distortions. Table 5b then considers the impact of NTBs as a third source of price distortions, and so the hypothetical value added (from which the ERP derives) without distortions is different than in 5a. As we note in the report, one result of the comparison of 5a and 5b is that there are five sectors with negative value added without the three types of intervention (tariff, energy subsidy and NTB), two more than in the case of the exclusion of NTB estimates in Table 5a. "Electricity is a special case, heavily dependent on subsidized energy; and so is fuel oil (mazot). More relevant to trade policy makers are the other three sectors. The sector "other chemicals" appears with a negative value added, with and without the inclusion of NTB equivalents in the estimation of ERPs – this sector appears dependent on energy subsidies and to a lesser extent on tariff protection. Including the NTB estimates in the ERPs adds two sectors to the negative-value-added group: food and tobacco, and fertilizers, both with very high ERPs even excluding NTB effects. These are suspect sectors, in terms of their economic sustainability."

The reader will note some declines in ERPa from 5a to 5b. In the case of food and tobacco and fertilizer, this change is not "real" but an artifact of the negative value added of the two sectors when considering NTBs. As noted above in the discussion of negative value added activities, ERP estimates can be negative due to the negative

denominator and a positive numerator. In this case, the true rate of protection is given by the absolute value of the ERPs, which we indicate by placing the estimates associated with this sector in parentheses.

But more intuitively interesting, is the case of agriculture. Agriculture's, ERP declines when considering NTBs relative to excluding NTBs, because the NTBs applied to intermediate inputs used by agriculture. NTBs act to "disprotect" agriculture.

By contrast, textiles are protected by NTBs. By excluding them from the estimates the ERP due to tariffs on textiles is negative – tariffs act as a net tax on the sector (-7.5%) – but energy subsidies offset the tariffs for a total ERP of 20.3% . But including NTBs in the estimates raises the ERP to 50%, meaning that NTBs provide a net protection. There is a NTB tariff-equivalent of 6.39% protecting textiles, without much NTB protection on the intermediate inputs used by the activity.

8. Concluding Discussion: The Unexpectedly High ERP Dispersion and Strong Effect of Energy Subsidies

This study has addressed four themes. First, it has compared for several selected disaggregated industries current ERP estimates derived from tariff schedules with those of a decade ago when at the initial stages of trade reforms. Second, it has presented recent effective rates of protection measure across the Egyptian economy using 23 aggregated sectors from available input-output matrix information. Third, it has incorporated and estimated the importance of energy subsidies in these ERP estimates, taking advantage of the fact that the input-output matrix has five disaggregated energy-related sectors for which we have subsidy estimates. Fourth, it has incorporated estimates of the tariff-equivalents of non-tariff barriers into ERP estimates. Key results are presented in Tables 4 and 5, and show that, broadly speaking, trade liberalization since the late-1990s has had a considerable impact in reducing protection of some industries. Nevertheless, some sectors, such as the food and tobacco sector, remain relatively hightly protected, due to tariff escalation and NTBs on the trade side, and due to energy subsidies on the input side. Energy subsidies are not formally sector specific but favor sectors that are energy intensive, and of particular note is the electricity sector.

Since the mid-1980s the Egyptian government has moved towards a reliance on private economic activity and trade openness, pursuing trade liberalization, elimination of quantitative restrictions on imports, and reduction in tariffs overall. Although Egypt is still a case of obvious tariff escalation, greater openness to trade appears to have reduced the levels of both nominal protection and effective protection in the selected industries for which we have information, although ERPs remain high for some, and even higher if NTB equivalent estimates are taken into account. On average, Table 4a shows that ERPs in the private sector have declined over the past the decade from 86 percent to 45 percent, and nominal rates of protection have declined generally across the board. (But these comparisons over time exclude NTBs, because NTBs estimate were not available for the late 1990s.)

The dispersion of ERPs across these selected industries, as measured by the standard deviation, fell between 1999 and 2009 from 192 to 57 percent. Nevertheless, certain industries increased their ERPs, because, although tariffs fell on the final product, they

fell even more on inputs. The textile group (except garments) is a case in point, where tariffs fell from 36% to 30%, between 1999 and 2009, but raw materials decline significantly, some to 5% by 2009. ERP on textiles rose from 84% to 229% Consumer benefited, certainly, but returns to domestic value added in the industry increases by 145 percentage points.

Turning to the 23 aggregated sectors making up the Egyptian economy, we find that the average tariff across lines is approximately 8 percent and the dispersion of nominal protection on tradables is not very high, the levels of tariffs ranging between zero on fertilizers to 25.8 percent on food. The sectors with the relatively highest tariffs are food and tobacco (not production agriculture), textiles, aluminum products, other industries and non-metal industries, in that order. But there is an unexpectedly high dispersion of ERPs relative to what one would expect looking at only applied tariffs. Despite the relatively low dispersion of nominal tariffs, the dispersion of effective rates of protection is wide, from high positive to high negatives. Even excluding NTBs, the standard deviation of total ERPs is 373 percent in comparison to an average level of 190 percent. The bulk of the average ERPs and their dispersion derives not from energy subsidies but from the tariffs and output subsidies. The average ERP due to energy subsidies over these 20 sectors is 53 percent with a standard deviation of 82 percent. The estimates of the tariff equivalents of NTBs are also highly dispersed. And so the dispersion of ERPs is even greater if one adjusts for NTBs, as shown by comparing in Tables 5a and 5b.

A notable result of the ERP estimates by the sectors available from the 2006/2007 I-O matrix is that energy subsidies are very important. For example, in the absence of subsidies on natural gas electricity prices would have to rise. Transport and communications (non-tradables), while taxed indirectly through imported input use, enjoys a positive total ERP due to fuel subsidies. Sectors that are taxed on the trade policy side (especially due to tradable input use by non-tradable sectors) are compensated by energy subsidies, suggesting that energy pricing is part of a strategy to subsidize and promote certain industries and in effect offset the *dis*-protection or taxation that results from tariffs on intermediate inputs. As mentioned in the text, the case of the cement sector is notable because energy subsidies appear to almost exactly offset the negative impacts of tariffs and indirect taxes. The fertilizer sector is also notable because, using Table 5a, it has zero nominal tariffs on the product side (a benefit to agriculture) but ends up with a very high a positive total ERP due to energy subsidies.

Looking ahead

The only way to enssure similar effective rates of protection, even with moderate rates of nominal protection on final products, is to have uniform rates of nominal protection across all sectors, and the removal of non-tariff barriers. The current Egyptian tariff schedule shows obvious tariff escalation, and dispersion in ERPs.[13] In addition, it appears that some industries enjoy high protection from NTBs. The study helps reveal which sectors and industries are "suspect", in that their sustainability is more dependent on policy discretion rather than their economic competitiveness. The pros and cons of benefiting these suspect industries are important policy questions, which could be pursued in the future. Moreover, the NTB estimates used in this study derive from comparing domestic and border prices, and so another question of interest regards the mechanism through which NTBs operate.

The advantages of lower level of nominal protection are that, by promoting competition they promote higher productivity, and that lower protection reduces the implicit tax on export sectors that derives from restrictions on imports. The advantage of uniform and relatively low tariffs – and the elimination of NTBs – is to guard against capricious and distorting differences in effective protection rates across industries. In addition, in terms of political economic pressures, the transparency of tariff uniformity and no NTBs makes clear when some industries attempt to turn the tariff schedule and other import restriction in their favor.

Energy subsidies complicate the Egyptian case considerably by creating additional advantages to some sectors relative to others. In fact, as the analysis shows, some sectors can be harmed by the direct effects of the tariff (and NTB) regime, but wind up benefiting due to energy subsidies on the input side. Not only do energy subsidies distort the incentive framework, they represent a high fiscal cost.

The transition to a continuous reduction in energy subsidies could raise political economy questions beyond this study, but should be part of the policy debate. Like food subsidies, energy subsidies tend to become institutionalized and their removal faces political resistance. Some countries, such as Indonesia, have implemented gradual reductions in energy subsidies accompanied by targeted compensation schemes, facilitating the transition.

[13] Egypt does have uniformity in the pattern of escalation across sectors (2-10-20-30 percent).

References

Abouleinein, S., H. El-Laithy and H. Kheir-El-Din. 2009 The impact of phasing out subsidies of petroleum energy products in Egypt. Egyptian Center for Economic Studies (ECES), Working Paper No. 145 (April).

Bouët, A., Y. Decreux, L. Fontagné, S. Jean, and D. Laborde. A consistent, ad-valorem equivalent measure of applied protection across the world: The MAcMap-HS6 database." CEPII Working paper No 2004–22, December (updated September 2005), Paris.

CAPMAS, Central Agency for Public Mobilization and Statistics, Cairo: http://www.msrintranet.capmas.gov.eg/pls/fdl/tst12e?action=1&lname=

Cassing, J., F. El Hamidi, A. El Mahdi, I. M. Ahmed, O. Salman, and N. Al Iskandarani, "Industry-Level Analysis," Annex III of The Economic Analysis of Tariff Reform in Egypt. Nathan Associates report for Development Economic Policy Reform Analysis Project (DEPRA), prepared for the Ministries of Economy and Foreign Trade and of Finance, submitted to USAID Economic Growth/Sector Policy, Cairo, Egypt. October 2000.

Corden, M. 1971. The Theory of Protection. Clarendon Press, Oxford.

Ghoneim, A. F. 2005. Promoting Competitive Markets in Developing Economies: The Case of Egypt. **http://idl-bnc.idrc.ca/dspace/handle/123456789/35100**

Lederman, D. 2007. Trade reforms without increases in the propensity to trade: Dissecting Egypt's non-fuel merchandise trade and policies. World Bank, working paper.

Sampson, G. 1974. "On factor substitution and effective tariff rates." *The Review of Economic Studies,* v. 41, n. 2 (April): 293-296.

Sampson, G.P. and A.J. Yeats. 1979. "On the use of Belgium-Netherlands coefficients for effective protection analysis." *Oxford Economic Papers,* New Series, v. 31, n. 3 (November): 496-507

Vousen, N. 1990. The Economics of Trade Protection. Cambridge University Press.

World Bank. 2009. Transforming Egypt: A Development Policy Review. Draft.

Tables

Table 1. Highest tariffs at the HS six-digit level for Egypt 2009

HS code	Number of products	Average tariff (%)	Item description
220410	1	3000.0	Sparkling wine of fresh grapes
220510	1	3000.0	Vermouth and other wine of fresh grapes, flavoured with plants or aromatic substances, in containers of <= 2 l
220590	1	3000.0	Vermouth and other wine of fresh grapes, flavoured with plants or aromatic substances, in containers of > 2 l
220600	1	3000.0	Cider, perry, mead and other fermented beverages and mixtures of fermented beverages and non-alcoholic beverages, n.e.s. (excl. beer, wine or fresh grapes, grape must, vermouth and other wine of fresh grapes flavoured with plants or aromatic substances)
220820	1	3000.0	Spirits obtained by distilling grape wine or grape marc
220830	1	3000.0	Whiskies
220840	1	3000.0	Rum and other spirits obtained by distilling fermented sugar-cane products
220850	1	3000.0	Gin and Geneva
220860	1	3000.0	Vodka
220870	1	3000.0	Liqueurs and cordials
220421	1	1800.0	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of <= 2 l (excl. sparkling wine)
220429	1	1800.0	Wine of fresh grapes, incl. fortified wines, and grape must whose fermentation has been arrested by the addition of alcohol, in containers of > 2 l (excl. sparkling wine)
220890	2	1515.0	Ethyl alcohol of an alcoholic strength of < 80% vol, not denatured; spirits and other spirituous beverages (excl. compound alcoholic preparations of a kind used for the manufacture of beverages, spirits obtained by distilling grape wine or grape marc, whiskies, rum and other spirits obtained by distilling fermented sugar-cane products, gin, geneva, vodka, liqueurs and cordials)
330210	2	1502.5	Mixtures of odoriferous substances and mixtures, incl. alcoholic solutions, with a basis of one or more of these substances, of a kind used in the food and drink industries; other preparations based on odoriferous substances, of a kind used for the manufacture of beverages
220300	1	1200.0	Beer made from malt

210690	3	1001.7	Food preparations, n.e.s.
220430	1	600.0	Grape must, of an actual alcoholic strength of > 0,5% vol (excl. grape must whose fermentation has been arrested by the addition of alcohol)
871610	1	135.0	Trailers and semi-trailers of the caravan type, for housing or camping
870324	3	61.7	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 3.000 cm³ (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870333	3	61.7	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 2.500 cm³ (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870323	4	56.3	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity > 1.500 cm³ but <= 3.000 cm³ (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870332	4	56.3	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity > 1.500 cm³ but <= 2.500 cm³ (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870390	4	56.3	Motor cars and other vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with engines other than spark-ignition internal combustion reciprocating piston engine "diesel or semi-diesel engine" (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)
870210	1	40.0	Motor vehicles for the transport of >= 10 persons, incl. driver, with compression-ignition internal combustion piston engine "diesel or semi-diesel engine"
870290	1	40.0	Motor vehicles for the transport of >= 10 persons, incl. driver, not with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", of a cylinder capacity of > 2.500 cm³, new
870321	1	40.0	Motor cars and other motor vehicles principally designed for the transport of persons, incl. station wagons and racing cars, with spark-ignition internal combustion reciprocating piston engine of a cylinder capacity <= 1.000 cm³ (excl. vehicles for the transport of persons on snow and other specially designed vehicles of subheading 8703.10)

Table 2. Value added at factor cost and market prices for five energy sectors, current millions LE, 2006/2007.

Energy sector	Gross value added at factor costs (includes subsidies, less taxes and import duties)	Gross value added at market prices (revenue from sales to buyers less intermediate input costs)	Subsidies	Subsidies as percentage of value added at factor costs
NATURAL GAS	64034	58682	6282	9.8%
FUEL OIL (MAZOT)	4394	1723	2937	66.8%
GAS OIL (SOLAR)	14032	2393	12016	85.6%
LPG	6771	427	6679	98.6%
GASOLINE	4328	1643	2796	64.6%

Source: 23 sector input-output matrix supplied by the World Bank Cairo office. Note that the first column represents net revenues to the industry and what is important at the firm level. The firm sells the product at a market price, receives a subsidy and pays indirect taxes and import duties on any imported intermediate inputs, and then pays for intermediate input costs. This value added at factor costs is what is available to pay for labor and returns to capital and other sector-specific resources. Gross value added at market prices is value added at factor costs less subsidies paid to the industry plus indirect taxes and import duties paid by the industry.

Table 3. Ad valorem subsidy adjustments to input costs for five energy products, based on current prices and actual domestic costs.

Energy product	Percentage increases in current prices of energy products to adjust to actual domestic costs	Corresponding ad valorem subsidy rate in percentage terms (S_I)
Natural gas	80.8	44.7
Mazot (fuel oil)	106.4	51.6
Solar (diesel oil)	206.7	67.4
LPG	1320	93.0
Gasoline	86.3	46.3

Source: Rates in the first column (δ) from Abouleinein, El-Laithy and Kheir-El-Din (2009); rates in the second column (S_i) author's calculations: $S_i = \delta/(1+\delta)$.

Table 4a. Estimates of Effective Rates of Protection for selected industries, 2009 and 1998 (only tariffs, excluding NTBs and subsidies).

ISIC code	Sector name	Private industries			Public industries		
		ERP 2009	ERP 1998	Change	ERP 2009	ERP 1998	Change
1711	Spinning, weaving & finishing textiles	15.7%	45.6%	-29.9%	16.3%	46.6%	-30.4%
1721	Textile products except garments	228.8%	83.5%	145.4%	na	na	na
1722	Manufacture of carpets & rugs	91.6%	63.7%	28.0%	na	175.7%	-769.1%
2102	Manufacture of containers, boxes of paper & paper boards	242.4%	-11083.0%	11325.4%	na	529.3%	-386.9%
2101	Manufacture of pulp, paper & paper board articles	21.1%	40.4%	-19.4%	28.9%	59.9%	-31.0%
2412	Manufacture of fertilizers & pesticides	-0.4%	20.7%	-21.1%	-2.0%	31.2%	-33.2%
2423	Manufacture of drugs & medicines	5.9%	6.1%	-0.3%	6.1%	5.8%	0.3%
2424	Manufacture if soap, perfume & cosmetics	76.7%	58.4%	18.3%	-1224.9%	385.0%	-1610.0%
2511	Tire & tube industries	98.0%	849.2%	-751.2%	37.5%	111.0%	-73.5%
2610	Manufacture of glass & glass products	58.2%	38.0%	20.2%	212.1%	72.0%	140.1%
2694	Manufacture of cement, lime & plaster	-1.6%	31.9%	-33.5%	-1.0%	29.6%	-30.6%
2710	Iron & steel basic industries	23.3%	31.4%	-8.1%	21.3%	29.1%	-7.8%
2720	Non-ferrous metal basic industries	17.9%	27.7%	-9.8%	15.5%	23.6%	-8.1%
2893	Manufacture of cutlery, hand tools & general hardware	4.6%	34.0%	-29.3%	na	34.0%	-29.4%
2921	Manufacture of agricultural machinery and equipment	4.9%	10.6%	-5.7%	na	15.5%	-10.8%
3110	Manufacture of electrical industrial machinery & apparatus	4.5%	25.7%	-21.2%	na	na	na
2930	Manufacture of electrical appliances & housewares	78.8%	83.1%	-4.3%	na	193.4%	444.7%
3410	Manufacture of motor vehicles	15.5%	57.9%	-42.4%	35.6%	218.5%	-182.9%
3811	Manufacture of jewelry & related articles	65.8%	32.6%	33.2%	na	na	na
	Average	45.0%*	85.6%*		37.0%	122.5%	
	Standard deviation	71.7%*	191.8%*		63.1%	144.8%	

Source : Authors calculations from WTO Integrated database of HS6 tariffs (2009) and information in Al Iskandarani for costs of importables as share of total output, and tariffs 1998. Note that na corresponds to industries not appearing as public sector in CAPMAS sources. Note that six public industries have been eliminated by 2007/2008. Note, */For the private sector, statistics exclude the group 2102 (container, boxes). If included, the average and the standard deviation of ERPs for private industries in 1998 would be -502 and 2569 percent, respectively. For the public sector the statistics exclude 2424 (soap). If include the average and standard deviation would be -77.7 and 385.2 percent, respectively.

Table 4b. Estimates of Effective Rates of Protection for selected industries, 2009 (applied tariffs and tariff equivalent NTBs).

ISIC code	Sector name	ERP 2009	
		Private	Public
1711	Spinning, weaving & finishing textiles	16.4%	-167.5%
1721	Textile products except garments	9988.5%	na
1722	Manufacture of carpets & rugs	na	na
2102	Manufacture of containers, boxes of paper & paper boards	na	na
2101	Manufacture of pulp, paper & paper board articles	66.6%	102.9%
2412	Manufacture of fertilizers & pesticides	17.3%	22.7%
2423	Manufacture of drugs & medicines	7.2%	6.4%
2424	Manufacture if soap, perfume & cosmetics	981.1%	-180.4%
2511	Tire & tube industries	-4647.9%	141.1%
2610	Manufacture of glass & glass products	68.4%	214.1%
2694	Manufacture of cement, lime & plaster	-1.4%	-7.1%
2710	Iron & steel basic industries	29.4%	27.8%
2720	Non-ferrous metal basic industries	na	na
2893	Manufacture of cutlery, hand tools & general hardware	34.2%	na
2921	Manufacture of agricultural machinery and equipment	11.9%	na
3110	Manufacture of electrical industrial machinery & apparatus	15.7%	na
2930	Manufacture of electrical appliances & housewares	100.6%	na
3410	Manufacture of motor vehicles	18945.7%	-179.3%
3811	Manufacture of jewelry & related articles	216.9%	na
	Average	1527.5%	-1.9%
	Standard deviation	5254.1%	137.6%

Source : Authors calculations from WTO Integrated database of HS6 tariffs (2009) and information in Al Iskandarani for costs of importables as share of total output, and tariffs 1998. Tariff equivalents for NTBs were estimated by Dr. Khaled Hanafy, details in Annex 3. Note that na corresponds to industries not appearing as public sector in CAPMAS sources. Note that six public industries have been eliminated by 2007/2008.

Table 5a. ERPs, 23 Egyptian sectors, tariffs 2009, I-O matrix 2006/2007, with output subsidies less indirect taxes, and energy subsidies (without NTBs).

Sector from input-output matrix 2006/2007	Average sector tariff	Estimated percentage value added relative to gross output without intervention	ERP due directly to tariffs and output subsidies	Addition to ERP due to energy subsidies	Total ERP	Percent of ERP due to energy subsidies
AGRICULTURE	8.30	77.8%	9.7%	0.4%	10.0%	3.49%
CRUDE OIL& EXTRACTIVE	3.39	95.7%	1.7%	0.0%	1.7%	0.00%
NATURAL GAS	5.00	98.1%	14.6%	0.0%	14.6%	0.00%
FOOD & TOBACCO	25.76	4.9%	481.0%	262.4%	743.4%	35.30%
TEXTILE	15.12	21.3%	-7.5%	27.8%	20.3%	137.02%
FERTILIZERS	0.00	11.3%	-44.7%	263.7%	219.0%	120.43%
OTHER CHEMICAL	8.41	-12.2%	(8.6%)	(243.2%)	(251.7%)	96.60%
FUEL OIL (MAZOT)	5.00	-2.8%	(467.0%)	(303.4%)	(770.4%)	39.39%
GAS OIL (SOLAR)	5.00	10.7%	769.6%	72.0%	841.6%	8.56%
LPG	5.00	14.6%	1409.7%	0.0%	1409.7%	0.00%
GASOLINE	5.00	15.7%	191.1%	0.0%	191.1%	0.00%
CEMENT	2.38	47.9%	-35.1%	33.5%	-1.6%	-
NON METAL INDUSTRIES	10.14	42.2%	-25.7%	28.8%	3.1%	927.79%
IRON & STEEL	7.71	20.6%	12.3%	57.1%	69.4%	82.25%
ALUMINUM & PRODUCTS	12.83	25.0%	29.7%	28.6%	58.3%	49.03%
METAL INDUSTRIES	7.70	45.8%	2.2%	7.4%	9.7%	77.00%
ENGINEERING & MACHINERY	5.12	32.7%	-10.7%	17.6%	6.9%	255.29%
OTHER INDUSTRIES	11.95	10.6%	8.0%	168.6%	176.6%	95.49%
CONSTRUCTION	0.00	49.8%	-15.8%	0.0%	-15.7%	-0.30%
ELECTRICITY	0.00	-25.3%	(29.2%)	(223.1%)	(193.9%)	115.08%
TRANSPORT & COMMUNICATION	0.00	43.7%	-11.1%	63.2%	52.1%	121.28%
HOTELS & RESTAURANTS	0.00	30.9%	-13.4%	8.7%	-4.7%	-183.21%
OTHER SERVICES	0.00	67.1%	-9.8%	12.5%	2.8%	451.76%
average	7.99*	31.57%	137.79%	52.62%	190.42%	114.80%
Standard deviation	5.8	31.7%	360.83%	82.09%	373.52%	234.14%

Source: Authors calculations based on 2006/2007 input-output matrix for Egypt. Note that value added is at factor costs (including subsidies less indirect taxes). The last column represents the ratio of the fourth column of figures relative to the fifth. Note that the standard deviation of the average tariffs only includes tradables. */Note that the average applied tariff is across tradable sectors only. Averages of ERPs in last 4 columns only include sectors for which VA is positive without intervention.

Table 5b. ERPs, 23 Egyptian sectors, tariffs 2009, I-O matrix 2006/2007, with output subsidies less indirect taxes, NTB effects, and energy subsidies.

Sector from input-output matrix 2006/2007	Average sector tariff	Ad valorem NTB	Estimated percentage value added relative to gross output without intervention	ERP due directly to tariffs and output subsidies	Addition to ERP due to energy subsidies	Total ERP	Percent of ERP due to energy subsidies
AGRICULTURE	8.30	0.00	78.3%	9.0%	0.3%	9.3%	3.7%
CRUDE OIL& EXTRACTIVE	3.39	0.00	95.7%	1.7%	0.0%	1.7%	0.0%
NATURAL GAS	5.00	0.00	98.1%	14.6%	0.0%	14.6%	0.0%
FOOD & TOBACCO	25.76	9.00	-1.5%	(-2130.3%)	(-917.1%)	(-3047.4%)	30.1%
TEXTILE	15.12	6.39	18.1%	15.3%	34.7%	50.0%	69.5%
FERTILIZERS	0.00	15.91	-2.8%	(-361.4%)	(-1246.9%)	(-1608.3%)	77.5%
OTHER CHEMICAL	8.41	0.00	-11.9%	(-6.4%)	(-248.8%)	(-255.3%)	97.5%
FUEL OIL (MAZOT)	5.00	0.00	-2.8%	(-468.5%)	(-304.8%)	(-773.3%)	39.4%
GAS OIL (SOLAR)	5.00	0.00	10.7%	768.7%	72.0%	840.6%	8.6%
LPG	5.00	0.00	14.8%	1394.9%	0.0%	1394.9%	0.0%
GASOLINE	5.00	0.00	15.7%	190.1%	0.0%	190.1%	0.0%
CEMENT	2.38	0.00	47.9%	-35.1%	33.5%	-1.6%	-2076.9%
NON METAL INDUSTRIES	10.14	9.00	38.1%	-10.9%	34.6%	23.6%	146.2%
IRON & STEEL	7.71	8.18	15.9%	56.7%	79.6%	136.3%	58.4%
ALUMINUM & PRODUCTS	12.83	0.00	26.2%	23.5%	27.2%	50.8%	53.6%
METAL INDUSTRIES	7.70	0.00	46.9%	-0.2%	7.3%	7.1%	102.7%
ENGINEERING & MACHINERY	5.12	0.00	33.6%	-13.1%	17.1%	4.0%	424.3%
OTHER INDUSTRIES	11.95	9.00	5.2%	137.0%	370.2%	507.2%	73.0%
CONSTRUCTION	0.00	0.00	50.6%	-17.1%	0.0%	-17.0%	-0.3%
ELECTRICITY	0.00	0.00	-25.1%	30.2%	(-224.8%)	(-194.6%)	115.5%
TRANSPORT & COMMUNICATION	0.00	0.00	43.7%	-11.1%	63.2%	52.0%	121.4%
HOTELS & RESTAURANTS	0.00	0.00	31.0%	-13.5%	8.7%	-4.9%	-177.6%
OTHER SERVICES	0.00	0.00	67.2%	-9.9%	12.5%	2.6%	485.5%
average	7.99*	2.50	28.5%	-19.4%	-99.7%	-119.1%	-37.9%
Standard deviation	5.8	4.57	32.80%	583.06%	340.57%	832.57%	469.52%

Source: Authors calculations based on 2006/2007 input-output matrix for Egypt. NTB tariff equivalents are based on the estimates of Dr. Khaled Hanafy (see Annex 3 for details). Note that value added is at factor costs (including subsidies less indirect taxes). The last column represents the ratio of the fifth column of figures relative to the sixth. Note that the standard deviation of the average tariffs only includes tradables. Note that the average applied tariff is across tradable sectors only. Average of ERPs in last 4 columns only include sectors for which VA is positive without intervention.

Table 6. Tariffs categories used for constructing average sector tariffs for ERP estimation of industries from input-output matrix

	Sector name	HS code 2, 4 or 6 digit	Notes
1	AGRICULTURE	01-05 Animal & Animal Products, 06-15 Vegetable Products	
2	CRUDE OIL& EXTRACTIVE	All HS 27 except natural gas, fuel and gas oils, LPG, gasoline (light oils), see sectors below	
3	NATURAL GAS	271111	Natural gas, liquefied
4	FOOD & TOBACCO	16-23 Foodstuffs (excluding tobacco)	Tobacco has specific duties, and note that alcohol beverages are excluded. See Table 1 above.
5	TEXTILE	50-63 Textiles	
6	FERTILIZERS	31 FERTILIZERS	28-38 Chemicals & Allied Industries
7	OTHER CHEMICAL	28 through 38 except 31	28-38 Chemicals & Allied Industries
8	FUEL OIL (MAZOT)	27101910 --- Partly refined or distilled (trade-crude) benzine , Diesel oil, fuel oil (mazot),transformers oil	
9	GAS OIL (SOLAR)	271011 or 270900	Light oils and preparations, of petroleum or bituminous minerals which >= 90% by volume "incl. losses" distil at 210°C "ASTM D 86 method"
10	LPG	271112	Propane, liquefied
11	GASOLINE	271011	Light oils and preparations, of petroleum or bituminous minerals which >= 90% by volume "incl. losses" distil at 210°C "ASTM D 86 method"
12	CEMENT	25 SALT, SULPHUR, EARTH & STONE, LIME & CEMENT, 2521 limestone flux, lmstn & oth cal sto usd mfr lime, cement, 2523 portland cement, aluminous cement, slag cement etc, 252310 Cement Clinkers, 252321 White Cement (Portland cement), 252329 Other Portland Cement, 252330 Aluminous Cement, 252390 Other Hydraulic Cements	There are only few cements with tariff high than 2%.
13	NON METAL INDUSTRIES	39-40 Plastics / Rubbers , 41-43 Raw Hides, Skins, Leather, & Furs, 44-49 Wood & Wood Products, 64-67 Footwear / Headgear, 68-71 Stone / Glass , 86-89 Transportation	This is consider a miscellaneous grouping.
14	IRON & STEEL	72 IRON & STEEL 73 RTICLES OF IRON OR STEEL	72-83 Metals
15	ALUMINUM & PRODUCTS	76 ALUMINUM & ARTICLES THEREOF	72-83 Metals
16	METAL INDUSTRIES	74, 75, 77-83	72-83 Metals

17	ENGINEERING & MACHINERY	84-85 Machinery / Electrical	
18	OTHER INDUSTRIES	90-97 Miscellaneous	Another miscellaneous grouping.
19	CONSTRUCTION	non tradable	Zero tariffs for non tradables
20	ELECTRICITY	non tradable	
21	TRANSPORT & COMMUNICATION	non tradable	
22	HOTELS & RESTAURANTS	non tradable	
23	OTHER SERVICES	non tradable	

Source: Egypt's 2009 tariff schedule reported to WTO and found in the Integrate Data Base, and groupings using HS6 listings in http://www.foreign-trade.com/reference/hscode.htm

Annex 1: Additional Tables

Annex Table 1. Tariff profile for selected industries at the HS 6-digit level from WTO used in calculation of ERPs for 2009, and those from late 1990s used by Al Iskandarani , by ISIC sector and tradable inputs.

		Tariffs associated with products and tradable inputs 2009 and those used by Al Iskandarani (2001)		**Share of input in cost of tradable inputs**	
ISIC r.3.1	Sector name and import-competing activity	HS6 2009 (WTO)	Al Iskandarani		**Notes on product and tradable input correspondence to HS 2, 4 and 6-digit Egyptian tariff lines at 2009 levels**
1711	**Spinning, weaving & finishing textiles**	0.10	0.35		HS 51 to 56, including only the woven (finished) products
	Broadwoven fabric mills & fabric finishing plants	0.05	0.39	0.1	HS 51 to 56, but excluding the woven (finished) products
	Yarn mills & finishing of textiles, n.e.c.	0.10	0.35	0.5	HS 51 to 56, including only the woven (finished) products
	Textile goods, n.e.c.	0.05	0.28	0.3	HS 51 to 56, but excluding the woven (finished) products
	Miscellaneous plastic products, n.e.c.	0.05	0.11	0.1	HS 39, primary forms, and HS 54, threads and yarns (excluding woven products)
1721	**Textile products except garments (only private)**	0.30	0.36		HS 63 group non-apparel textils
	Yarn mills & finishing of textiles, n.e.c.	0.10	0.35	0.3	HS 51 to 56, including only the woven (finished) products
	Textile machinery	0.00	0.07	0.15	see HS 8445 to 8449
	Chemicals & chemicals preparations, n.e.c.	0.02	0.2	0.15	HS 32, items with dyes for fabrics
	Fabricated textile products, n.e.c.	0.05	0.39	0.15	HS 51 to 56, but excluding the woven (finished) products
	Nonwoven fabrics	0.05	0.28	0.1	HS 51 to 56, but excluding the woven (finished) products

	Thread mills	0.05	0.05	0.1	HS 51 to 56, but excluding the woven (finished) products
1722	**Manufacture of carpets & rugs**	0.30	0.40		HS 57s
	Yarn mills & finishing of textiles, n.e.c.	0.00	0.35	0.6	HS 8445 to 8449
	Industrial inorganic & organic chemicals	0.02	0.11	0.2	HS 28s and 29s
	Synthetic rubber (?)	0.02	0.05		HS 400291 400299
	Textile machinery	0.00	0.07	0.05	HS 8445 to 8449
	Drawings	0.00	0.2	0.15	HS 8445, drawing equipment
2102	**Manufacture of containers, boxes of paper & paper boards**	0.20	0.34		HS 481910
	Paper & paper mills	0.02	0.05	0.8	HS 8439 and 4700s
	Plastics materials & resins	0.05	0.07	0.05	HS 39, esp. 3911
	Printing ink	0.10	0.2	0.05	HS 3215
	Adhesives & sealants	0.10	0.2	0.05	HS 3506
	Wood products	0.02	0.05	0.05	HS 4700s
2101	**Manufacture of pulp, paper & paper board articles**	0.10	0.17		see HS 48s
	Paper & paperboard mills	0.02	0.05	*0.5*	see HS 8439
	Die-cut paper & paperboard & cardboard	0.10	0.05	*0.2*	see HS 4802
	Pulp mills	0.02	0.05	*0.1*	see HS 8439
	Printing ink	0.10	0.2	*0.1*	see HS 3215
	Scrap	0.02	0.05	*0.1*	see HS 4706
2412	**Manufacture of fertilizers & pesticides**	0.00	0.18		see HS 3100s
	Chemicals & fertilizers minerals	0.00	0.05	0.5	see hs 31s
	Industrial inorganic & organic chemicals	0.02	0.11	0.4	see HS 28 and 29s
	Bags, except textile	0.10	0.2	0.1	see HS 3923
2423	**Manufacture of drugs & medicines**	0.05	0.08		see HS 3003 and 3004
	Industrial inorganic & organic chemicals	0.02	0.07	*0.6*	see HS 28 and 29s
	Packing: other than plastics	0.10	0.15	*0.2*	see HS 4804
	Drugs	0.05	0.07	*0.1*	see HS 3003 and 3004
	Miscellaneous plastics products, n.e.c.	0.05	0.11	*0.1*	see HS 3920s
2424	**Manufacture if soap, perfume & cosmetics**	0.30	0.31		see 3401s and 33s

	Industrial inorganic & organic chemicals	0.02	0.11	*0.4*	see HS 28 and 29s
	Miscellaneous plastics products, n.e.c.	0.05	0.11	*0.3*	see HS 3920s
	Paperboard containers & boxes	0.20	0.33	*0.15*	see HS 481910
	Surface active agents	0.02	0.1	*0.05*	see HS 3402s
	Petroleum refining	0.02	0.1	*0.05*	see HS 2712
	Toilet preparation	0.05	0.1	*0.05*	see HS 3301
2511	**Tire & tube industries**	0.10	0.29		4011s, note 10% for trucks, 20% cars, 5% aircraft, construction equipment and ag machines
	Tire cord & fabrics	0.05	0.2	0.3	see HS 5902s
	Synthetic rubber	0.02	0.1	0.3	see HS 4002s
	Industrial inorganic & organic chemicals	0.02	0.11	0.2	see HS 28 and 29s
	Fabricated rubber products, n.e.c.	0.02	0.2	0.1	see HS 4003 and 4004
	Carbon black	0.02	0.1	0.05	see HS 280300
	Miscellaneous fabricated wire products	0.05	0.1	0.05	see HS 7217s
2610	**Manufacture of glass & glass products**	0.30	0.27		see HS 7003 to 7013, there are some consumer wares for 10% and 20%
	Industrial inorganic & organic chemicals	0.02	0.11	*0.3*	see HS 28 and 29s
	Glass & glass products, except containers	0.05	0.2	*0.3*	see HS 7001 and 7002
	Special dies & tools & machine tool accessories	0.02	0.07	*0.2*	see HS 8475, machines for glass
	Paperboard containers & boxes	0.20	0.33	*0.1*	see HS 481910
	Miscellaneous plastics products, n.e.c.	0.05	0.11	*0.1*	see HS 3920s
2694	**Manufacture of cement, lime & plaster**	0.02	0.20		HS 2523 portland cement, aluminous cement, slag cement etc
	Minerals, ground or treated	0.02	0.1	*0.45*	see HS 2521
	Cement, hydraulic	0.10	0.1	*0.4*	see HS 2522s
	Industrial inorganic & organic chemicals	0.02	0.11	*0.1*	see HS 28 and 29s
	Bags except textile	0.10	0.3	*0.05*	see HS 3923
2710	**Iron & steel basic industries**	0.10	0.16		
	Primary metal products, n.e.c.	0.02	0.1	*0.6*	see HS 7201
	Primary nonferrous products, n.e.c.	0.02	0.03	*0.15*	see 74 to 80, basic metal goods
	Iron & steel forging	0.05	0.05	*0.1*	see 8462s

	Screw machine products, bolts, etc.	0.10	0.1	*0.1*	see HS 7318s
	Special dies & tools & machine tool accessories	0.05	0.07	*0.05*	see 8462s
2720	**Non-ferrous metal basic industries**	0.10	0.24		see 74 to 80 groups, finished products
	Primary metal products, n.e.c.	0.02	0.05	0.3	see 74 to 80 groups, basic metals
	Primary aluminium	0.10	0.05	0.3	see HS 7601 and 7603
	Machine tools, metal forming types	0.05	0.08	0.2	see HS 8460s
	Scrap	0.00	0.05	0.1	see HS 7204
	Industrial inorganic & organic chemicals	0.02	0.11	0.05	see HS 28 and 29s
2893	**Manufacture of cutlery, handtools & general hardware**	0.05	0.20		see HS 8202, note that for cutlery and consumer hardward (clippers, etc.) tariffs are 30%
	Iron & steel foundries	0.05	0.05	*0.3*	see 8462s
	Aluminium rolling & drawing	0.05	0.05	*0.3*	see 8454, 8455
	Screw machine products, bolts, etc.	0.10	0.08	*0.15*	see 7318
	Metal stamping, n.e.c.	0.05	0.08	*0.1*	see 8462s
	Motors & generators	0.02	0.11	*0.1*	see 8501s, note that for some motors, tariffs are 30%
	Miscellaneous plastics products, n.e.c.	0.05	0.11	*0.05*	see HS 3920s
2921	**Manufature of agricultural machinery and equipment**	0.05	0.09		8433 see also between 8431 to 8436
	Iron & steel foundries	0.05	0.03	0.55	see 8462s
	Mechanical power transmission equipment	0.05	0.1	0.15	see 8483s
	Miscellaneous plastics products, n.e.c.	0.05	0.11	0.1	see HS 3920s
	Tires & inner tubes	0.05	0.29	0.1	see 4011s, tyres for agricultural equipment
	Farm machinery equipment	0.02	0.05	0.05	see 84s related to agriculture, e.g., 8432s
	Screw machine products	0.10	0.1	0.05	see 7318
3110	**Manufacture of electrical industrial machinery & apparatus**	0.05	0.19		see 85s, industrial is 2 and 5 and 10%, consumer goods 30%
	Miscellaneous plastics products, n.e.c.	0.05	0.11	0.3	see HS 3920s
	Non-ferrous wire drawing & insulating	0.05	0.3	0.3	see 8408s
	Other electrionic components	0.06	0.08	0.1	the average for HS 85
	Metal stamping n.e.c.	0.05	0.08	0.1	8455 to 8463
	Blast furnaces & steel mills	0.05	0.05	0.05	8456 to 8463

	Relays & industrial controls	0.10	0.05	0.05	see 8536s, note that for 853650 there are 5 items with tariffs between 0 and 20.
	Other electrionic components	0.06	0.08	0.05	the average for HS 85
	Plating & polishing	0.05	0.1	0.05	8456 to 8463
2930	**Manufacture of electrical appliances & housewares**	0.30	0.36		see 85s, industrial is 2 and 5 and 10%, consumer goods 30%
	Blast furnaces & steel mills	0.05	0.12	0.2	8456 to 8463
	Hardware n.e.c.	0.05	0.1	0.15	see HS 8202 for equipment.
	Miscellaneous plastics products, n.e.c.	0.05	0.11	0.1	see HS 3920s
	Motors & generators	0.02	0.05	0.1	see 8501s
	Plastics, materials, resins	0.05	0.07	0.1	see HS 39, esp. 3911
	Refrigeration & heating equipment	0.15	0.15	0.1	see 841430, there are 3 items from 5 to 30%, average 15
	Screw machine products, bolts, etc.	0.10	0.1	0.1	see 7318
	Wiring devices	0.05	0.3	0.1	see 85s, industrial is 2 and 5 and 10%, consumer goods 30%
	Paper board containers & boxes	0.20	0.33	0.05	see HS 481910
3410	**Manufacture of motor vehicles**	0.10	0.35		see hs 87s, note that there are 3 tariffs, 10%, 40% and 135%.
	Motor vehicle parts & accessories	0.03	0.15	0.4	average 8708 group
	Motor vehicles & passenger car bodies	0.05	0.3	0.15	8707
	Automotive stampings	0.05	0.08	0.1	8455 to 8463, especially 8462
	Internal combustion engines, n.e.c.	0.05	0.2	0.1	8407 group relevant to automobiles
	Miscellaneous plastics products, n.e.c.	0.05	0.11	0.05	see HS 3920s
	Refrigeration & heating equipment	0.05	0.15	0.05	841520
	Electric equipment for internal combustion engines	0.05	0.2	0.05	854430
	Paints & allied products	0.10	0.15	0.05	see 8208
	Tires & inner tubes	0.20	0.29	0.03	see 4011s, 5% for ag, 10 for buses and 20% for standard autos
	Automotive & apparel trimmings	0.03	0.15	0.02	average 8708 group
3811	**Manufacture of jewerly & related articles**	0.30	0.22		see 71s finished products, e.g., 7117
	Primary nonferrous metals, n.e.c.	0.06	0.1	0.7	average for 7101 to 7112

	Jewelers' materials & lapidary work	0.06	0.15	0.1	average for 7101 to 7113
	Rolling, drawing & extruding of cooper	0.02	0.15	0.1	8206 to 8209 group
	Fabricated metal products, n.e.c.	0.06	0.15	0.05	average for 7101 to 7113
	Chemicals	0.02	0.11	0.05	see HS 28 and 29s
2691	**Manufacture of pottery, china & earthenware (only public sector)**	0.3	0.3		see 6905 to 6913, ranges from 10 to 30%
	Industrial inorganic & organic chemicals	0.02	0.11	*0.4*	see HS 28 and 29s
	Lima & clay	0.02	0.1	*0.4*	HS 2507
	Metal stampings, n.e.c.	0.05	0.07	*0.1*	see 8462s
	Paperboard containers & boxes	0.2	0.33	*0.1*	see HS 481910

Annex Table 2. List of sectors from input-output matrices for Egypt

Industries included in 2006/2007 matrix used in this present study	Industries included in 2005 matrix used in Lederman (2005)
Agriculture	Agriculture - vegetables
Crude oil and extraction	Agriculture – animals
Natural gas	Cotton products
Food and tobacco	Mining and quarrying
Textiles	Food industry
Fertilizers	Beverages
Other chemicals	Tobacco
Fuel oil (mazot)	Textiles
Gas oil (diesel)	Wood
LPG	Paper
Gasoline	Print
Cement	Leather
Non-metal industry	Rubber
Iron and steel	Chemical industry
Aluminum and its products	Petroleum
Metal industry	Non-metal industry
Engineering and machinery	Metal industry
Other industries	Non-electrical machinery
Construction	Electrical machinery
Electricity	Transport machinery
Transportation and communications	Other industries
Hotels and restaurants (tourism)	
Other services	

Annex 2. Some details of the ERP algebra

The hypothetical value added for the industry – the value added which would otherwise prevail without any protections and subsidies whatsoever on the revenue or cost sides – can be written in terms of the observed cost share, a_{gi}, and the ad valorem protection rates. As noted in the text, the two cost shares are related:

$$a_{gi} = \frac{p_i x_{gi}(1+t_i)}{p_g y_g (1+t_g)(1+s_g)} = a_{gi}^H \frac{(1+t_i)}{(1+t_g)(1+s_g)} \Leftrightarrow a_{gi}^H = a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)$$

The hypothetical value added for industry g without protection and subsidies can then be written (with the superscript indicating the hypothetical):

$$VA_g^H = p_g y_g \left(1 - \sum_{i \in I_g} \frac{p_i x_i}{p_g y_g}\right) = R_g^H \left(1 - \sum_{i \in I_g} a_{gi}^H\right) = R_g^H \left(1 - \sum_{i \in I_g} a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)\right)$$

The calculation of the ERPs is facilitated by noting that the observed value added can be rewritten in term of these hypothetical cost shares:

$$VA_g = p_g y_g (1+t_g)(1+s_g)\left(1 - \sum_{i \in I_g} a_{gi}^H \left(\frac{1+t_i}{(1+t_g)(1+s_g)}\right)\right)$$

$$= p_g y_g \left[\left(1 - \sum_{i \in I_g} a_{gi}^H\right) + \left(t_g + (1+t_g)s_g - \sum_{i \in I_g} a_{gi}^H t_i\right)\right]$$

The ERP is then estimated as the percent difference of the observed value added from the hypothetical:

$$ERP_g = \frac{VA_g}{VA_g^H} - 1 = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}^H t_i}{(1 - \sum a_{gi}^H)} = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)t_i}{\left[1 - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{1+t_i}\right)\right]}$$

When adding input subsidies, the hypothetical cost shares are related to observed cost shares in the following manner:

$$a_{gi} = \frac{p_i x_{gi}(1+t_i)(1-S_i)}{p_g y_g (1+t_g)(1+s_g)} = a_{gi}^H \frac{(1+t_i)(1-S_i)}{(1+t_g)(1+s_g)} \Leftrightarrow a_{gi}^H = a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)$$

The hypothetical, border-price-equivalent value added – that is, without tariffs and all subsidies – would now be:

$$VA_g^H = p_g y_g \left(1 - \sum_{i \in I_g} \frac{p_i x_i}{p_g y_g}\right) = R_g^H \left(1 - \sum_{i \in I_g} a_{gi}^H\right) = R_g^H \left(1 - \sum_{i \in I_g} a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)\right)$$

Again the calculation of the ERPs is facilitated by noting that the currently observed value added (at factor costs, without deducting subsidies on outputs) can be rewritten in term of these hypothetical cost shares:

$$VA_g = p_g y_g (1+t_g)(1+s_g)\left(1-\sum_{i\in I_g} a_{gi}^H \left(\frac{(1+t_i)(1-S_i)}{(1+t_g)(1+s_g)}\right)\right)$$

$$= p_g y_g \left((1+t_g)(1+s_g) - \sum_{i\in I_g} a_{gi}^H (1+t_i) + \sum_{i\in I_g} a_{gi}^H S_i (1+t_i)\right)$$

$$= p_g y_g \left[\left(1-\sum_{i\in I_g} a_{gi}^H\right) + \left(\left(t_g + (1+t_g)s_g\right) - \sum_{i\in I_g} a_{gi}^H t_i\right) + \sum_{i\in I_g} a_{gi}^H S_i (1+t_i)\right]$$

But the hypothetical cost shares are not directly observable and so, as mentioned in the text, the practical formula for calculating the ERPs uses observed cost shares relative to gross revenue, adjusted by tariffs and subsidies:

$$ERP_g = \frac{\left(t_g + (1+t_g)s_g\right) - \sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)t_i}{\left[1-\sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)\right]} + \frac{\sum a_{gi}\left(\frac{S_i(1+t_g)}{(1-S_i)}\right)}{\left[1-\sum a_{gi}\left(\frac{(1+t_g)(1+s_g)}{(1+t_i)(1-S_i)}\right)\right]}$$

Annex 3. Measuring the ad valorem equivalent of NTBs for selected industries

The ad valorem equivalents of non-tariff barriers were estimated by Dr. Khalid Hanafy. This section discusses the NTB measures, deriving from a short report on NTBs submitted by Dr. Hanafy. The authors of this present report have made some slight editorial changes.

Unlike tariffs, the price effects of non-tariff barriers are usually unobservable directly and must be inferred. One straightforward method to estimate the effect of non-tariff barriers on domestic prices is to use an ad-valorem price wedge net of tariffs and transportation costs. The price-wedge method attributes to NTBs the differences between an observed domestic price of an imported good and the border price (CIF) of the good – differences unexplained by tariffs, transport costs, marketing margins, quality differences, etc. Ad-valorem price wedges for specific goods attributed to NTBs can then be used as to approximate NTBs for industries or economic sectors.

In practical terms the ad-valorem equivalent of NTBs, n, takes the difference between an observed domestic price, PD, (if retail, adjusted downward for marketing margins) and an observed border price, PW, (adjusted upwards for tariffs, t, and transport costs, k) and translates that difference into a percentage of the border price:

$$\frac{P_D - [P_W(1+t)+k]}{P_W} = n$$

It is important to point out that although the price wedge approach gives an estimate of the value of NTBs, it says nothing about the exact policies or policy instruments acting as NTBs nor does it reflect their respective contributions. Moreover, although a similar quality of domestic and imported commodities is a requirement in the price wedge approach, in practical application this assumption does not always hold. It is not always an easy or straightforward task to determine objectively whether the products being compared are of comparable quality. In theory, differences in quality between the domestic and imported products could lead to further price adjustments, but in practice for some products price-equivalent measures of quality cannot be accurately accounted for. In addition, unobservable but normal trading and transactions costs beyond transport costs may not be fully accounted for, which would lead to the price wedge overestimating the effects of NTBs.

Data Collection

The data required to calculate the price wedges were collected from various sources for the domestic market price of the imported good and its border price (CIF). In a few cases the border prices were unavailable. In such cases these were replaced by retail prices of the imported product in the country of origin.

For each industry representative products were chosen and the required analysis was performed. Where more than one product is available an average ad-valorem price gap was calculated for that industry as a whole.

The NTB price wedges were also adjust marketing margins when the domestic prices were observed at the retail level. In such cases, the marketing margin was either obtained from the importer, or roughly estimated. In the remaining cases, it was

considered unnecessary to take into account profit margins. There are two cases where the marketing margin is not applied in Annex Table 3:

The domestic price of the imported product used is not the retail price. This is the case in pharmaceutical products, where data was obtained from domestic pharmaceutical companies importing inputs directly. Thus the domestic price as shown in the Annex Table 3 is not the retail price. This also holds for the industrial machinery and other sectors, such as cement and iron.

The CIF price used was not available. Following some examples in the literature, the retail price in the country of origin was used instead. This yields an approximation that assumes that marketing margins in both cases are roughly equivalent, but that in the country of origin NTBs are zero (otherwise one would be computing the additional NTBs in Egypt).

Data collection involved several channels

Chamber of Commerce. Officials from the Chamber of Commerce were contacted and the issue of NTBs was discussed. The interviews covered the general conditions of importing and provided an overview of the most common NTBs present in Egypt.

Federations. Federations offered background on issues related to NTBs in the respective industries and provided data for the representative products.

Businessmen. Interviews and discussions with various businessmen in various fields enriched the study with insight regarding the nature and details of NTBs faced. Moreover, businessmen were able to provide the required price data. This was particularly constructive since the otherwise unobservable border prices were obtained. These businessmen varied from importers selling the imported product, or domestic producers importing specific inputs for use in their own production.

Practitioners. Practitioners were also resorted to for information on prices of the imported product as well as those of close Egyptian substitutes. They were able to provide insight and helpful information on the issue.

Market. The domestic market prices of several products, whether imported or domestic, were obtained from observation of the market itself. A survey of the available imported products was conducted as well as of the domestic product of almost identical quality. In some cases foreign prices of the imported product were obtained from online sources.

Results from interviews

Based on the interviews and discussions held with officials from the Chamber of Commerce, officials from federations, businessmen and practitioners, it was evident that some specific industries are protected to a greater extent than others from NTBs. In general, importers in Egypt face from the following NTBs:

> The imported products have to pass through the General Assembly for the Control of Exports and Imports. This is done to ensure that imported products meet the Egyptian standard specifications.

For activities with trade preferences, the importer has to document Country of Origin and the domestic component of the good.

Certificate of Origin. There must be a certificate of origin from the place of production of the imported goods.

Goods imported from China must meet the China Quality Certification. Anti-dumping duties. The aim is to abort the attempts of other countries to grant export subsidies to their producers.

Sales taxes. In some cases, products are exempted from customs duties but must pay sales tax.

Customs clearance.

The cosmetics, soap & perfume sector enjoys to a greater extent protection from NTBs. Before importing the products, each type or model inside each category must be recorded in the Ministry of Health for 2000 EGP. The Ministry of Health takes 6 samples from each type inside every category for lab testing, and a 5000 EGP fee for testing must be paid. Test results are received after 21 days to get the product's final release. A sales tax applied to imported goods of 25% must be paid. Moreover, 3% of the invoice value must be paid to the ministry.

Similar procedures are required for pharmaceutical industry. Imported products must pass through examinations causing time delays. Costs to the firm could lead to loss of business opportunities and unmet delivery due dates.

A note on the accompanying Annex Table 3

It is important to note that dollar prices were converted to the Egyptian currency at the rate of 5.5 EGP/$, and euro prices were converted at the rate of 7 EGP/€.

Annex Table 3. Ad Valorem price wedges attributable to non-tariff barriers

	Sector description	Domestic Price of imported product	CIF Price of imported product	Tariff Rate	Transport cost per unit of good	marketing margin rate	Price Gap	Ad-valorem price wedge
1711	**Spinning, weaving & finishing textiles**							
	Spinning	30.36	27.78	0.02	0.01	0.02	1.41	5.07
	Weaving	35.75	32.45	0.03	0.01	0.025	1.42	4.38
	Finishing Textiles	51.48	43.45	0.04	0.01	0.04	4.22	9.72
	Average for sector							**6.39**
1721	**Textile products except garments**							
	Table spread	120	60	0.3	0.01		41.99	**69.98**
2101	**Manufacture of pulp, paper & paper board articles**							
	Art paper	6500	4840	0.1	70	0.15	131	2.71
	Duplex (grey back)	4800	2475	0.1	70	0.15	1287.5	52.02
	Board	7500	6325	0.1	70	0.05	97.5	1.54
	Average for sector							**18.76**
2412	**Manufacture of fertilizers & pesticides**							
	Fertilizers - Ammonia	1400	1100	0.05	70		175	15.91
2423	**Manufacture of drugs & medicines**							
	Aspartam	124.85	121	0.05	0.07		-2.27	-1.88
	Avicel	37.235	30.8	0.05	0.07		4.83	15.67
	Hepamerz	93.1	87.5	0.05	0.07		1.15	1.32
	Average for sector							**5.04**
2424	**Manufacture of soap, perfume & cosmetics**							

	Soap	6	2.5	0.3	0.01	0.15	1.84	73.65
	Cosmetics – Shampoo	22	9	0.3	0.01	0.23	5.23	58.14
	Perfume	600	250	0.3	0.02	0.17	172.98	69.19
	Average for sector							**66.99**
2511	**Tire & tube industries**							
	High quality truck tires	2500	1787.5	0.12	0.7	0.15	122.3	6.84
	High quality light truck tires	750	385	0.12	0.49	0.2	168.31	43.72
	High quality passenger tires	600	368.5	0.22	0.35	0.2	30.08	8.16
	Average for sector							**19.57**
2610	**Manufacture of glass & glass products**							
	Glass cups	55	44	0.15	0.07		4.33	9.84
2694	**Manufacture of cement, lime & plaster**							
	Cement (per ton)	492.5	462.5	0.05	6.5		0.38	**0.08**
2710	**Iron & steel basic industries**							
	Iron (per ton)	3100	2750	0.02	70		225	**8.18**
2893	**Manufacture of cutlery, handtools & general hardware**							
	Drill	185	149	0.05	0.14		28.41	19.07
2921	**Manufacture of agricultural machinery and equipment**							
	Grass cutting machine NR American 1.5 Horses”	1000	700	0.2	0.7	0.1	59.3	8.47
	Grass cutting machine”NR American 2 Horses”	1500	1100	0.2	1	0.1	29	2.64
	Grass cutting machine”NR American 4 Horses”	4000	2500	0.2	1.5	0.1	598.5	23.94

	Tractor " NR American for 1 Feddan"	15000	11000	0.2	1000	0.05	50	0.45
	Irrigation Machine" NR American"	10000	7000	0.2	500	0.1	100	1.43
	Draw water machine(30-100 m) 1"	10000	6500	0.2	500	0.1	700	10.77
	Average for sector							**7.95**
3110	**Manufacture of electrical industrial machinery & apparatus**							
	Standard frame (textile industry)	8443620	7343730	0.05	1400		731303	**9.96**
2930	**Manufacture of electrical appliances & housewares**							
	Refrigerator	3849	2519	0.4	7		315.4	12.52
3410	**Manufacture of motor vehicles**							
	Chrysler van	625000	137500	1.35	140		301735	219.44
	Passat –VW	250000	152600	0.4	140		36220	23.74
	Average for sector							**121.59**
3811	**Manufacture of jewelry & related articles**							
	Watch (Guess)	2500	1650	0.1	0.01		684.99	41.51