CURRENCY DEPRECIATION AND THE INTENSIVE MARGIN OF EXPORT TRADE: FIRM AND PRODUCT LEVEL EVIDENCE FROM EGYPT

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Abstract

This paper explores the impact of currency depreciation on the firm-product-destination level exports of Egypt, using a rare dataset of monthly-transaction level custom data over the period 2005-2016. Using computed monthly real exchange rates and product-specific control variables, the empirical analysis is undertaken in two steps. First, we conduct aggregate-level estimations to investigate the response of the intensive margin of export trade to real depreciation in the Egyptian pound. Second, we run a series of heterogeneity analyses according to different data classifications such as exporter size, exported product type, region of export destinations, different time intervals in the sample period and finally the exported product's sector, subsector (HS2) and their frequently exported product groups (HS4). Aggregate-level results confirm that the overall real depreciation affects export value in a positive and significant way, mainly driven by the higher magnitude of the positive effect on export quantity. Nevertheless, the heterogeneity analyses reveal that the response of exports is not homogenous among all data classifications. Hence, the framework of analysis used in this paper provides additional impetus for a better and more informed evaluation of product-specific export promoting policies in Egypt.

الملخص

تناقش هذه الدراسة تأثير انخفاض الجنيه على الصادرات المصرية على مستوى الشركات-المنتجات-الوجهة التصديرية، وذلك باستخدام مجموعة بيانات جمركية للمعاملات الشهرية خلال الفترة 2005-2016. وباستخدام سعر الصرف الحقيقي الشهري المحسوب، ومتغيرات التحكم لكل منتج، يتكون التحليل التطبيقي في هذه الورقة من خطوتين: أولا، قمنا بوضع تقديرات على المستوى الكلي للبحث في استجابة الهامش المكثف لتجارة الصادرات لانخفاض الجنيه. وثانيا، قمنا بإجراء سلسلة من تحليلات التغاير بناء على مجموعة من البيانات التصنيفية المختلفة مثل حجم الشركة المُصدرة، ونوع المنتج المصدَر، ومنطقة الوجهات التصديرية، وفترات زمنية مختلفة لفترة العينة، وأخيرا القطاع الذي ينتمي إليه المنتج المصدَر والقطاع الفرعي (HS2) ومجموعة المنتجات المصدَرة بشكل متواتر (HS4). وتؤكد النتائج في مجملها على أن الانخفاض الحقيقي الكلي في سعر الصرف يؤثر على قيمة الصادرات بصورة إيجابية ومعنوية مدفوعا في ذلك في الأساس بارتفاع التأثير الإيجابي على كم الصادرات. إلا أن تحليلات التغاير تشير إلى عدم تجانس استجابة الصادرات في كل البيانات التصنيفية؛ ومن ثم يدعو التحليل إلى تقييم أفضل وأكثر اطلاعا لسياسات تحفيز الصادرات في مصر.

JEL classification: *F13, F23, F31, O24*

Key words: *exchange rate, firm and product level exports, intensive margin, Egypt, heterogeneity*

I. INTRODUCTION

The impact of currency depreciation on export performance remains ambiguous despite the vast literature studying this relationship. While theoretically, a devaluation or a depreciation in the exchange rate will positively affect exports only if the foreign demand elasticity for the exports is more than unity, empirical results in literature are mixed and not often consistent with theory (See, for example, Rowbotham, Saville and Mbululu 2014; and Bahmani-Oskooee and Kandil 2010). Since exchange rate is perceived as a policy tool to stimulate exports and their competitiveness particularly in developing countries, reasons pertaining to this inconsistency are of interest to many researchers. The size of the share of imports in the cost structure of export production (Iurii 2014), behavior of exporters towards currency risk and uncertainty (Aftab et al. 2012), differences in exporter firms' characteristics such as productivity (Berthou and Dhyne 2018) and the nature of products exported are an unexclusive list of examples causing this ambiguity in exports' response to changes in exchange rate (for synthesis studies see Auboin and Ruta 2013; Bouoiyour and Selmi 2015). Therefore, analyzing the impact of changes in exchange rate only at the aggregate-level or country-level, which is the greater portion in prevailing literature, does not allow for a heterogeneity analysis of responses across sectors and firms and thus will only result in weakly targeted policy recommendations.

Egypt makes an interesting case study for the analysis of this relationship due to its history of exchange rate regime changes and the recent unprecedented currency depreciation of more than a 125 percent in one year. Egypt first adopted a fixed/pegged system in relation to the US dollar in the 1980s when Bretton Woods System collapsed. It maintained this peg until the adoption of the managed float regime in 1991, when the Economic Reform and Structural Adjustment Program (ERSAP) was implemented. From 2000 to 2004, the Egyptian pound experienced a cumulative depreciation of 68 percent against the US dollar when Egypt decided to start the transition into a flexible exchange rate regime (Helmy, Fayed and Hussein 2018). At the end of this period, foreign exchange interbank market eliminated the parallel market and stabilized the nominal exchange rate. Therefore, the International Monetary Fund (IMF) reclassified Egypt's exchange rate as a managed float. Due to political turmoil, international reserves declined rapidly in 2011 and in an attempt to conserve foreign reserves, the Central Bank of Egypt (CBE) introduced a new system of buying and selling foreign currency in 2012. Shortly after that, the parallel market began to flourish with devaluations in the currency reaching a 100 percent till the CBE was pressured to move to a more liberal exchange rate

regime in November 2016 (Zaki, Ehab and Abdallah 2017). The new floating regime resulted in a depreciation from 8 EGP/$ in October 2016 to 17.6 EGP/$ in October 2017 in the official nominal bilateral exchange rate. Although our sample period lasts till October 2016 before the floatation took place, it nonetheless covers 12 years of monthly export transactions which represents different macroeconomic episodes, reflecting the various behavior pattern of the response of export to changes in exchange rate.

The detailed analysis in this study contributes to the emerging literature on the sensitivity of value of exports to various domestic and international factors using high-frequency firm-level datasets. In this regard, most of the previous studies on Egypt with few exceptions (see Zaki et al. 2017) have mainly focused on aggregated datasets for Egyptian exports, which might not help with industry and trade specific policy solutions. Towards this end, we use a unique dataset on firm and product transaction-level exports from Egypt with information on their destinations to perform an integrated analysis of the response of the intensive margin to currency depreciation, decomposed into export value and quantities. The empirical analysis is undertaken in two steps. First, aggregate-level estimations are conducted for easier comparison with previous literature. Second, since the response of export value varies widely across sectors, products, destinations, firm sizes and time horizons, we proceed with a heterogeneity analysis of the impact along multiple dimensions. Moreover, in both types of analysis and unlike the aggregate variables usually used in literature, most of the control variables used are constructed at the product-level to capture the variation of different factors at the micro-level.

Our findings confirm that the intensive margin—the value of exports—responds positively to currency depreciation as the increase in quantity surpasses the decrease in prices. The 0.325 estimated elasticity of the response of quantity is lower than the typical 0.5 - 2 elasticity used for simulations in international real business cycle models (Berman, Martin and Mayer 2012). Accordingly, despite the positive relation, it is still a weak one relative to other economies. As we are interested in studying the net effect of quantity increases and price decreases, we focus on the effect of depreciation on the value of exports throughout the heterogeneity analysis rather than on quantity alone. While the overall response of the USD value of exports to real depreciation is homogenous, the heterogeneity analysis retrieves non-homogenous responses, and this could have different implications for the export promoting policies. We also find that the competitiveness effect of a certain exported product in the

destination country plays an important role in how effective the depreciation is able to boost exports of certain products.

We argue that while previous literature that studies the response of the intensive margin to exchange rate changes provide useful insights, the fact that they are based on estimations at the aggregate level limit their effective use for policy implications. Therefore, the heterogeneity analysis in this paper provides an important framework for policy makers working on export promotion programs, highlighting the need of putting this unique GOEIC dataset into use in various policy applications related to export promotion.

The remainder of the paper is organized as follows. Section II provides a literature review of existing studies on the topic. Section III presents the data used in the study and the estimation variables. Section IV lays out the details of the empirical investigation. Section V describes the aggregate results and their possible explanations. Section VI presents a heterogeneity analysis of the exchange rate effect across multiple dimensions. Section VII is dedicated to the main conclusions and policy implications, as well as, the study limitations.

II. LITERATURE REVIEW

Although economists have long debated the expected impact of changes in exchange rate on aggregate exports, imports and trade balance, empirical results have differed to the point of no guidance on the sign and magnitude of the effect. The relatively less abundant literature on the disaggregated level, whether the sectoral level or the firm-level of exports, shows even higher variations in results.

Literature on the Aggregate and Sectoral Level

Literature on the effect of exchange rate on exports either study the impact of large movements in exchange rate, such as a currency devaluation or the effect of currency risk (exchange rate volatility) on exports. Results for both segments differ widely:

In a recent study, Rowbotham et al. (2014) examine the impact of exchange rate on export performance in a sample of nine-efficiency driven economies, namely Brazil, the Dominican Republic, Malaysia, Mauritius, Mexico, Peru, South Africa, Thailand and Turkey over the period of 1990 to 2009. Using a fixed-effects method, they found that contrary to conventional theory, a weakening of the exchange rate does not necessarily improve export performance. In fact, for the nine countries surveyed, export growth seems to be associated with stronger exchange rates.

In another study conducted by Bahmani-Oskooee and Kandil (2010) who examined the effect of currency devaluation on exports using annual data for Iran for the period 1990-2003, results were conditional on the export structure. Before 1995 when oil and its related products had the greatest share in Iranian exports, devaluation showed no significant effect, while after 1995 it started to have a positive one with the increasing diversification of exports. Thus, their results suggest that export diversification plays a key role in the extent to which exchange rate can affect export performance.

Similarly, results on currency risk and exchange rate volatility are mixed. Sauer and Bohara (2001) use a large panel of industrialized and developing countries to investigate the link between exchange rate volatility and exports using fixed- and random-effects models. They found that a negative relation between exchange rate volatility and exports exist for least developed countries (LDC), especially for Latin America and Africa, but not for exports from Asian LDCs or industrialized countries. Hence, the effect of currency risk on export performance is not universal and differs with country characteristics.

Other studies tried to examine the effect of both currency risk and devaluation together. Bhattacharyya and Rit (2018) tried to determine the effect of nominal exchange rates on Indian exports between 1996 and 2014 using quarterly data after controlling for the effect of exchange rate volatility on exports. No direct evidence was found to support that nominal exchange rate or its volatility influences exports. Nonetheless, they found strong evidence of an indirect effect through the pass-through effect of exchange rate on prices (about 54 percent) in the long run.

Conversely, Fang, Lai and Miller (2005) investigate both effects for eight Asian countries using a dynamic conditional correlation bivariate GARCH-M model and argue that depreciation raises exports, but the associated exchange rate risk could offset that positive impact. Results show that exchange rate risk contributes to export growth in Malaysia and the Philippines, therefore leading to positive net effects. However, exchange rate risk generates a negative effect for the other six countries, resulting in a negative net effect in Indonesia, Japan, Singapore, Taiwan and a zero net effect in Korea and Thailand.

Other researchers found the sectoral level analysis of export performance to be more informative. For instance, Dincer and Kandil (2009) examine the effect of exchange rate fluctuations on disaggregated data that comprise exporting sectors for capital, intermediate and consumption goods. Building on a theoretical model that decomposes movements in the exchange rate into anticipated and unanticipated components, they found that unanticipated

depreciation had a positive net effect on export growth in the 5-year period before Turkish structural reforms in 2003 but a negative one on the same period length after 2003 for the sectors studied. This is explained by the increasing cost of imported inputs and the absence of quality and market access measures that reinforce competitiveness. However, heterogeneity of responses between sectors was not studied.

Similarly, using sectoral monthly data from July 2003 to April 2010, Shah, Mehboob and Raza (2012) found that the depreciating currency in the case of Pakistan improves the competitiveness of all of the three export sectors he was studying, namely the food, textiles and manufacturing sectors. However, they did not delve into the heterogeneities between the sectors studied.

Finally, Kohler and Ferjani (2019) analyze the sensitivity of the Swiss agriculture and food sector exports to exchange rate movements, using both time series and dynamic panel data models based on data from 1999 to 2012. They found that exchange rate changes have a relatively small effect on exports as well as having a lagged effect explained by inflexible consumption habits, long-term trade contracts, and exporter firms' hedging against currency risk.

Clearly, exports respond differently to currency deprecation or currency risk due to micro, sector and firm-level factors which need to be studied at a more disaggregated level.

Literature on the Firm Level

Firm-level data is useful as it helps in understanding behavior and decision-making determinants at the micro level. Despite the scarcity of literature on firm and transaction level exports, the following studies delve more into the factors affecting the response of exports to changes in exchange rate:

Ali (2017) conducted an integrated analysis of prices and quantities using currency of transaction exchange rates on agricultural exports in Pakistan for the period 2000-2013. Through a heterogeneity analysis across different data classifications, such as destination regions, different product groups and others, Ali (2017) was able to provide more accurate results for the overall positive and small response of the intensive margin to depreciation. In fact, Ali (2017) also used a model that incorporates other explanatory variables that were more relevant to the firm, product and transaction level analysis, such as product specific tariff rates, NTMs and foreign demand, which is similar to the model we are using in this study.

Another study examining the effect of exchange rate on the heterogeneity responses of firms, Berman et al. (2012) uses a French firm-level data set with destination-specific export values and volumes on the period from 1995 to 2005. Their findings show that high-performance firms react to a depreciation by increasing their markup more than increasing their export volume. Firms that are highly productive absorb more exchange rate movements in their markups, therefore heterogeneous pricing-to-market may explain the weak impact of exchange rate movements on aggregate exports volume. Their results coincide with Guillou (2008), where she investigates the relationship between the export behavior and the exchange rate at the firm-level by using a dataset of French manufacturing firms from 1994 to 2004. She finds that exchange rate has a significant influence on the probability of entering a foreign market but none on export intensity. On a similar note, Berthou and Dhyne (2018) found that countries with low productive firms tend to respond more to exchange rate movements in terms of aggregate exports than countries with highly productive exporters. Hence, firm productivity plays a role in determining the relationship between exchange rate and export response that would be impossible to track at the aggregate level.

Finally, not only firm specific characteristics, international activity levels and tariffs affect the relationship between exchange rate and export performance, other factors such as Non-tariff measures (NTMs) play a role. Fontagné et al. (2015) found that sanitary and phyto-sanitary (SPS) concerns among French firms discourage the presence of exporters in SPS-imposing foreign markets. In addition, they also found a negative effect of SPS imposition on the intensive margins of trade. These negative effects are smaller the larger the firm.

As shown in the above section, there are many micro and firm level factors affecting the performance of exports as well as the relationship between exchange rate and exports that will be neglected in an aggregated level study or in a study that does not employ relevant disaggregated level explanatory variables. A closer look at studies in the context of Egyptian economy is provided in the next section.

Egypt as a Case Study

Literature on the firm-level exports of Egypt is generally lacking with only a small number of contributions that we aim to build on. Zaki et al. (2017) studied the impact of devaluation of the Egyptian pound on the intensive and extensive trade margins in a gravity model, using the GOEIC dataset for the period 2005-2016. Findings showed that at the firm-level, depreciation of the real exchange rate had a positive effect on the value of exports (a 10 percent decrease in

real exchange rate is associated with a 2-3 percent increase in export value), but the effect on the quantity of exports was insignificant. At the sectoral level, they found that products that benefit the most from a currency depreciation are products that Egypt has a comparative advantage in and are also sensitive to real depreciations, namely, fruits and vegetables, apparel and clothing, fibers, mineral fuels and oils and some chemical products. They also added that devaluation may have limited effects if the country's main trade partners are in recession. This study is the only study in Egyptian context that uses firm and transaction level data to explore this relationship. Therefore, we aim to add to this work by incorporating firm and product level explanatory variables in the model instead of the gravity model.

Other research that did not employ firm and transaction level data on the effect of the exchange rate on exports in Egypt include Kheireldin and Elshawarby (2000) as they emphasized the evidence on the weak role of exchange rate variations on Egyptian exports performance. Results of their study indicate that the exchange rate in the Egyptian economy did not exhibit the usual impact on exports predicted by economic theory during the period studied (1980-1998). In a similar vein, El-Ramly and Abdel-Haleim (2008) find that the adjustment of output to the devaluation of 2003 in Egypt was slow and ineffective because exports and imports are not very responsive to the changes in the relative prices caused by devaluations. Their main recommendation is to diversify and improve products in addition to removing bureaucratic obstacles.

Regarding exchange rate volatility, Bahmani-Oskooee, Hegerty and Hosny (2015) examine its effect on Egypt's export and import flows with the European Union. Their study found that a small share of Egypt's trade flows responds to increased volatility in the short run. However, in the long run, a large number of industries see their trade flows reduced due to an increase in exchange rate risk. Moreover, to assess the exchange rate uncertainty and how exports perform in Egypt, Bouoiyour, Jamal, and Selmi (2015) use an optimal GARCH model. Their results show a significant and positive effect of real exchange rate returns on real exports, explaining that this might be due to export performance-exchange rate uncertainty in developing countries depending on the volatile behavior of oil prices. After subtracting the share of oil from real exports and differential prices, results showed a negative and significant linkage between the two variables.

Elshehawy, Shen and Ahmed (2014) examined the factors that affect Egypt's bilateral export flows to its main trading partners other than exchange rate, by using panel data and the

gravity model approach with fixed effects. They use annual data covering the period 2000-2013 for 42 main trading partners. Their results show that Egypt's GDP, importer's GDP, importer's population, regional trade agreements (RTA) and the border between Egypt and its trading partner are the main factors positively affecting Egypt's exports to its main trading partners, while transportation costs are found to have negative but insignificant effect on Egypt's exports. However, none of these studies used disaggregated level explanatory variables.

As our model incorporates tariff and non-tariff measures, it is of interest to explore literature about the impact of these factors on export performance in Egypt. Technical barriers to trade and sanitary and phyto-sanitary measures are the most important NTMs in for Egyptian exports since they represent 83.9 percent of NTMs imposed on Egyptian exports (Ghali et al 2013). El-Enbaby, Hendy and Zaki (2014) use firm-level data to analyze the effects of product standards on the firm-product extensive margin and firm-product intensive margin. They find that SPS measures imposed on Egyptian exporters have a negative impact on the probability of exporting a new product to a new destination, while the intensive margin of exports is not significantly affected by these measures. Similarly, Péridy and Ghoneim (2013) show that almost all NTMs categories are trade reducing, especially SPS measures, quantitative restrictions, pre-shipment inspection and export-related measures with technical barriers to trade to a lesser extent. Ghali et al. (2013) estimated the impact of NTMs on Egyptian and Tunisian imports. In their study they examined different types of NTMs and their impact on the extensive and intensive margins. They found that NTMs have a significant negative effect on both the intensive and extensive margins in Egypt. Similarly, Youssef and Zaki (2019) conducted a study using a gravity model to predict bilateral trade flows based on the economic size, geographic distance, and other relevant characteristics that typically contribute to facilitated trade and identify specific sectors and markets for which Egypt seems to have an untapped potential. Their study explores some of the important supply and demand side factors and assesses the role of trade policy measures (tariffs and non-tariffs barriers) in impeding export growth. Their study shows that the limited external competitiveness starts domestically and may find part of its roots in what the country produces. It also shows that when combined with analysis of the world's growing demand, Egypt's exports are centered around many products for which global demand is declining. In addition, some of the products that had competitive advantage have lost their competitiveness over time.

In light of the previously reviewed literature examining the case of Egypt, our study tries to understand the dynamics of the relationship between transaction and firm-level exports

and exchange rate along with the presence of other factors that might be jointly explaining export behavior at the disaggregated level. Next section describes in detail which explanatory variables we compute and decide to use for this purpose.

III. DATA AND ESTIMATION VARIABLES

The aim of the study is to examine the effect of exchange rate movements on firm-level exports of Egypt during the period 2005 till 2016. In this respect, the study uses transaction level data from the General Organization for Export and Import Control of Egypt (GOEIC), an affiliated agency to the Egyptian Ministry of Trade and Industry. The data contains monthly information on firm ids, the value and quantity of exported products in both USD and EGP classified in the Harmonized System (HS) of classification at the 4-digit level of disaggregation, as well as, their destination countries.

The raw dataset contains around 1.7 million transactions for the period January 2005 till October 2016. To generate a manageable sample, export transactions of products that belong to product groups accounting for less than one percent of their respective sector's export value and those of firms which export less than one percent of the export value during the whole sample period while having low relative comparative advantage (RCA), were excluded from the study.[1] Transactions to only 85 countries out of 220 were included in the sample either due to required data for the explanatory variables being unavailable for the whole sample period for some of the destinations or the export value to those destinations combined accounted for less than one percent of export value. Moreover, other observations have been dropped automatically during estimation due to severely unbalanced panels or insufficient data for certain products during certain months in the 12-year period. This final sample captures around 70 percent of Egypt's exports value of the whole dataset.[2] The sample also provides a diverse sample of export markets including developed as well as developing countries. A detailed list of export destinations, product categories and descriptive statistics of data can be found in the appendix.

[1] Results were robust when using the whole dataset of transaction

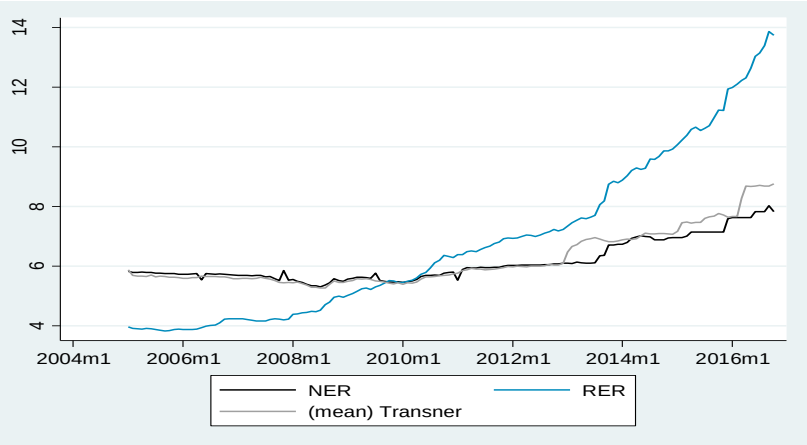
[2] Note that this dataset does not include oil and its related products. So, the sample captures around 70% of non-oil related export values.

Exchange rate developments in Egypt

During the sample period January 2005- October 2016, the nominal bilateral exchange rate of the Egyptian pound against the US dollar has only risen from EGP 5 to EGP 8 for the whole period, while black market rates were more volatile and similarly the exchange rates used in international trade transactions which is discussed below (see Table B1 in section B of the appendix). There is no consensus in literature on which measure of exchange rate is the most suitable measure to capture the effect of EX rate on exports; some use the bilateral rate to USD (see Mustafa and Mohammed (2004), Aftab et al. (2012), Solakoglu, Solakoglu, and Demirağ (2008)), and other studies use the effective exchange rate, either in their real or nominal forms (See Yang and Yang (2017); Berthou and Dhyne (2018); Cheung and Sengupta (2013)). For this study we computed a monthly real exchange rate using the official bilateral exchange rate adjusted for the domestic price level increase relative to that of the USA by using the ratio of US and Egyptian monthly CPI.

Having transaction level information about the quantity, the EGP and USD value of exports, we also computed a transaction level exchange rate to compare its effect on the intensive margin to that of the bilateral exchange rates. Despite the computed transaction level exchange rate showing higher volatility, which can be perceived as a proxy for parallel market rates (see Descriptive Statistics in the appendix), its monthly mean is similar to that of the real exchange rate up until 2010 when the real exchange rate started to show a higher trend possibly due to the political uncertainties experienced during this time period and the accompanied unprecedented high inflation rates (see Figure 1). Starting 2013, the mean of the transaction level exchange rate started to have a higher trend than that of the nominal bilateral exchange rate pointing to the start of the speculation period prior to the currency floatation decision in November 2016. This is the first paper to show transaction level exchange rates used in export trade in Egypt and their statistical comparison to the official bilateral rate.

Figure 1. Nominal and real bilateral exchange rates vs. the mean of transaction level exchange rate developments



Source: Constructed by the authors using GOEIC and the Citadel Capital datasets.

Firms, Products and Destinations under Study

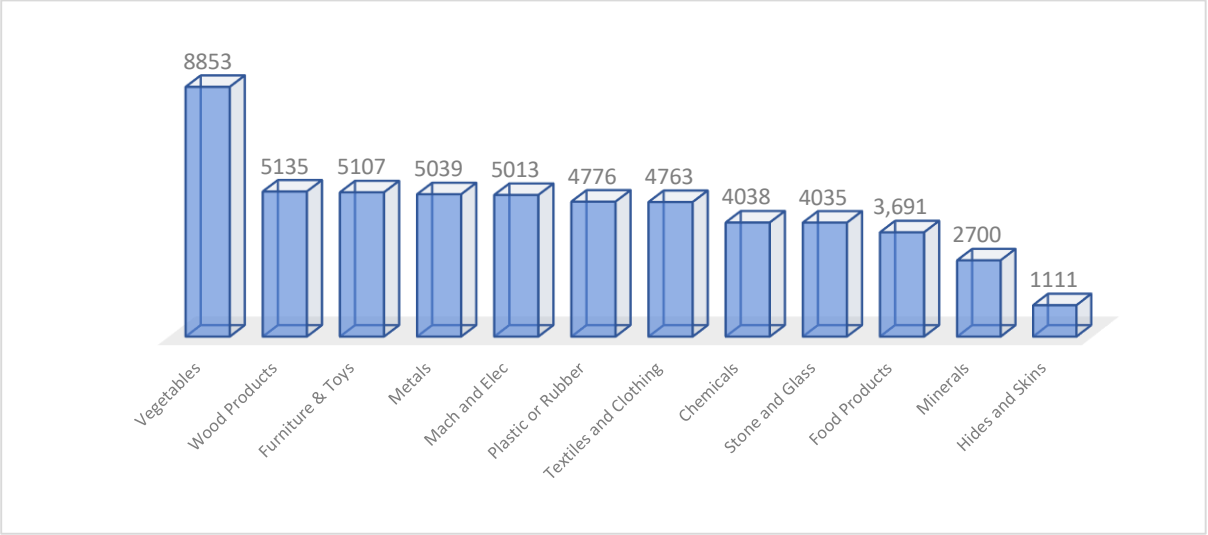
Although the dataset does not include firm names or any information regarding individual firms, it is still a great advantage to have data at the firm and product-level as it allows us to explore the behavior of exporting firms collectively during the sample period of the study and to relate it to the estimation results of the heterogeneity analysis.

Figure 2 uses the raw data of the GOEIC database that consists out of more than 23 thousand firms to get an estimate nearest to the actual number of firms operated at some point during the sample period in each sector. [3] It is interesting to note that most of the largest sectors in terms of number of firms do not have the largest share in export value (see Figure 2 and Figure 3).[4] One explanation could be that it is easier in terms of doing business to operate in the exporting activity of these sectors resulting in smoother entry and exit of the market. It can also mean that sectors with a large export share but with a relatively small share in number of firms operating in this sector, such as textiles and clothing, mainly depend on large firms.

[3] Excluding the fuel sector. Data used for regression estimation in this study is only a sample of this database.

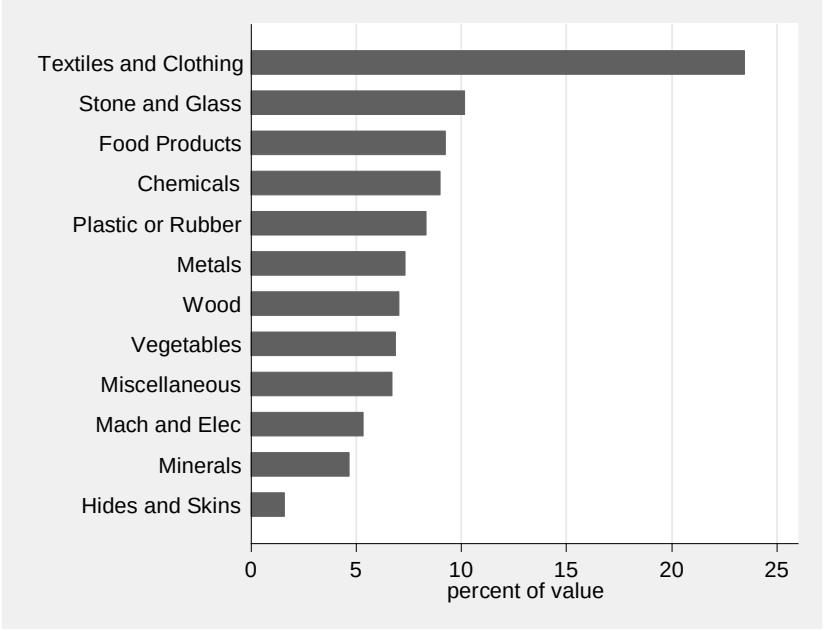
[4] Except for the vegetables sector.

Figure 2. Number of exporting firms that operated at some point between 2005 and 2016 in each sector



Source: Compiled by the authors using the GOEIC database.

Figure 3. Export value share by sector over the period 2005-2016 (period average)

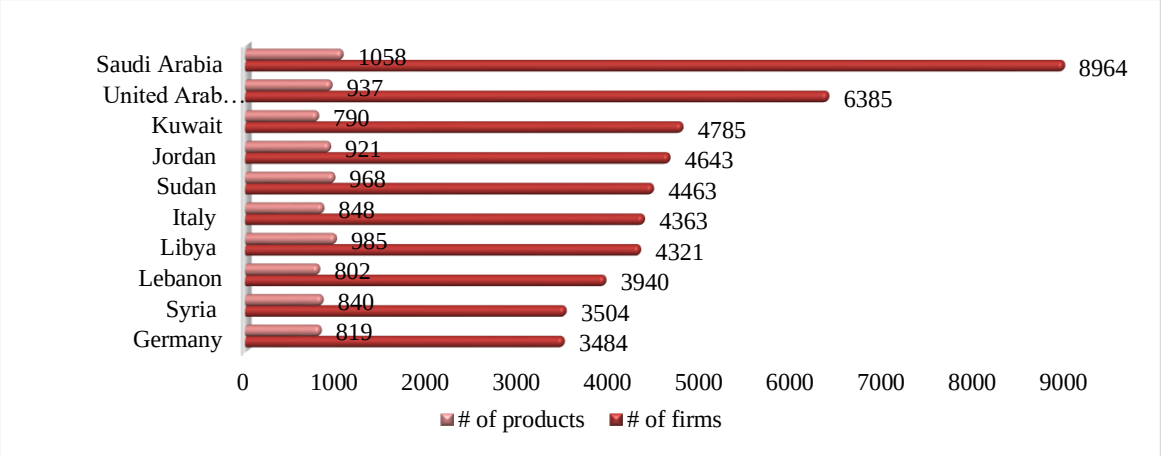


Source: Constructed by the authors.

It is clear from Figure 4 that the top 10 destinations for Egyptian exports by number of firms and products exported are mainly countries from the Middle East and North Africa (MENA), Italy and Germany, with Saudi Arabia being on top of the list with almost 9000 firms exporting more than 1000 products at some point during the whole sample period. Almost 40 percent of exports' value during the sample period were transactions with the MENA region,

35 percent with Western and Central Europe, 10 percent with North America, 5 percent with Sub-Saharan Africa and the rest (10 percent) to the rest of the world.

Figure 4. Top 10 destinations by number of exporting firms and number of distinct exported products (2005 - 2016) in the raw dataset



Source: Compiled by the authors using the GOEIC database.

Estimation Variables

In our approach, we attempt to control for sector and product-specific factors directly through the inclusion of indicators that capture the competitiveness effect, foreign demand and tariff and non-tariff measures at the product-level, along with the aggregate changes in the real exchange rate. This approach enables us to capture the effect of the variation of these factors across different dimensions. We explain below how each variable has been constructed.

$$\mathbf{X_{kijt}} = f\,(\mathrm{rer_t},\ \mathrm{fd_{kjt}},\ \mathrm{comp_{kjt}},\ \mathrm{tariff_{kjt}},\ \mathrm{sps_{kjt,}})$$

The subscripts i, j, k and t denote export origin firms, export destinations, product and time, respectively.

I. Dependent Variables

Three estimation equations with three different dependent variables were formulated as follows:

- $\mathbf{X_{kijt}}$: is the monthly transaction level value of exports once in million EGP and once in million USD for firm (i) per product (k) to destination country (j) at time (t)

- **Q_{kijt}:** is the monthly transaction level of the quantity or volume of Egyptian exports in each product's specific units for firm (i) per product (k) to destination country (j) at time (t)

II. Explanatory Variables

- **rer_t:** is the monthly real exchange rate of the EGP to 1 US dollar computed by the authors using monthly nominal official bilateral exchange rate values retrieved from the Citadel Capital database along with monthly CPI values for Egypt and the USA. Both CPI indices rebased to year 2010. Original CPI values for Egypt ($Egypt\ CPI_t$) are retrieved from the CAPMAS database and the USA CPI ($USA\ CPI_t$) is retrieved from the FRED. ***rer_t*** is the main variable of interest and the currency real depreciation appears as an increase in the exchange rate and thus the estimation coefficient is expected to be positive. Real exchange rate (**rer_t**) was computed by the authors as follows:[5]

$$\boldsymbol{rer_t} = ner_t * {(Egypt\ CPI)_t}/{(US\ CPI)_t}$$

- **fd_{kjt}:** is the annual foreign demand of destination (j) in thousand USD of product (k) at the 4-digit level of HS classification of products at time (t) excluding Egyptian imports of the same product to avoid the possibility of endogeneity in the regression. Some studies use GDP of the destination as a proxy for its economic activity level, others use the global GDP as a proxy for global export demand as is usually the case using a gravity model. However, we found that computing net imports on the product and destination level is more precise, avoids aggregation bias and gives room to heterogeneity analysis. Foreign demand was calculated by the authors as follows similar to that of Ali (2017):

[5] As a comparison to results using RER, Nominal exchange rate (NER) and transaction level exchange rates were used. For this purpose, transaction level exchange rates were calculated using the information on the dollar, EGP value of exports as well as their quantities in the GOEIC dataset to compute an exchange rate used for the documentation of each transaction.

$$\boldsymbol{fd_{kjt}} =$$

$$\{[\text{total } imports\ of\ country\ (j) of\ product\ (k) at\ time\ (t)]$$

$$- [country(j)'s\ imports\ of\ product\ (k)\ from\ Egypt\ at\ time\ (t)]\}.$$

- **comp$_{kijt}$:** is the Egyptian export competitiveness effect of product (k) at the 4-digit level in destination (j) at time (t). It is one of the indicators of the trade performance index used in the trade competitiveness map and defined by the International Trade Center to show the percentage change in the competitiveness of a country's exports in the world market for a certain sector at a certain time period. We tailored this definition to apply on our dataset and computed the competitiveness effect in our estimation as follows:

$$\boldsymbol{comp_{kijt}} =$$

$$\{\Delta\ in\ Egyptian\ share\ in\ the\ destination\ markets' imports\ for\ product\ (k) at\ time\ (t)$$
$$* the\ initial\ share\ of\ destination's\ imports\ in\ world\ trade\ for\ product\ (k) at\ time\ (t).\}$$[6]

Data used for the computations of fd and comp are retrieved from the International Trade Center's website (ITC), which are based on UN Comtrade's trade flow data for products classified at the HS4 classification level.

- **Tariff$_{kijt}$:** is an annual weighted average tariff rate index per imposing country on each product at the HS 4-digit level exported by Egypt.[7]
- **Sps$_{kijt}$:** is a dummy for the main non-tariff measure called sanitary and phyto-sanitary measure (SPS) imposed on Egyptian exports. Products (k) at the 4-digit level at year (t) imported from Egypt by destinations (j) take a value of 1 if SPS measures are imposed and 0 otherwise.

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[6] The annual Egyptian export share in % per product (k) in destination (j)'s imports at time (t) was computed in the process as follows: {(Country (j)'s imports of product (k) at time (t) from Egypt)/ (Country (j)'s total imports of product (k) at time (t)) * 100}. The initial share of destination's imports in world trade import share in % of destination (j) in global imports market per product (k) at time (t) was also computed in the process as follows: {(imports of country (j) of product (k) from Egypt at time (t))/ (total imports of country (j) of product (k) at time (t)) *100}.

[7] As per the TRAINS tariff data guide, weighted average tariff rate calculation is as follows =(Sum of duties collected/Total imports)X100 =(35X100)/1210=3%.

Both tariff and non-tariff data are retrieved from UNCTAD, Trade Analysis Information System (TRAINS) and is used as a proxy for trade cost that is expected to be negatively correlated to the dependent variables. All variables are expressed in logarithmic form, except for comp (a percentage variable) and the SPS dummy, so that inferences about the elasticity of export quantity and value to changes in exchange rate could be made. The descriptive statistics of each variable included in the estimations can be found in section C of the appendix.

IV. METHODOLOGY

Data Properties and Implications on the Methodology

In panel data, researchers usually deal with two dimensions, for instance firms and time, rather than only firm or time as in cross-sectional and time-series analysis, respectively. However, in our study, there are even more than two dimensions, namely firms, products, destination markets and time dimensions. Accordingly, each observation in the dataset takes the following form: product (k) exported by firm (i) to destination market (j) at month-year (t).

This is an unbalanced panel dataset, meaning that observations in each individual panel do not begin and end at the same dates and some have missing data in between. This is the case because in a sample period that spans for 12 years, the continuity of more than 13,000 firms to export the same product to the same destination is not realistic. Some firms might go bankrupt or merge with other firms, decide to export to other destinations, shift their production to a different product category or start their activity after the sample begins. Having an unbalanced sample is not a major problem by itself because the regression used in this study can accommodate unbalanced data. Nonetheless, based on Cameron and Trivedi (2005) and Wooldridge (2013), an issue arises when attrition is non-random, which means firms leave the sample for reasons correlated with the errors of the dependent variable. However, one cannot easily drop all firms that do not start and end with the sample because a survivorship bias will occur (Yang and Yang 2017 p. 8) which can be considered a form of selection bias. Fortunately, the fixed effects model allows attrition to be correlated with the unobserved effects which are controlled for in the estimation (Wooldridge 2013).

The Fixed Effects Model

The Fixed Effects Model has the advantage of eliminating omitted variable bias by controlling for unobservable time-invariant factors correlated with the independent variables through including time, as well as, individual fixed effects (Hsiao 2003).

Equation 1: the value of exports in USD as the dependent variable (the intensive margin):

$$\ln (X_{(\$)})_{kijt} = \beta_1 \ln(rer)_t + \beta_2 \ln(fd)_{kjt} + \beta_3 comp_{kijt} + \beta 4 \ln(tariff_{kijt}+1) + \beta 5(sps_{kjit}) + i + k + j + \epsilon_{ijkt}$$

Equation 2: the value of exports in EGP as the dependent variable (the intensive margin):

$$\ln (X_{(EGP)})_{kijt} = \sigma_1 \ln(rer)_t + \sigma_2 \ln(fd)_{kjt} + \sigma_3 comp_{kijt} + \sigma_4 \ln(tariff_{kijt}+1) + \sigma_5(sps_{kjit}) + i + k + j + \xi_{ijkt}$$

Equation 3: the volume/quantity of exports as the dependent variable (Part of the intensive margin):

$$\ln (Q)_{kijt} = \boldsymbol{\alpha}_1 \ln(rer)_t + \boldsymbol{\alpha}_2 \ln(fd)_{kjt} + \boldsymbol{\alpha}_3 comp_{kijt} + \boldsymbol{\alpha}_4 \ln(tariff_{kijt}+1) + \boldsymbol{\alpha}_5(sps_{kijt}) + i + k + j + \gamma_{ijkt}$$

To use multiple fixed effects in the estimation, namely for firms, products and time, we use the linear regression absorbing multiple levels of fixed effects estimation (reghdfe) in Stata developed by Correia (2014). The tariff variable both enter the equation as ln(tariff+1) so that the zero values would not be missing once the ln operator is included and consequently retaining the number of observations as is. *i, k, and j* are firm, product and destination fixed effects, respectively. ϵ_{ijkt}, ξ_{ijkt} and γ_{ijkt} are the discrepancy terms, i.i.d component. Firm fixed effects control for time-invariant individual firm-specific unobservable factors, product fixed effects account for heterogeneity across commodity groups and destination fixed effects control for any other reason that could affect export value and quantity such as geographical characteristics of the country etc.. This choice of fixed effects is similar to that of Berthou, and Dhyne (2018) and Ali (2017). To account for autocorrelation, standard errors are clustered at month and year level as the real exchange rate varies monthly.

V. MAIN RESULTS AND DISCUSSION

This section initially presents the overall results of the effect of real exchange rate on the intensive margin (value) and quantity of Egyptian export trade using different combinations of fixed effects and interaction terms. To control for unobservable effects on the intensive margin, estimations in Table 1 include different time, firm, product and destination fixed effects. Columns 1 to 3 use time trends that yield inconsistent coefficients for the real exchange rate variable. The reason for this inconsistency is that exchange rate is already adjusted for inflation, which is one of the macroeconomic influences to be controlled by the time dummies. Therefore, time trends are not suitable for this regression.

The consistency of the positive and statistically significant coefficients for the real exchange variable and the other explanatory variables in columns 4 to 7 using different fixed effects is an indication of the estimate stability. As the dummies included in column 4 control for most of the potentially omitted variables and as it shows the highest R^2 compared to columns 5 to 7, column 4 is used as the baseline regression for all estimations of the heterogeneity analysis. Thus, a 10 percent currency depreciation is associated with a 1.5 percent increase in the USD value of exports, which is small compared to the 5.1 percent increase in the EGP value of exports in column 8. The 3.2 percent positive effect on export quantity associated with a 10 percent currency depreciation as shown in column 9 is theoretically intuitive as a result of short-run price stickiness. In fact, Froot and Klemperer (1989) and Knetter (1989) argue that exporting firms with a market share objective do not increase the profit margin in order to increase export volume.[8]

Two studies that have similar research questions to this paper but use different methodologies can be used as benchmarks for our results. In the first study, Zaki et al. (2017) find that a 10 percent currency depreciation is associated with around 2 percent positive effect on the export value in USD, which is a slightly larger estimate compared to ours, while the 2 percent positive effect of the EGP value is smaller than ours. They also find the effect on export quantity to be statistically insignificant. In addition, gravity model specific explanatory variables were used rather than the product-destination specific variables used in our model. The second study conducted by Ali (2017) uses a more similar approach to ours with a similar Pakistani dataset, however, the study was only limited to the exports of the agricultural sector. He finds that a 10 percent depreciation is associated with a 1.4 percent increase in agricultural exports, which is a very similar estimate to ours, and 0.4 percent increase in quantity using transaction level exchange rates. He also finds that his estimates are smaller than the estimates of other studies examining product or firm-level exports of more developed countries.

The coefficients of the control variables all have the expected sign except for the tariff variable and are all highly significant. The foreign demand variable has a small but positive effect on export value and a larger effect on export quantity asserting that the higher the destination's demand for a certain product, the higher are their exports from Egypt for that product. Similarly, the positive significant effect of the competitiveness effect on both the value

[8] We computed an alternative estimation using one lag of the foreign demand variable for which the coefficients were the same, which excludes the possibility of the existence of a simultaneity problem.

and quantity of exports emphasizes that when either the Egyptian market share for a certain product in the destination market increases or the market share of the destination in the world market increases, the Egyptian exports for this product increases. The negative significant effect of the NTMs such as SPS measure is expected as the stricter the non-tariff measures get of the destination market on the Egyptian products, the higher the quality of the product should be, and exclusions occur. However, the positive significant effect of tariff rates on export value and quantity is not aligned with the conceptual theory suggesting the existence of a negative relationship between tariff rates and export value. In the heterogeneity analysis, we seek to find an understanding for this contradiction. It is noteworthy that the correlation coefficient between the tariff rates and the value of exports in USD over the sample period is 0.014.

It is evident from the high significance of the control variables that the exchange rate is not the only determining factor when evaluating the intensive margin of exports. To examine the relative importance of the real exchange rate to changes in exports value compared to changes in other factors such as competitiveness and foreign demand, we tried adding control variables gradually in order to track the effects of each variable on the value of exports. Results show that the control variables are significant even though we are not controlling for the exchange rate at the same time. This means that for a devaluation to work in affecting the intensive margin, several prerequisites are necessary with relevance to competitiveness and foreign demand need to be high and NTMs such SPS measures need to be decreased. It reassures our argument that real exchange rate depreciation is not the only factor affecting Egyptian exports and there are other factors that are also important with relevance to boosting exports.

Table 1. Overall estimation - response of the intensive margin (export value in $)

	(1)	*(2)*	*(3)*	*(4)* ***Baseline***	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Variables	lvalue	lvalue	lvalue	**lvalue**	lvalue	lvalue	lvalue	Lvalue (EGP)	Lquantity
Ln(RER)	-	-0.188	-0.012	**0.146*** **	0.137***	0.165***	0.141***	0.512***	0.325***
		(0.130)	(0.143)	**(0.023)**	(0.023)	(0.024)	(0.023)	(0.018)	(0.048)
Ln(foreign demand)	0.094***	0.094***	0.094***	**0.101*** **	0.128***	0.058***	0.094***	0.106***	0.126***
	(0.002)	(0.002)	(0.002)	**(0.002)**	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)
Competitiveness effect	0.198***	0.198***	0.199***	**0.166*** **	0.188***	0.166***	0.193***	0.187***	0.041
	(0.018)	(0.018)	(0.018)	**(0.019)**	(0.019)	(0.018)	(0.018)	(0.018)	(0.027)
Ln(tariff rate)	0.013***	0.013***	0.013***	**0.013*** **	0.018***	0.009***	0.008***	0.018***	0.035***
	(0.001)	(0.001)	(0.001)	**(0.001)**	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)
NTM-SPS dummy	-0.346***	-0.346***	-0.346***	**-0.358*** **	-0.189***	-0.358***	-0.169***	-0.407***	-0.688***
	(0.039)	(0.040)	(0.039)	**(0.039)**	(0.034)	(0.039)	(0.035)	(0.045)	(0.069)
Choice of Fixed Effects									

month##year	yes					yes	yes		
month, year		yes				yes	yes		
year			yes						
firm	yes	yes	yes	**yes**	yes	yes	yes	yes	yes
hs4 product	yes	yes	yes	**yes**	yes			yes	yes
destination	yes	yes	yes	**yes**		yes		yes	yes
Observations	628,320	628,320	628,320	**628,320**	628,320	628,350	628,350	732,482	815,172
R-squared	0.479	0.478	0.478	**0.476**	0.454	0.456	0.432	0.531	0.706

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (month-year) level.

In an attempt to understand how the other explanatory variables influence the relationship between the real exchange rate and the intensive margin, Table 2 reports the baseline estimation with different interaction terms. The results show that the competitiveness effect has a significant positive effect on the impact of exchange rate on export value (see Figures A1 and A2 in Appendix A for the marginal effects estimation). Thus, the competitiveness effect plays a considerable role in export trade as well as in the relationship between export trade and changes in real exchange rate. It is also clear that real depreciation is more effective when it is coupled with higher competitiveness. An important remark drawn from these results is that the positive effect of depreciation on exports might be offset by a decline in the competitiveness effect. In the heterogeneity analysis in the following section, we show how disaggregation can give a more accurate picture of export responses to all of the factors mentioned above that should be more relevant for policy implications.

Table 2. Baseline estimation with interaction terms

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Variables	lvalue	lvalue	lvalue	lvalue	lvalue
Ln(RER)	0.143*	0.145*	0.146*	0.140*	0.146*
	(0.072)	(0.071)	(0.071)	(0.071)	(0.071)
Ln(foreign demand)	0.100***	0.102***	0.101***	0.101***	0.101***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
Competitiveness effect	0.166***	-0.536***	0.145	0.166***	0.166***
	(0.050)	(0.142)	(0.151)	(0.049)	(0.050)
Ln(tariff rate)	0.013***	0.013***	0.013***	-0.003	0.013***
	(0.002)	(0.002)	(0.002)	(0.009)	(0.002)
NTM-SPS dummy	-0.359***	-0.357***	-0.358***	-0.361***	-0.465
	(0.075)	(0.078)	(0.075)	(0.074)	(0.268)
ln(RER)#ln(Foreign demand)	0.001				
	(0.002)				
ln(RER)#(Competitiveness effect)		0.458***			
		(0.104)			

ln(RER)#ln(Foreign demand)#(Competitiveness effect)			0.003		
			(0.019)		
ln(RER)#ln(Tariff Rate)				0.009*	
				(0.004)	
ln(RER)#(NTM-SPS dummy)					0.049
					(0.143)
Observations	628,320	628,320	628,320	628,320	628,320
R-squared	0.476	0.476	0.476	0.476	0.476

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (month-year) level.

VI. HETEROGENEITY ANALYSIS

One of the main objectives of the study is to investigate the GOEIC dataset at a more disaggregated level in order to reach sector/product specific policy implications. Therefore, this section attempts to classify data in ways that allow for a heterogeneity analysis and make use of the multi-dimensional property of the data. The analysis in this section explores the effect of exchange rate across firms, sectors, product types and destinations of different characteristics.

Response of Exports Across Different Sectors

We should expect a heterogeneous response of the intensive margin across sectors as products differ in many ways: the time lag for supply response, the size of imported intermediary inputs, quality and foreign demand differences, etc., which can result in different impacts of currency depreciation. We also show in this section how the analysis at a more disaggregated level brings about more accurate information for the decision making process of fiscal and international trade policies. Therefore, we classified the products under study according to our modification of the HS product classification by section (2-digit HS) to allow for a heterogeneity analysis of the impact of exchange rate on the 12 main sectors.[9] In the following section we delve into a more disaggregated level, namely the product group level (4-digit HS) to point to the product groups that either cause the results of the HS2 level or those that show opposite results.

Table 3 presents the detailed results for the response of the intensive margin to RER in the different sectors. All sectors are positively and significantly affected by currency depreciation, except for the metals sector, which is insignificantly affected and the minerals sector, which is positively affected yet with marginal significance (see Figure 5 for the descending order of the most significant sector coefficients).

[9] Oil and oil related products are excluded from the study. Footwear, animal products and transport equipment sectors were dropped as the frequency of transactions was too small due to having unbalanced panels.

Table 3. Response of export value across different sectors

	Chemicals	***Food Products***	***Hides & Skins***	***Mach & Elec***	***Metals***	***Minerals***
Variables	lvalue	lvalue	lvalue	lvalue	lvalue	lvalue
Ln(RER)	0.224***	0.225***	0.404***	0.202***	0.055*	-0.017
	(0.031)	(0.027)	(0.044)	(0.032)	(0.033)	(0.025)
Ln(Foreign demand)	0.134***	0.132***	0.048***	0.181***	0.086***	0.084***
	(0.007)	(0.005)	(0.011)	(0.013)	(0.007)	(0.005)
Competitiveness Effect	1.160***	0.568***	0.240**	6.083***	1.106***	0.006
	(0.066)	(0.089)	(0.105)	(0.555)	(0.091)	(0.016)
Ln(Tariff rate)	-0.006	0.005	0.004	-0.008	0.013***	0.004
	(0.004)	(0.003)	(0.014)	(0.006)	(0.004)	(0.007)
NTM-SPS dummy	-0.371***	-0.248***	-0.108	-	-	-
	(0.104)	(0.095)	(0.109)			
Observations	62,424	63,428	9,596	29,694	48,289	32,083
R-squared	0.583	0.461	0.435	0.529	0.631	0.576

	Furniture, Toys, Instr.	***Plastic or Rubber***	***Stone & Glass***	***Textiles & Cloth***	***Vegetables***	***Wood***
Variables	lvalue	lvalue	lvalue	lvalue	lvalue	lvalue
Ln(RER)	0.068***	0.066**	0.057**	**0.165*** **	**0.266*** **	0.105***
	(0.024)	(0.030)	(0.027)	(0.023)	(0.039)	(0.032)
Ln(Foreign demand)	0.167***	0.125***	0.088***	0.107***	0.044***	0.089***
	(0.012)	(0.008)	(0.006)	(0.003)	(0.006)	(0.009)
Competitiveness Effect	0.233***	2.245***	0.282***	0.167***	0.235**	0.818***
	(0.057)	(0.203)	(0.073)	(0.029)	(0.095)	(0.158)
Ln(Tariff rate)	0.034***	-0.003	-0.001	**-0.026*** **	0.026***	0.024***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.006)
NTM-SPS dummy				**-1.006*** **	-0.210***	-0.039
				(0.083)	(0.058)	(0.099)
Observations	31,977	55,785	64,014	156,194	45,306	25,197
R-squared	0.512	0.483	0.432	0.398	0.521	0.528

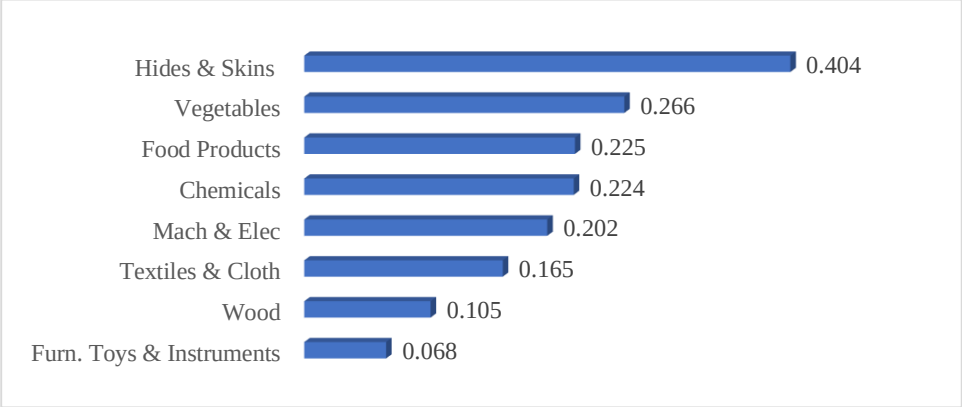
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (firm-product-destination) level. NTM-SPS dummy has been omitted from several sectors due to being invariant across the sector and time invariant.

The pattern of the magnitude of coefficients in Figure 5 reveals that the positive effect of the devaluation on the value of exports is strongest among sectors that use a larger proportion of domestic intermediate inputs in their production. On the other hand, for sectors that are heavily reliant on imported materials in production process, the positive effect of exchange rate devaluation on exports is partially offset by increased costs, resulting in a weaker response of export growth to devaluation. For example, exports of the hides and skins, vegetable products and food products sectors show the largest responses to the exchange rate devaluation, which is predictable since these sectors are based mainly on domestic resources. However, for sectors such as textiles and clothing and furniture, toys and instruments, the supply channel of the

exchange rate devaluation constrains the response of their exports due to higher cost of imported intermediate goods.

Regarding the other explanatory variables, all sectors respond positively to increases in foreign demand and competitiveness. The only sector that responds positively and significantly to lower tariff rates is textiles and clothing. Chemicals, food, textiles and vegetables sectors' exports respond positively to relaxing non-tariff measures. In general, firms in the minerals sector behave differently with their exports only responding positively and significantly to increased foreign demand, while all other coefficients appear insignificant.

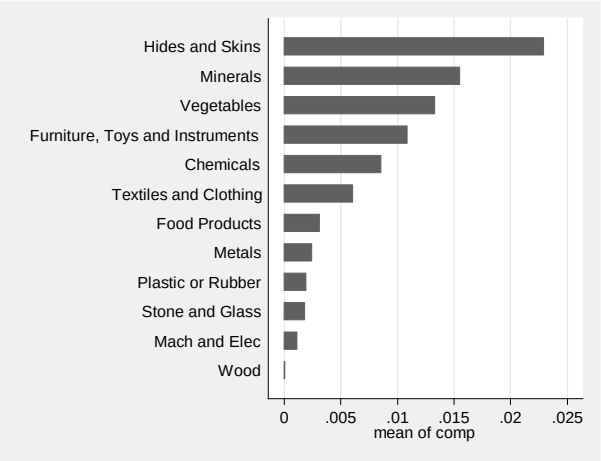
Figure 5. Graphical representation of the sectoral RER largest and most significant coefficients



Source: Constructed by the authors.

Another interesting result is that the two sectors, namely the hides and skins and minerals sectors, which have the highest means of competitiveness effect in the sample (see Figure 6) are the only two sectors showing either an insignificant relation between competitiveness effect and export value in the case of the minerals sector or a moderate significance in the case of the hides and skins sector. Moreover, those sectors that show the largest positive relation have the lowest competitiveness effect means in the sample. As an interpretation for this result, one can claim that increasing the competitiveness of exports of those sectors, which have the lowest competitiveness effects, such as the woods sector, the machinery and electronics sector, the plastic and rubber sector, the chemicals sector and the metals sectors, could result in a remarkable positive effect on their export value.

Figure 6. Mean competitiveness effect by sector over the period 2005-2016 (period average)



Source: Constructed by the authors.

Analysis at the HS2 and HS4 product level

In this section, we emphasize that the more disaggregated the analysis gets, the more accurate interpretations can be made, and accordingly more targeted-policy recommendations can be distilled. Thus, this section presents how results at a more disaggregated level can differ from a more aggregate one. The sectoral level can exhibit a relationship while the product subgroups and products (2-digit and 4-digit level) exhibit the opposite for the same relationship.

Starting with the sectors showing a positive significant relation between their exports and the real depreciation, we find that, for instance, exports of rice, which is one of the most frequently exported products classified under the vegetable products sector, is showing a negative insignificant relationship. Another example is exports of cotton (not carded or combed), which are also showing a negative relationship with real depreciation despite the overall positive and significant relationship of the textiles and clothing sector to real depreciation (See Table B1 in appendix B). Thus, generalizing a policy decision on a whole sector equally might be harmful for some strategic products like raw cotton and rice.

Similarly, sectors that show an insignificant or marginally significant relation between their exports and real depreciation show different results for their subsectors and products. For instance, exports of the Minerals sectors are generally insignificantly affected. However, marble products, which are the most frequently exported products in the sector, are in fact, negatively and significantly affected by a currency depreciation. Additionally, in the metals sector, iron and steel exports show a negative significant relation although their subsectors show a marginally significant one. Aluminum and nickel are the only products positively and

significantly affected in the metals sector (Table B1 in the appendix), although the sector as a whole shows a marginally positive and significant relation. Thus, enforcing a policy on steel, iron, copper and zinc products that is homogenous to the one imposed on aluminum and nickel might harm the production of these two products. In conclusion, when formulating policies for a certain sector, it cannot be generalized for products within the same sector.

Table 4. Subsectors (HS2) and products (HS4) showing the highest significant positive elasticity in relation to real depreciation (RER)

Relevant Sector Name & Subsector/Product code	Subsector or Product Name	RER coef.	# Obs.	R-sq.
Vegetable Products				
1211	Plants and parts of plants (including seeds and fruits), of a kind used primarily in perfumery, in pharmacy or for insecticidal, fungicidal	0.412***	15,318	0.44
Food Products				
1704	Sugar confectionery	0.330***	4,891	0.466
Chemical Products				
3004	Medicaments; for therapeutic or prophylactic use, put up in measured doses or packed for retail sale	0.400***	9,166	0.45
Plastic and Rubber				
40	Rubber and articles thereof.	*0.389****	*4,676*	*0.598*
Hides and Skins				
41	Raw hides and skins (other than fur skins)	*0.407****	*8,544*	*0.396*
Wood Products				
4818	Toilet paper; handkerchiefs, tissues, towels, serviettes, bed sheets and similar household or hospital articles, apparel and clothing accessories of paper pulp, paper, cellulose wadding or webs of cellulose fibers	0.278***	6,897	0.48
Textiles and Clothing				
5701	Carpets and other textile floor coverings	0.276***	11,957	0.538
6210	Garments made up of fabrics	0.246***	10,355	0.547
Mach. and Elec.				
8544	Insulated wire, cable and other electric conductors; optical fiber cables of individually sheathed fibers	0.496***	5,250	0.586

Source: Constructed by the authors' estimations.
Note: Results are based on the baseline regression (column 4 in Table 1). Coefficients of the other explanatory variables are not reported.

Across different end user good classification of exports

In order to examine how exports' response to real currency depreciation differs according to the product types exported, we classified exported products into three categories, namely intermediate, consumer or capital goods according to the goods' end user classification of the Broad Economic Categories (BEC) constructed by the UN. It is obvious from Table 5 that most of Egypt's exports over the period of study in the sample are intermediate goods followed by consumption goods, while capital goods exports are the least with an average share of total value of exports not exceeding 3 percent.

Table 5. End user good classification (Sample)

	Share of Obs.	***Share of Value***
Capital Goods	2.85%	2.86%
Consumption Goods	34.98%	23.3%
Intermediate Goods	62.15%	73.1%

Source: Constructed by the authors.

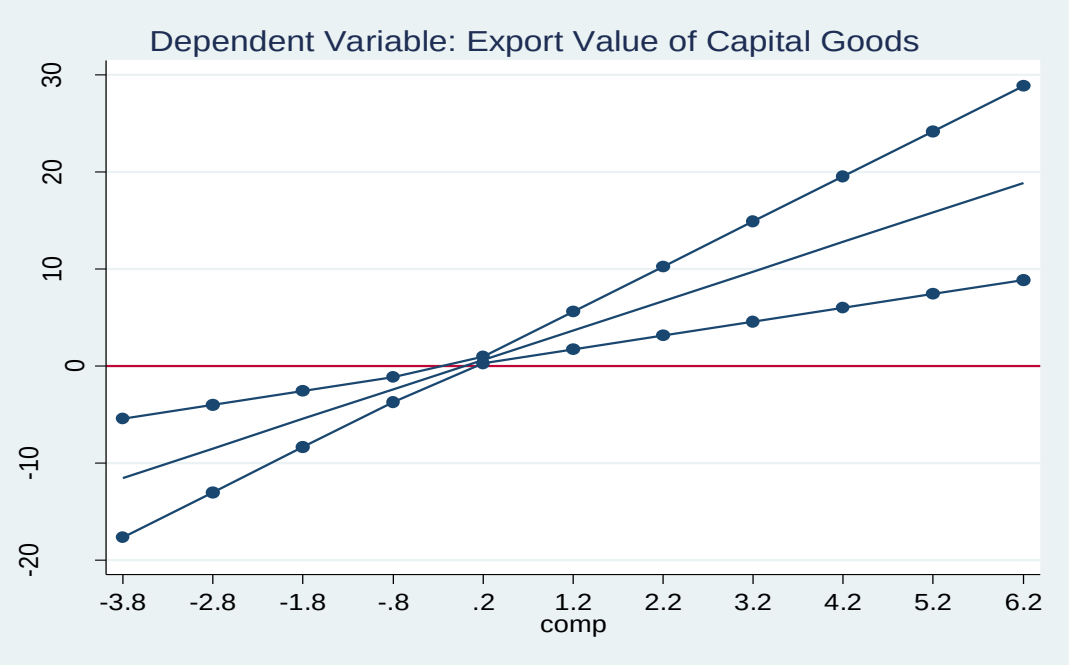
As is shown in Table 6, there is no substantial difference in the response of exports to currency depreciation across the three types of products, with very slight difference in the coefficients' magnitude. Specifically, capital goods which are higher on the value chain or are more differentiated, are the most responsive to exchange rate changes (price changes) with a higher dependence on the competitiveness effect. The competitiveness effect has a remarkably high positive and significant effect on the export value as well as on the relationship between RER and the exports value of capital goods, as is shown in Figure 7. Interestingly, capital goods have the lowest competitiveness mean in the sample (see Figure 8), which points to the higher importance of a competitiveness-enhancing policy for differentiated goods over an exchange rate one in order to increase the volume and hence the value of exports.

Table 6. Response of export value across the different end user categorizations of products

	(1)	*(2)*	*(3)*
	Intermediate Goods	***Consumption Goods***	***Capital Goods***
Variables	lvalue	lvalue	lvalue
Ln(RER)	0.117***	0.159***	0.162***
	(0.025)	(0.021)	(0.036)
Ln(Foreign demand)	0.086***	0.119***	0.177***
	(0.002)	(0.004)	(0.018)
Competitiveness Effect	0.146***	0.285***	5.209***
	(0.020)	(0.039)	(0.552)
Ln(Tariff rate)	0.013***	0.010***	0.012
	(0.002)	(0.002)	(0.008)
NTM-SPS dummy	-0.322***	-0.319***	-
	(0.044)	(0.102)	-
Observations	394,322	209,567	14,516
R-squared	0.532	0.403	0.549

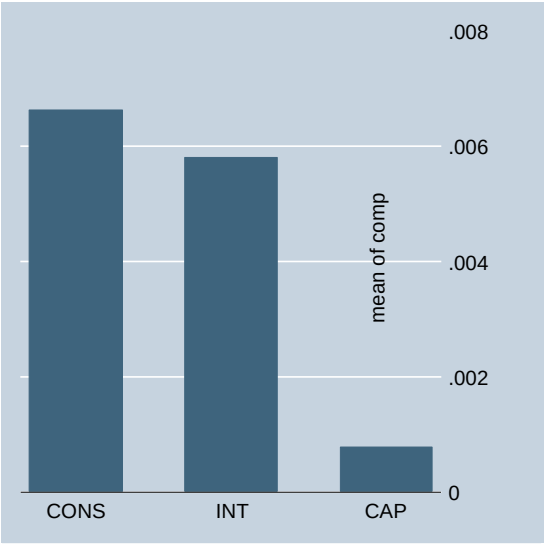
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (month-year) level. NTM-SPS dummy has been omitted from several sectors due to being invariant across the sector and time invariant.

Figure 7. The marginal effect of RER on the export value of capital goods as the competitiveness effect changes



Source: Constructed by the authors using GOEIC dataset.

Figure 8. Mean competitiveness effect by end user good classification (period average)



Source: Constructed by the authors using GOEIC dataset.

In an attempt to further explore the reason behind the relative value response differences between product types, we ran the regression on quantity and prices separately across the different product types. We find that while the prices of consumer and capital goods exports decrease due to currency devaluation, prices of intermediate goods surprisingly increase and accordingly can explain the relative rigidity in export quantity response shown in Table 7.

Hence, the relatively lower response of intermediate goods' export value can be attributed to the low response of export quantity due to the increase in prices.

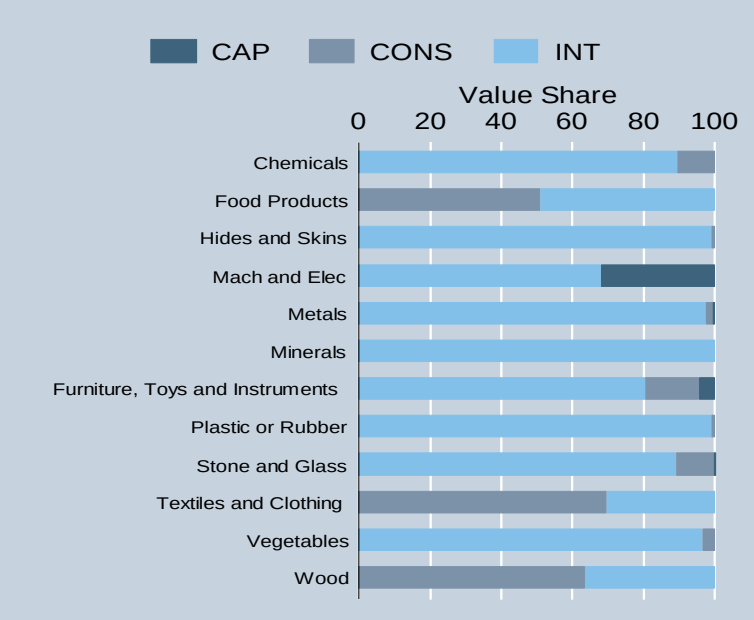
Table 7. Response coefficients of the quantity and price ($) of exports to real exchange rate across the different product types

	lquantity	*St.d*	*lusprice*	*St.d*
INT	**0.077****	(0.035)	**0.211*****	(0.024)
CONS	0.640***	(0.070)	-0.329***	(0.041)
CAP	0.645***	(0.095)	-0.321***	(0.083)

Source: Constructed by the authors.

Looking closely at the share of **product type** among the exports of the different sectors, we could not find a clear pattern for significant response determination. However, one can safely claim that sectors that showed either insignificant or marginally significant and positive relation between currency depreciation and export value are predominated by intermediate goods exports with a value share near a 100 percent in the sector's exports. These sectors are the metals sector, the minerals sector as well as the plastic and rubber sector (see Figure 9 and results of Table 3).

Figure 9. Export value share of product end user type in each sector (period average)



Source: Constructed by the authors.

This finding also implies that sectors with a large portion of their export value dependent on capital goods should show high responsiveness to depreciation. According to

Figure 9, the only sectors in the sample that export capital goods are the machinery and electronics sector with a share of only 35 percent of sector value and the furniture, toys and instruments sector accounts for less than 3 percent of value share. Thus, the heterogeneity of the response to real depreciation across the different sectors will not likely be affected by the share of product type by stage of production as most sectors are dominated by intermediate and consumption goods.

Across different exporter sizes

As literature suggests, firm size can be a factor in the determination of the exchange rate relation to exports (see, for example, Wagner 1995). As there are no information provided on individual firms, such as firm productivity and number of employees, we classified exporters into three categories according to the average of the firm's total value of exports over the sample period; firms below 10^{th} or the 25^{th} percentiles are classified as small, those within the 25^{th} and 75^{th} percentiles are medium (medium1 and medium2) and those above the 75^{th} or the 90^{th} percentiles are large as shown in Table 9.[10]

Results reflect the reality of exporters in Egypt; the larger the size of the exporter the greater the response of export value to changes in exchange rate beside the fact that all exporter sizes are significantly and positively affected by depreciation (see Table 8). Large exporters are generally more responsive to all variables in the estimations, especially export competitiveness, which is only significant for large exporters. On the other hand, small exporters are not as affected by exchange rate depreciation since they export in small quantities. In addition, they usually do not export themselves rather they export through intermediaries. This is due to the high transaction costs that small exporters face when exporting. Most of the explanatory variables are insignificant in explaining the intensive margin of smaller exporters while having a relatively small R-squared pointing to the possibility of a relatively higher importance of variables not depicted by the estimation variables, such as firm-related transaction costs.

[10] This methodology is a modified version of that depicted in an earlier version of Kamal and Zaki (2018).

Table 8. Response of export value across different sizes of exporters

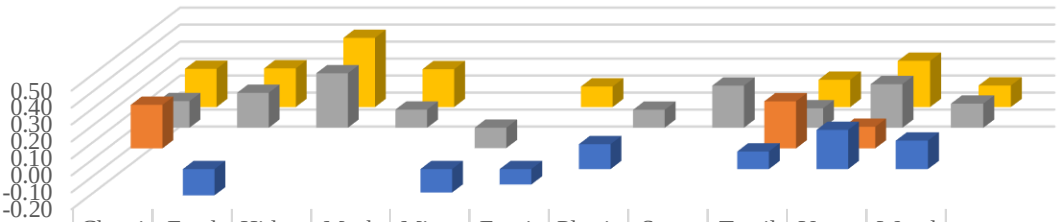
	(1)	*(2)*	*(3)*	*(4)*
Exporter Size	***Small***	***Medium***		***Large***
Percentile	**<25%**	**>25% & <50%**	**>50% & <75%**	**>75%**
Number of firms	**1115**	**1115**	**1115**	**1115**
Variables	lvalue	lvalue	lvalue	lvalue
Ln(RER)	0.048**	0.094***	0.122***	0.149***
	(0.020)	(0.020)	(0.020)	(0.025)
Ln(Foreign demand)	0.019***	0.035***	0.050***	0.121***
	(0.004)	(0.004)	(0.004)	(0.002)
Competitiveness Effect	0.021	0.042**	0.047	0.237***
	(0.037)	(0.019)	(0.029)	(0.026)
Ln(Tariff rate)	-0.005	0.010***	0.022***	0.012***
	(0.004)	(0.003)	(0.003)	(0.002)
NTM-SPS dummy	-0.100	0.095	-0.145***	-0.467***
	(0.061)	(0.067)	(0.054)	(0.048)
Observations	20,853	43,890	93,801	469,355
R-squared	0.315	0.365	0.372	0.435

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (firm-product-destination) level.

We ran regressions on each firm size inside each sector as is shown in Figure 11 to have a deeper analysis (see Figure 10). Although there is a definite positive relationship between exports' response to devaluation and firm's size at the aggregate level, this relationship is not clear-cut when examined within each sector. For some sectors, such as textile and clothing and chemicals, medium-sized firms increase their exports in response to exchange rate devaluation more than larger firms. One explanation could be that smaller firms in these sectors are able to exploit the price competitiveness by increasing their productivity and capacity utilization, which is not fully exploited. Interestingly, the negative significant effects of real depreciation on exports are only observed among small firms, specifically in food and furniture sectors. This sectoral analysis reveals that large firms could exhibit a stronger or weaker response to real depreciation as compared to small and medium sized firms, depending on the sector's characteristics.

Overall, the heterogeneity results show that the sectoral dimension is an important factor in determining the response of firms of different sizes to devaluation. This suggests that any policy decision should not be generalized on a sector or on an exporter size category as a whole, but a deeper look into the sectors should direct a more targeted policy making process.

Figure 10. The percent change of export value in response to a 1% real currency devaluation across different exporter sizes in each sector [11] (using baseline)



	Chemicals	Food Products	Hides & Skins	Mach & Elec	Minerals	Furniture, Toys & Inst.	Plastic or Rubber	Stone & Glass	Textiles & Cloth	Vegetables	Wood
small		-0.16			-0.14	-0.09	0.15		0.10	0.23	0.17
medium 1	0.26								0.28	0.13	
medium2	0.16	0.21	0.32	0.11	-0.12		0.11	0.25	0.12	0.26	0.14
large	0.23	0.23	0.41	0.22		0.121			0.16	0.27	0.13

Source: Constructed by the authors using the estimation results.

Across different exports' destinations

Regions of export destinations are classified based on a modified version of the UN region classification of countries (see Table 9).

Table 9. Export destination regions classifications

UNAIDS classified regions	*Share of Obs.*	*Share of Value*
East Asia	2.79%	2.90%
Eastern Europe and Central Asia	1.11%	0.58%
Middle East and North Africa	38.27%	28.31%
North America	8.47%	11.7%
South America	1.14%	1.12%
South and South-East Asia	4.54%	4.70%
Sub-Saharan Africa	8.37%	6.60%
Western and Central Europe	35.30%	44.06%

Results in Table 12 show that for regions to which Egypt exports the greatest share of its export value and with which export transactions are the most frequent, the effect of real depreciation is the highest. These regions are the Middle East and North Africa, Western and Central Europe, North America and Sub-Saharan Africa. Nonetheless, the competitiveness effect is higher in magnitude compared to the RER, which indicates that competitiveness is an

[11] Some sectors or firm sizes are excluded as sector and firm size combinations with insignificant coefficients were not included in the graph, so missing sectors or firm sizes are not significantly affected by RER changes. Exporter sizes are defined as in Table B2.

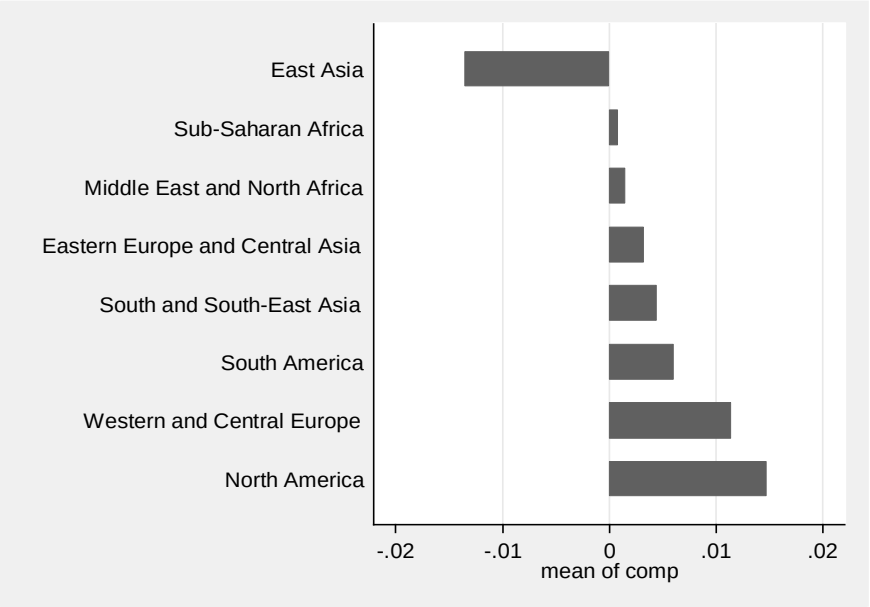
even more significant variable to affecting exports, especially exports to Sub-Saharan Africa. The average competitiveness of Egyptian exports in Sub-Saharan Africa is the second lowest among all the other regions (see Figure 11). This means that a policy targeted at improving Egyptian exports competitiveness, especially in Sub-Saharan Africa, will remarkably increase Egyptian exports to Egypt's biggest trade partners. Analyzing the foreign demand variable across the regions, we find that the value of exports is mostly affected by foreign demand in North America and Western and Central Europe. However, a country is more in control of its competitiveness unlike foreign demand, which is more of an exogenous factor since it is in the hands of the importers.

Table 10. Response of export value by region of export destination

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
	Eastern Europe & East & Central Asia	***South Asia***	***Middle East & North Africa***	***North America***	***South America***	***Sub-Saharan Africa***	***Western & Central Europe***
Variables	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1
Ln(RER)	-0.065*	0.074**	0.200***	0.224***	0.155***	0.246***	0.098***
	(0.033)	(0.036)	(0.026)	(0.030)	(0.045)	(0.027)	(0.024)
Ln(Foreign demand)	0.074***	0.086***	0.069***	0.317***	0.066***	0.093***	0.136***
	(0.008)	(0.007)	(0.003)	(0.016)	(0.013)	(0.006)	(0.004)
Competitiveness Effect	0.009	0.108**	0.254***	0.297***	0.550***	2.012***	0.324***
	(0.018)	(0.047)	(0.049)	(0.060)	(0.188)	(0.281)	(0.042)
Ln(Tariff rate)	-0.014	-0.000	0.011***	0.136***	0.017*	-0.007**	-0.006
	(0.009)	(0.005)	(0.002)	(0.010)	(0.009)	(0.003)	(0.006)
NTM-SPS dummy	0.102	-	-	-0.205	-	-	-0.234***
	(0.073)			(0.124)			(0.040)
Observations	24,682	27,324	222,581	54,616	7,738	56,000	232,021
R-squared	0.534	0.656	0.530	0.530	0.667	0.523	0.550

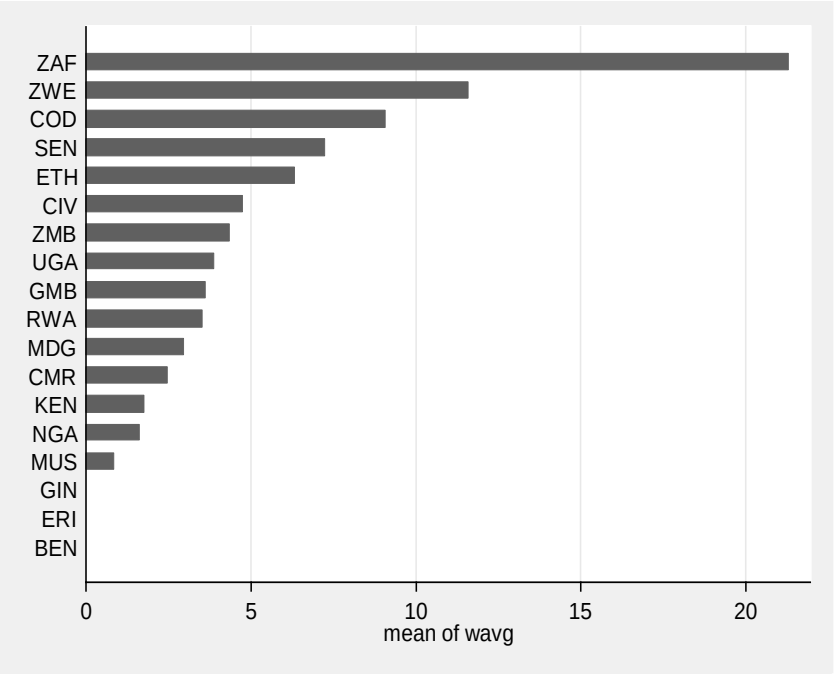
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (month-year) level.

Figure 11. Mean competitiveness effect among regions (sample)



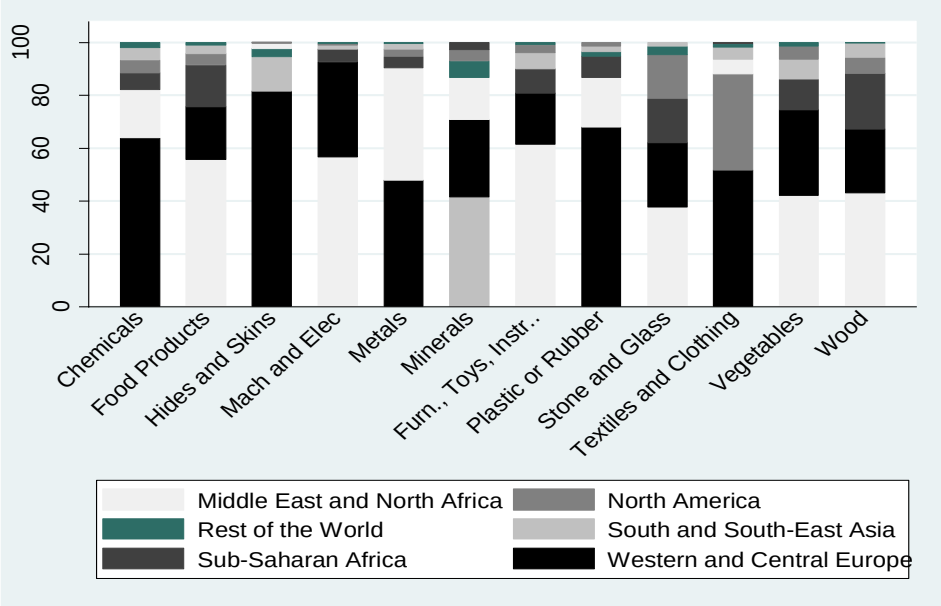
Analyzing the relevance of the other explanatory variables, we find that Sub-Saharan Africa is the only region showing a negative correlation between its imposed tariff rates and Egyptian exports (see Table 10). Similarly, the textiles and clothing sector is the only sector showing a negative correlation between tariff rates and exports (see Table 3). Moreover, the average tariff rates imposed on textiles and clothing sector's exports to Sub-Saharan Africa is greater than the average tariff rates of Sub-Saharan Africa on all Egyptian products and greater than the average tariff rates imposed on Egyptian textiles and clothing exports worldwide. Looking deeper on which countries impose highest tariffs on Egyptian textiles and clothing exports in Sub-Saharan Africa, we find South Africa (ZAF) to be one of the biggest importers of Egyptian textiles and clothing exports in the region as well as the highest tariff imposer (see Figure 12). Combining all of those results, one can safely deduce that having a more effective trade agreement targeted at textiles and clothing products between Egypt and countries in Sub-Saharan Africa, especially South Africa, can significantly boost exports of textiles and clothing in the region. This finding also suggests that exporting textiles and clothing products to high tariff imposing countries will negatively affect exports.

Figure 12. Average tariff rates imposed by countries in Sub-Saharan Africa on Egyptian textiles and clothing products



Analyzing the dominance of destination regions by sector, no common pattern was detected that could affect the significance of the sector's response to depreciation. All sectors, whether significantly affected or not, export mainly to the Middle East and North Africa as well as to Western and Central Europe, with the exceptions of the hides and skins sector and the minerals sector for which South and Southeast Asia replace the MENA region and of the textiles and clothing sector for which North America replaces the MENA region as well (see Figure 12).

Figure 13. Export value share of destination regions in each sector (sample)

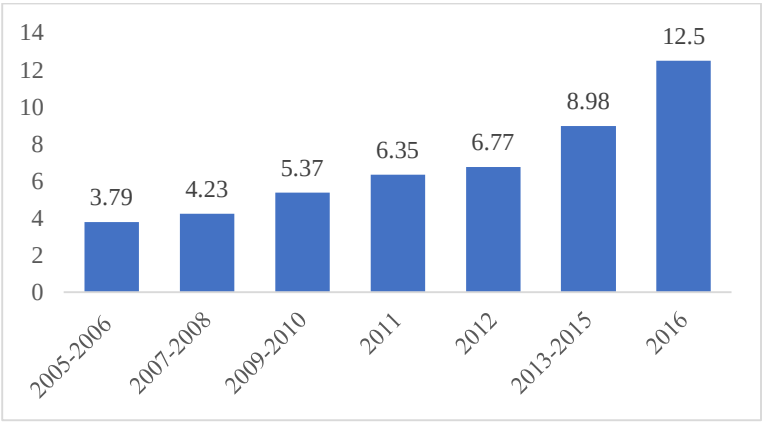


Source: Constructed by the authors.

Across different time intervals

The sample period of the study covers a period of multiple economic and political events that might have affected Egyptian export trade, such as the global financial crisis in 2008/2009, the Egyptian revolution and its following period of unrest from 2011-2013, and finally the speculation for the exchange rate floatation starting in the second quarter of 2016 till the end of the sample period in 2016. It is of interest to observe how such events can affect the influence of fluctuations in exchange rate on Egyptian exports and to what degree this relationship is stable. As is shown in Figure 14, the mean of RER shows a slow increase before 2013 when it starts to increase exponentially till October 2016.

Figure 14. RER mean by year-intervals



Source: Constructed by the authors.

After a long period of high and significant positive correlation between exports and depreciation till 2010, the following period in which Egypt experienced the highest internal political instability, namely in 2011 and 2012, the impact of currency depreciation on exports is statistically insignificantly. However, either the impact of political instability was insignificant to export performance or the negative impact was delayed to materialize in the following period, namely from 2013 till 2015 where depreciation started to have a significant negative effect on Egyptian exports. This negative impact can be one of the reasons speculations for further depreciation started end of 2015 and beginning of 2016. Indeed, the highest negative correlation is presented during the period of high speculation of currency depreciation and anticipation of high fluctuations in exchange rates in 2016 (Table 11). This observation leads to the conclusion that speculation of exchange rate regime instability might have a greater negative impact on exports than political instability.

Table 11. Response of export value in different time intervals

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
	2005-2006 Pre-Financial Crisis	**2007-2008 Financial Crisis**	**2009-2010 Post-Financial Crisis**	**2011 Egyptian Revolution**	**2012 Temporary unstable political state**	**2013-2015 New regime**	**2016 Speculation for Currency Depreciation**
VARIABLES	lvalue	lvalue	lvalue	lvalue	lvalue	lvalue	lvalue
Ln(RER)	2.240***	0.842***	0.598***	1.780	-1.254	-0.115**	-1.157**
	(0.419)	(0.197)	(0.104)	(1.561)	(2.681)	(0.043)	(0.480)
Comp	0.064***	0.074***	0.096***	0.103***	0.117***	0.103***	0.109***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.009)
Ln(Foreign Demand)	0.119***	0.144**	0.163***	0.868***	0.364***	0.455***	0.799***
	(0.015)	(0.060)	(0.037)	(0.109)	(0.045)	(0.058)	(0.102)
Ln(Tariff Rate)	0.020***	0.016***	0.005*	0.019**	0.019**	0.008***	0.025***
	(0.004)	(0.004)	(0.003)	(0.007)	(0.008)	(0.002)	(0.006)
NTM-SPS Dummy	-0.465	-0.173	-0.571***	-0.191	-0.613***	-0.478***	-0.222**
	(0.322)	(0.175)	(0.189)	(0.182)	(0.108)	(0.045)	(0.079)
Observations	74,803	105,188	109,304	56,937	56,481	183,582	38,758
R-squared	0.513	0.509	0.502	0.550	0.554	0.506	0.535

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the (month-year) level.

VII. CONCLUSION AND POLICY IMPLICATIONS

This study examined how the intensive margin responds to currency depreciation in Egypt during the period January 2005 till October 2016 using firm and product monthly transaction-level data. A linear regression absorbing multiple levels of fixed effects is utilized to control for the multi-dimensional unobservable time-invariant factors. It also incorporates product and

country level specific explanatory variables beside the real exchange rate measure (RER). For the overall relationship, we find that one percent real currency depreciation is associated with an 0.13 percent increase in the USD value of exports, a 1.3 percent increase in the EGP value of export and a 2.6 percent increase in quantity of exports.

Through interaction terms analysis, we also find that the competitiveness effect of a certain exported product in the destination country is one of the greatest factors in the model affecting the positive response of export value to real depreciation. However, the overall results for the response of the USD value of exports to real depreciation differs across different data classifications presented in the heterogeneity analysis, which is an important tool for constructing targeted export promoting policy recommendations in a time where the Egyptian currency is experiencing a serious devaluation.

The heterogeneity analyzes (1) the different sectors, (2) the subsectors and their frequently exported products, (3) the type of product by end user classification, (4) the exporter size as well as, (5) the destination regions of exports, and finally (6) the time periods of trade. The conclusions for the analysis are as following:

1. The sectors that are most positively and significantly affected by currency depreciation are in a descending order of the magnitude of effect as follows: The hides and skins sector, the vegetables sector, the food products sector, the chemicals sector, the machinery and electronics sector, the textiles and clothing sector and the wood sector and finally the furniture, toys and instruments sector.

2. Larger exporters in the hides and skins, the vegetables and the food products sectors are the most positively affected by real currency depreciation. The only sector showing a negative and significant association to higher tariffs is the textiles and clothing sector. We also found that exports of some sectors, which have relatively low competitiveness effect means, respond strongly to increases in competitiveness, such as the machinery and electronics sector and the metals sector. This hints to the importance of the Egyptian product market shares in the countries of destinations.

3. For this section, one of the main aims was to show that for sectors showing a certain relationship to real depreciation, a more disaggregated level of study might show a different picture. For sectors positively and significantly affected by real depreciation, some products are even negatively affected, such Cotton, not carded or combed inside the textiles and clothing sector. Other products are positively and

significantly affected inside sectors that showed an overall insignificant or a marginally significant response to real depreciation, such as rubber products inside the plastic and rubber sector among many other examples mentioned in the results section. A list of the most positively affected products is provided in the heterogeneity analysis section.

4. The value of capital goods exports, which shows the highest positive elasticity with respect to competitiveness, is the most responsive to real depreciation followed by consumption goods, while intermediate goods exhibit the least response.

5. Generally, larger firms' exports show a stronger response to currency devaluation. However, the sectoral analysis reveals that small and medium-sizes firms could have stronger or weaker response to real depreciation depending on the readiness of smaller firms in each sector to increase their capacity utilization and exploit the benefits of currency depreciation by increasing their export growth. For example, medium sized firms in the chemicals industries have a larger response to real depreciation relative to larger firms in the same sector.

6. The value of exports to the destination regions to which Egypt exports the greatest share of its export value and with which export transactions are the most frequent, the response to real depreciation is positive and significant. These regions are Middle East and North Africa, Western and Central Europe, North America and Sub-Saharan Africa. Interestingly, exports across different regions are most responsive to increased competitiveness, followed by their response to real depreciation. This is quite evident in the response of exports to Sub-Saharan Africa.

7. Considering different time intervals in the sample due to political and economic events, we find that in periods where there was high speculation of currency fluctuations and depreciation, such as the months in year 2016 that were followed by the decision to adopt a floating exchange rate regime in Egypt, the negative effect of real depreciation was much higher and significant on export value than periods of high political instability from 2011 to 2013 in which the effect of real depreciation was even positive.

Policy Implications

At the monetary policy level, as the overall magnitude of real depreciation is small, inflation needs to be closely monitored as not to increase to the extent of hindering exporters from decreasing their export prices in the international market. If foreign demand elasticity of exports in a certain sector is not sufficient to give room for firms to make profits in a time of high inflation rates, firms will decide to shift their production to the domestic market where they can set the prices that go along with the general increase in prices in the economy. This is especially the case in the period after the 2011 Revolution, in which not only excessive increases in inflation rates are taking place parallel to a currency depreciation exceeding 100 percent, but also in which, according to the study results, the response of export value to depreciation been negative.

At the fiscal and industrial policy level, higher taxes can be imposed on the beneficiaries of real currency depreciation in order for the government to be able to support those entities harmed on one hand and to support the beneficiaries themselves on the other hand in form of other investment promotions, trade and production facilitation benefits. Otherwise, smaller exporters may decide to shift their production to the domestic market instead or go out of business. Moreover, production in the positively affected sectors need to be encouraged through production facilitation benefits, which will not only increase export value but will also have a spill-over effect on domestic production of these products and hence decrease the dependence on their imports and accordingly decrease trade deficit. Beside encouraging investment, the needed infrastructure is multi-dimensional as it also needs a serious labor policy that ensures employers and workers are well equipped with the required skills, knowledge, education and training.

At the international trade policy level, government should promote collective exporting activities between smaller and larger exporters to decrease transaction and transportation cost for smaller exporters. Additionally, as per the study's findings, the product competitiveness in the destination region, i.e., its relative market share to the destination's global share for a certain product, is a key factor in increasing the positive influence of real depreciation in export value. Promoting and supporting a greater market share of sectors or in regions where the effect of the competitiveness is of high positive magnitude and significance will have a great boosting effect on exports. Finally, formulating trade agreements with the destination countries of those few sectors negatively affected by tariff rates will have a boosting effect on their exports. For the

regions that exhibit insignificant responses to depreciation or have the least price elasticity to Egyptian exports, it could be useful to encourage export diversifications. As exports to these regions will not sufficiently increase after depreciation, product diversification in these regions might introduce more elastically demanded products as well as increased exports to these regions. If this cannot be achieved due to external reasons, the focus of export production should be shifted from these regions to the regions that are more responsive to depreciation so as not to waste resources and be more efficient.

Limitations and Recommendations

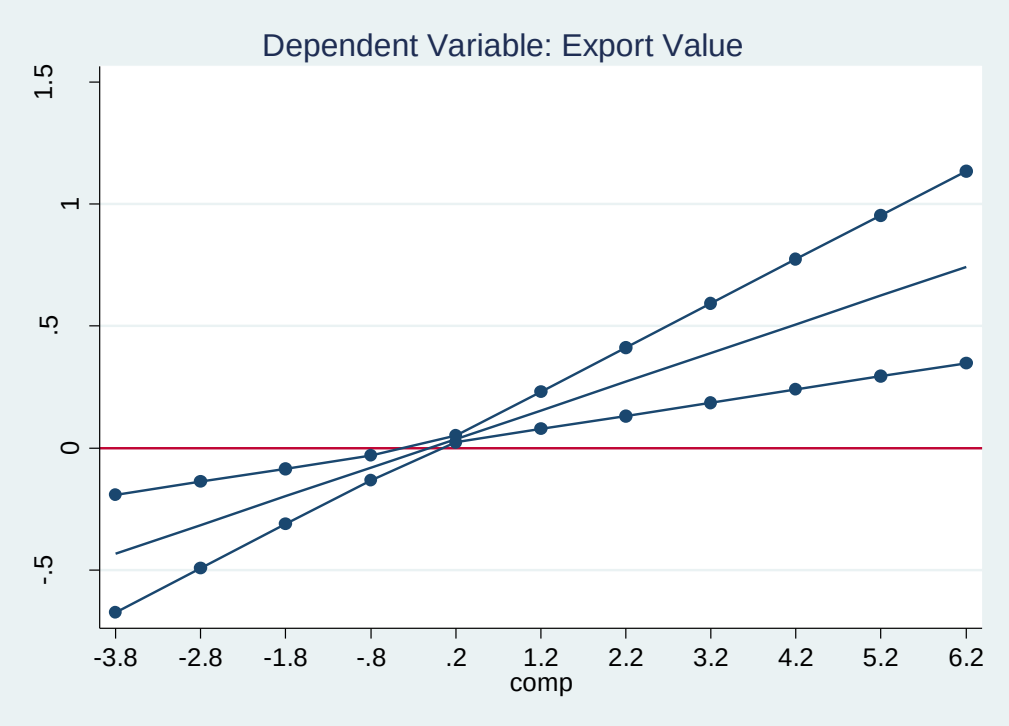
Despite the usage of a disaggregated dataset that is both rich and rare, some limitations were evident before and during the conduct of this study that might be possible to deal with in future research. One obvious limitation of this study is the sample period which ends before the start of the currency floatation in October 2016 due to shortage of data for the period following this date. A comparison between the export performance in a fixed regime vs. a floating regime could be further examined in future research when more time periods and data are available for the floating regime period.

Another limitation would be the lack of data on some of the useful characteristics of firms included in the study, which could have been used as additional control variables or used for the heterogeneity analysis. Examples of such variables would be the number of employees of each firm that could be used to compute firm productivity, the location of firms inside Egypt, the number of experience years in international trade, the type of firm ownership or whether the firm is a domestic, foreign, private or public investment. The dataset also lacks information about the fuel sector that constitutes the largest part of Egyptian exports, which gives room to a stand-alone study of the fuel sector upon availability of firm level monthly data. Finally, the large size and the unbalanced feature of the panel data used in this study posed great limitations in implementing a dynamic model, such as the GMM method or the CCE model.

Appendices

Appendix A: Main Results

Figure A1. Marginal effect of RER on export value as competitiveness effect changes



Source: Constructed by the authors. Dotted lines are confidence intervals at 95%.

Appendix B: Heterogeneity Analysis Results

Table B1. Response of export value of 2-digit (> 100 observations) and most frequently exported 4-digit products inside each sector to the RER and other explanatory variables

HS sections & codes	*Product Groups*	*Ln(RER)*	*Ln(fd)*	*comp*	*# of obs.*	*R-sq.*
Sector 2	**Vegetable Products**	***0.266****				
07	Edible vegetables and certain roots and tubers	0.196*	0.249**	1.856***	1,240	0.41
		(0.107)	(0.107)	(0.647)		
10	Cereals	-0.061	0.076***	-0.181	6,743	0.50
		(0.087)	(0.026)	(0.303)		
1006	*Rice*	*-0.165*			*5,802*	*0.423*
11	Prod.mill.indust; malt; starches; inulin; wheat	0.054	0.165***	0.696**	2,225	0.68
		(0.088)	(0.021)	(0.294)		
12	Oil seed, oleagi fruits; miscell grain, seed,	0.433***	-0.010	0.111	26,202	0.48
		(0.034)	(0.007)	(0.078)		
1211	*Plants and parts of plants (including seeds and fruits), of a kind used primarily in perfumery, in pharmacy or for insecticidal, fungicidal*	*0.412****			*15,318*	*0.440*
13	Lac; gums, resins & other vegetable saps & ext	0.178	0.008	1.244	936	0.72
		(0.142)	(0.070)	(1.361)		
14	Vegetable plaiting materials; vegetable product	0.435***	0.017	-0.334	536	0.50
		(0.002)	(0.001)	(0.033)		
15	Animal/veg fats & oils & their cleavage product	0.050	0.060***	2.388***	6,714	0.46
		(0.073)	(0.010)	(0.489)		
Sector 3	**Food Products**	**0.225*** **				
17	Sugars and sugar confectionery.	0.313***	0.176***	0.432***	6,922	0.63
		(0.048)	(0.028)	(0.088)		
1704	*Sugar confectionery*	*0.330****			*4,891*	*0.466*
18	Cocoa and cocoa preparations.	0.155	0.228*	2.376	1,586	0.64
		(0.161)	(0.116)	(1.843)		
19	Prep.of cereal, flour, starch/milk; pastrycook	0.083*	0.202***	1.350**	9,445	0.41
		(0.045)	(0.020)	(0.565)		
20	Prep of vegetable, fruit, nuts or other parts	0.253***	0.119***	1.540***	26,239	0.38
		(0.028)	(0.010)	(0.208)		
2001	*Vegetables, fruit, nuts and other edible parts of plants; prepared or preserved by vinegar or acetic acid*	*0.174****			*3,905*	*0.451*
2009	*Fruit juices (including grape must) and vegetable juices*	*0.238****			*11,239*	*0.387*
21	Miscellaneous edible preparations.	0.114***	0.168***	1.011**	11,644	0.37
		(0.039)	(0.016)	(0.433)		
2106	*Food preparations not elsewhere specified or included*	*0.255****			*4,092*	*0.454*
22	Beverages, spirits and vinegar.	-0.432***	0.131***	-2.441**	1,215	0.64
		(0.152)	(0.030)	(0.957)		
23	Residues & waste from the food indust; prepr a	0.165	0.062	0.981***	1,628	0.76
		(0.116)	(0.041)	(0.328)		
24	Tobacco and manufactured tobacco substitutes	0.321***	0.046**	0.282*	4,246	0.66
		(0.062)	(0.020)	(0.152)		
2403	*Manufactured tobacco and manufactured tobacco substitutes*	*0.331****			*4,093*	*0.666*
Sector 4	**Mineral Products**	**-0.017**				
25	Salt; sulphur; earth & ston; plastering mat; l	-0.005	0.077***	0.007	31,338	0.58
		(0.027)	(0.006)	(0.016)		

2515	*Marble, travertine, ecaussine and other calcareous stone*	*-0.211****			*19,175*	*0.401*
26	Ores, slag and ash.	-0.318***	-0.037**	-0.339*	712	0.68
		(0.112)	(0.019)	(0.195)		
Sector 5	**Chemical Products**	***0.224****				
28	Inorgn chem; compds of prec mtl, radioact elem	0.091**	0.146***	1.447***	9,678	0.70
		(0.042)	(0.015)	(0.118)		
29	Organic chemicals.	0.010	0.071**	1.870*	2,061	0.78
		(0.106)	(0.029)	(1.014)		
30	Pharmaceutical products.	0.395***	0.116***	0.007	11,739	0.43
		(0.044)	(0.025)	(2.55)		
3004	*Medicaments; for therapeutic or prophylactic use, put up in measured doses or packed for retail sale*	*0.400****			*9,166*	*0.450*
31	Fertilisers.	0.212***	0.198***	0.312***	3,335	0.69
		(0.076)	(0.041)	(0.111)		
32	Tanning/dyeing extract; tannins & derivs; pigm	0.531***	0.027*	1.460	6,316	0.51
		(0.043)	(0.015)	(1.007)		
33	Essential oils & resinoids; perf, cosmetic/toi	0.088**	0.191***	0.378	12,279	0.51
		(0.040)	(0.018)	(0.275)		
3301	*Oils; essential; concentrates thereof in fats, fixed oils, waxes or the like*	*0.143***			*5,072*	*0.306*
34	Soap, organic surface-active agents, washing p	0.175***	0.206***	4.510***	9,142	0.40
		(0.041)	(0.019)	(1.069)		
3402	*Organic surface-active agents (not soap); surface-active, washing and cleaning preparations*	*-0.106**			*5,214*	*0.492*
35	Albuminoidal subs; modified starches; glues; e	0.078	0.186***	5.006***	1,937	0.682
		(0.082)	(0.054)	(1.248)		
38	Miscellaneous chemical products.	0.078	0.190***	0.639***	5,335	0.72
		(0.064)	(0.023)	(0.151)		
Sector 6	**Plastics and Rubbers**	***0.066****				
39	Plastics and articles thereof.	0.029	0.149***	2.494***	50,997	0.48
		(0.030)	(0.009)	(0.240)		
3920	*Plastics; plates, sheets, film, foil and strip*	*-0.041*			*5,831*	*0.416*
3922	*Sanitary ware; baths, shower-baths, sinks, wash-basins, bidets, lavatory pans, seats and covers, flushing cisterns and sanitary ware, of plastics*	*-0.121***			*7,861*	*0.498*
3926	Articles of plastics and articles of other materials	*-0.073***			*13,892*	*0.414*
40	Rubber and articles thereof.	0.389***	0.015	0.358	4,676	0.598
		(0.050)	(0.021)	(0.238)		
Sector 7	**Hides and Skins**	**0.404***				
41	Raw hides and skins (other than fur skins) and	0.407***	0.048***	0.210**	8,544	0.396
		(0.045)	(0.014)	(0.105)		
42	Articles of leather; saddlery/harness; travel	-0.085	0.010	5.970**	1,018	0.559
		(0.128)	(0.052)	(2.935)		
Sector 8	**Wood Products**	***0.105****				
44	Wood and articles of wood; wood charcoal.	0.068	0.080***	0.296*	6,650	0.491
		(0.041)	(0.015)	(0.153)		
4402	*Wood charcoal*	*-0.177****			*3,456*	*0.406*
46	Manufactures of straw, esparto/other plaiting	0.627***	0.257**	4.646	176	0.727
		(0.208)	(0.103)	(5.360)		
48	Paper & paperboard; art of paper pulp, paper/p	0.137***	0.111***	1.759***	15,857	0.467
		(0.042)	(0.013)	(0.454)		
4818	*Toilet paper; handkerchiefs, tissues, towels, serviettes,*	*0.278****			*6,897*	*0.480*

		bed sheets and similar household or hospital articles, apparel and clothing accessories of paper pulp, paper, cellulose wadding or webs of cellulose fibers					
49		Printed books, newspapers, pictures & other prints	0.031	0.003	0.857	2,264	0.570
			(0.058)	(0.034)	(1.653)		
	4901	*Printed books, brochures, leaflets and similar printed matter,*	*-0.027*			*2,042*	*0.582*
Sector 9		**Textiles and Clothing**	***0.165******				
51		Wool, fine/coarse animal hair, horsehair yarn	0.378***	0.165***	1.236**	1,367	0.702
			(0.083)	(0.036)	(0.530)		
52		Cotton.	0.036	0.073***	0.142***	21,242	0.452
			(0.036)	(0.007)	(0.041)		
	5201	Cotton; not carded or combed	*-0.171***			*5,039*	*0.372*
	5205	Cotton yarn (other than sewing thread), containing 85% or more by weight of cotton, not put up for retail sale	*0.040*			*9,489*	*0.389*
53		Other vegetable textile fibres; paper yarn & w	0.089**	0.043***	0.117*	4,403	0.403
			(0.037)	(0.010)	(0.061)		
54		Man-made filaments.	0.067	0.084***	-0.143	4,216	0.572
			(0.074)	(0.015)	(0.211)		
55		Man-made staple fibres.	0.474***	-0.045**	0.145	4,651	0.535
			(0.070)	(0.020)	(0.090)		
56		Wadding, felt & nonwoven; yarns; twine, cordag	-0.013	-0.119*	10.578***	1,087	0.618
			(0.155)	(0.067)	(2.401)		
57		Carpets and other textile floor coverings.	0.234***	0.085***	0.111*	14,818	0.472
			(0.040)	(0.016)	(0.057)		
	5701	Carpets and other textile floor coverings	*0.276****			*11,957*	*0.538*
58		Special woven fab; tufted tex fab; lace; tapes	0.211***	0.073***	-0.281	10,290	0.468
			(0.067)	(0.020)	(0.205)		
	5811	Quilted textile products	*0.230****			*9,301*	*0.445*
61		Art of apparel & clothing access, knitted or c	0.091***	0.045***	0.040	33,550	0.419
			(0.025)	(0.016)	(0.101)		
	6109	T-shirts, singlets and other vests	*-0.087***			*18,757*	*0.423*
62		Art of apparel & clothing access, not knitted/	0.166***	0.005	-0.305**	36,379	0.462
			(0.029)	(0.012)	(0.150)		
	6203	*Suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts; men's or boys'*	*-0.087**			*9,829*	*0.507*
	6204	*Suits, ensembles, jackets, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts; women's or girls'*	*0.035*			*5,801*	*0.472*
	6210	*Garments made up of fabrics*	*0.246****			*10,355*	*0.547*
63		Other made up textile articles; sets; worn cloths	0.100***	0.148***	1.067***	22,971	0.372
			(0.035)	(0.016)	(0.182)		
	6302	*Bed linen, table linen, toilet linen and kitchen linen*	*0.068**			*17,809*	*0.354*
Sector 10		**Stones and Glass**	***0.057*****				
68		Art of stone, plaster, cement, asbestos, mica/	0.116***	0.024*	1.671***	20,788	0.360
			(0.035)	(0.014)	(0.308)		
	6802	Monumental or building stone, mosaic cubes etc., of natural stone including slate; artificially coloured granules of natural stone	*0.173****			*15,957*	*0.351*
69		Ceramic products.	0.098***	0.170***	0.142**	22,932	0.327
			(0.028)	(0.010)	(0.057)		
	6908	Glazed ceramic flags and paving, hearth or wall tiles; glazed ceramic mosaic cubes and the like	*-0.200****			*8,298*	*0.460*

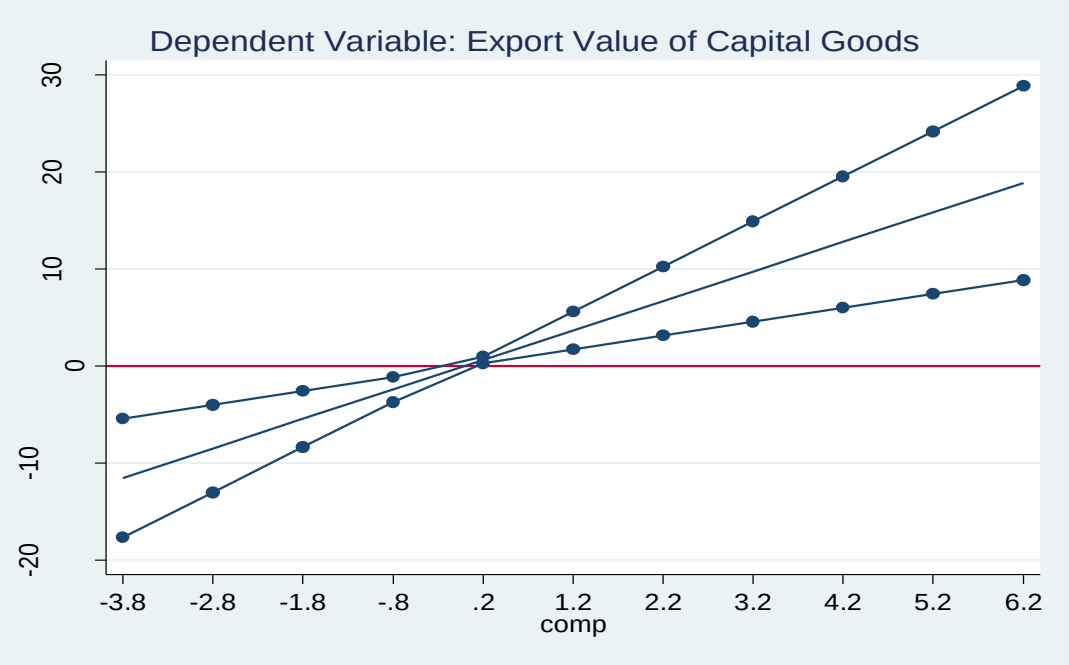
	6910	Ceramic sinks, wash basins, wash basin pedestals, baths, bidets, water closet pans, flushing cisterns, urinals and similar sanitary fixtures	*0.003*			*7,273*	*0.385*
70		Glass and glassware.	-0.056	0.046***	7.158***	18,842	0.393
			(0.040)	(0.011)	(0.582)		
	7013	*Glassware of a kind used for table, kitchen, toilet, office, indoor decoration or similar purposes*	*-0.253****			*6,410*	*0.562*
71		Natural/cultured pearls, precious stones & metals.	0.228*	-0.060**	4.572***	1,111	0.936
			(0.128)	(0.029)	(0.948)		
	7117	*Imitation jewelry*	*-0.034*			*427*	*0.321*
Sector 11		**Metals**	***0.055****				
72		Iron and steel.	-0.101*	0.117***	1.013***	9,973	0.696
			(0.055)	(0.015)	(0.191)		
73		Articles of iron or steel.	0.079**	0.117***	1.621***	19,696	0.474
			(0.035)	(0.016)	(0.444)		
	7326	*Iron or steel*	*-0.142***			*7,265*	*0.557*
74		Copper and articles thereof.	-0.108	0.058***	0.343*	3,574	0.712
			(0.076)	(0.021)	(0.197)		
75		Nickel and articles thereof.	0.212**	0.029	-11.751	2,007	0.406
			(0.096)	(0.025)	(7.874)		
76		Aluminium and articles thereof.	0.086**	0.186***	1.752***	10,333	0.709
			(0.041)	(0.016)	(0.111)		
82		Tool, implement, cutlery, spoon & fork, of bas	0.154	-0.087	2.445	2,005	0.551
			(0.100)	(0.059)	(2.324)		
Sector 12		**Mach & Elec.**	***0.202****				
84		Nuclear reactors, boilers, mchy & mech applian	0.052	0.187***	2.244**	12,101	0.440
			(0.039)	(0.017)	(1.109)		
85		Electrical machinery equip. parts thereof; sound rec	0.243***	0.210***	5.746***	17,426	0.553
			(0.036)	(0.017)	(0.550)		
	8544	Insulated wire, cable and other electric conductors; optical fiber cables of individually sheathed fibers	*0.496****			*5,250*	*0.586*
Sector 13		**Instruments, Furniture and Toys**	***0.068****				
90		Optical, photo, cine, meas, checking, precisio	0.067	0.125***	4.679**	3,955	0.513
			(0.052)	(0.036)	(2.169)		
94		Furniture; bedding, mattress, matt support, cu	0.027	0.258***	-1.782*	22,543	0.530
			(0.032)	(0.026)	(1.067)		
	9403	*Furniture and parts thereof*	*-0.002*			*18,793*	*0.544*
	9405	*Lamps, light fittings; including searchlights, spotlights and parts thereof, n.e.c.; illuminated signs, name-plates and the like*	*0.048*			*2,849*	*0.457*
95		Toys, games & sports requisites; parts & acces	0.189	0.012	51.398***	118	0.594
			(0.433)	(0.350)	(16.172)		
96		Miscellaneous manufactured articles.	0.032	0.065***	0.083	4,930	0.614
			(0.042)	(0.019)	(0.050)		
	9614	*Smoking pipes (including pipe bowls) and cigar or cigarette holders, and parts thereof*	*0.236****			*1,665*	*0.504*

Table B2. Interaction terms across the different end user categorizations of products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Intermediate Goods			***Consumption Goods***			***Capital Goods***	
Variables	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1
Ln(RER)	-0.007**	0.012***	0.012***	0.005	0.011***	0.011***	-0.087**	0.019
	(0.004)	(0.002)	(0.002)	(0.005)	(0.003)	(0.003)	(0.043)	(0.013)
Ln(Foreign demand)	0.004**	0.014***	0.041***	0.013	0.017	0.012***	-0.022	0.016***
	(0.002)	(0.001)	(0.013)	(0.052)	(0.012)	(0.002)	(0.014)	(0.004)
Competitiveness Effect	0.041***	-0.149***	0.013***	0.012***	0.010***	0.017	2.114***	-3.678***
	(0.013)	(0.045)	(0.001)	(0.002)	(0.003)	(0.012)	(0.577)	(1.184)
NTM-SPS dummy	-0.071***	-0.069***	-0.130**	-0.015	-0.015	0.074*	-	-
	(0.011)	(0.011)	(0.055)	(0.014)	(0.014)	(0.043)		
ln(RER)#ln(Foreign demand)	0.005***			0.001			0.023**	
	(0.001)			(0.001)			(0.009)	
ln(RER)#(Competitiveness effect)		0.124***			0.003			3.040***
		(0.036)			(0.032)			(0.822)
ln(RER)#(NTM-SPS dummy)			0.028			-0.043**		
			(0.024)			(0.019)		
Observations	511,138	511,138	502,160	282,135	282,135	282,259	22,455	22,455
R-squared	0.534	0.534	0.535	0.317	0.317	0.317	0.490	0.498

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Standard error clustered at the firm-product-destination level. coefficients for tariff rates and their interactions are not reported due to not being significant in all estimations and thus not of direct interest. All insignificant interaction terms were not reported in the table.

Figure B1. The Marginal effect of RER on the export value of capital goods as the competitiveness effect changes



Source: Constructed by the authors.

Table B3. Response of export value across different sectors for Western and Central Europe destinations

Western and Central Europe

	Chemicals	Food Products	Hides and Skins	Mach & Elec.	Metals	Minerals	Furn., Toys, Instr.	Plastic & Rubber	Stone & Glass	Textiles & Cloth.	Vegetables	Wood
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1	lvalue1
Ln(RER)	0.030	0.021**	0.061**	0.068*	-0.018	0.011*	0.009	0.017	-0.001	0.019***	0.006	0.004
	(0.024)	(0.011)	(0.030)	(0.041)	(0.019)	(0.007)	(0.011)	(0.014)	(0.005)	(0.005)	(0.004)	(0.006)
Ln(Foreign demand)	0.199	0.021	0.149**	0.416	0.788***	0.027**	-0.000	0.662***	0.099**	0.025**	-0.004	0.076***
	(0.193)	(0.045)	(0.062)	(0.684)	(0.088)	(0.013)	(0.001)	(0.185)	(0.047)	(0.012)	(0.013)	(0.028)
Competitiveness Effect	0.064***	0.011***	0.009	0.048***	0.032***	0.013***	0.008**	0.053***	0.013***	0.023***	0.008***	0.012**
	(0.011)	(0.004)	(0.005)	(0.013)	(0.007)	(0.002)	(0.004)	(0.008)	(0.004)	(0.002)	(0.001)	(0.005)
Ln(Tariff rate)	0.049**	-0.003	-0.025	-0.025	0.037**	-0.013	0.006**	0.042***	0.010*	0.003	0.017***	0.004
	(0.021)	(0.004)	(0.017)	(0.033)	(0.017)	(0.010)	(0.003)	(0.014)	(0.005)	(0.004)	(0.004)	(0.004)
NTM-SPS dummy	-0.026	0.033*	-0.020	-	-	-	-	-	-	-0.049***	-0.010	0.000
	(0.037)	(0.018)	(0.020)							(0.014)	(0.007)	(0.009)
Observations	18,917	13,363	6,606	12,763	19,180	14,311	17,213	24,292	25,322	96,123	21,352	15,380
R-squared	0.689	0.585	0.366	0.364	0.566	0.621	0.392	0.430	0.690	0.325	0.400	0.443

Source: Constructed by the authors.

Appendix C. Descriptive Tables and Figures

Overall:

Table C1. Summary Statistics of Estimation Variables

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Value (EGP)	817,559	1.031421	6.688676	0	858.97
Value ($)	817,559	.1621976	1.045143	0	124.71
Quantity	817,559	14926.43	841736	0	5.98e+08
RER	817,559	6.644852	2.546058	3.700868	13.01943
Foreign Demand	817,559	595.2741	1959.411	.001	128663.6
Competitiveness Effect	817,559	.0058293	.1335947	-3.880291	6.878121
SPS	817,559	.0015033	.0387427	0	1
Tariff rate (weighted average)	817,559	4.951866	15.13824	0	3000

Table C2. Correlation Matrix of Estimation Variables

	lvaluele	*lvalue*	*lquantity*	*lrer*	*lfd*	*comp*	*sps*	*Tariff rate*
lvaluele	1.0000							
lvalue	0.9445	1.0000						
lquantity	0.4591	0.3613	1.0000					
lrer	0.0990	0.0358	0.0419	1.0000				
lfd	0.1830	0.1551	0.1326	0.0301	1.0000			
comp	0.0369	0.0433	0.0207	-0.0541	0.0002	1.0000		
sps	0.0050	0.0015	-0.0053	0.0354	0.0084	-0.0012	1.0000	
Tariff rate	0.0138	0.0034	0.0954	-0.0060	0.0192	0.0030	0.0083	1.0000

Sectors:

Table C3. Transaction frequency by sector (sample)

Sector	*Obs. freq.*	*% freq.*
Chemicals	73,913	9.04
Food Products	75,786	9.27
Hides and Skins	13,378	1.64
Mach and Elec	43,607	5.33
Metals	60,202	7.36
Minerals	38,258	4.68
Miscellaneous	55,161	6.75
Plastic or Rubber	68,412	8.37
Stone and Glass	83,180	10.17
Textiles and Clothing	191,892	23.47
Vegetables	56,102	6.86
Wood	57,666	7.05
Total	817,557	100.00

Figure C1. Export value share by sector (sample)

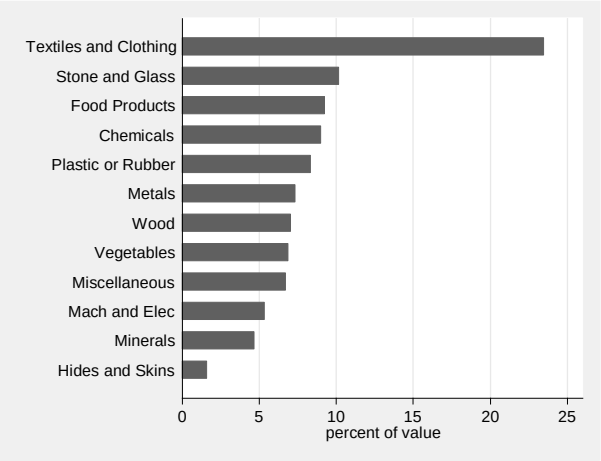


Figure C2. Export value share by sector for each year (sample)

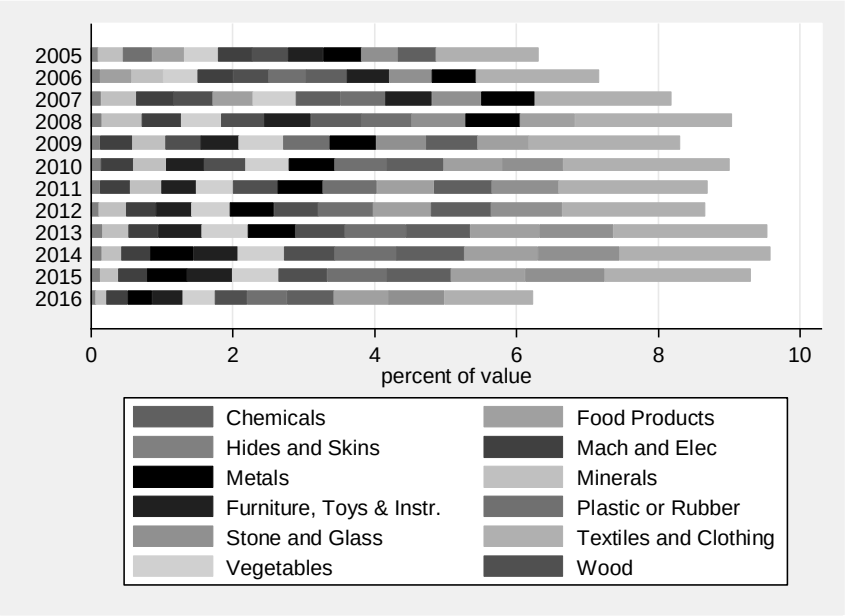


Figure C3. Mean tariff rate by sector (sample)

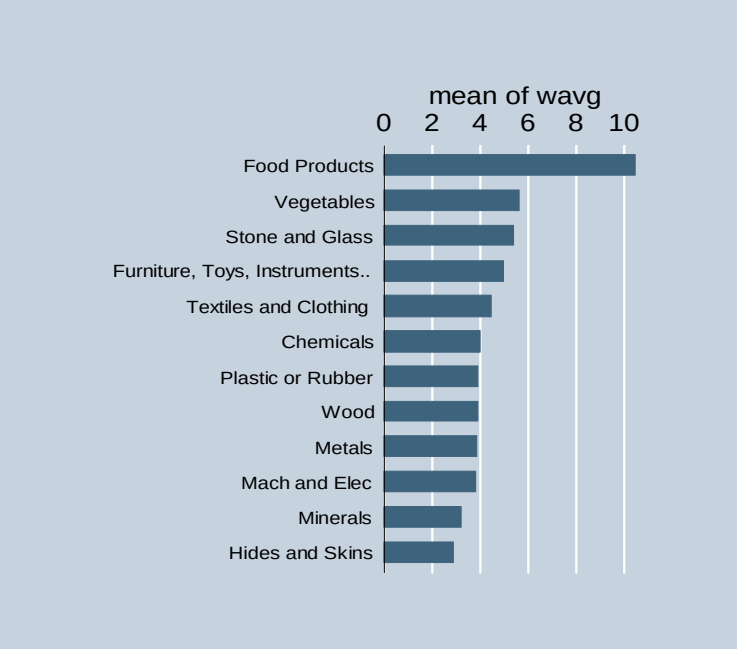


Figure C4. Mean competitiveness effect by sector (sample)

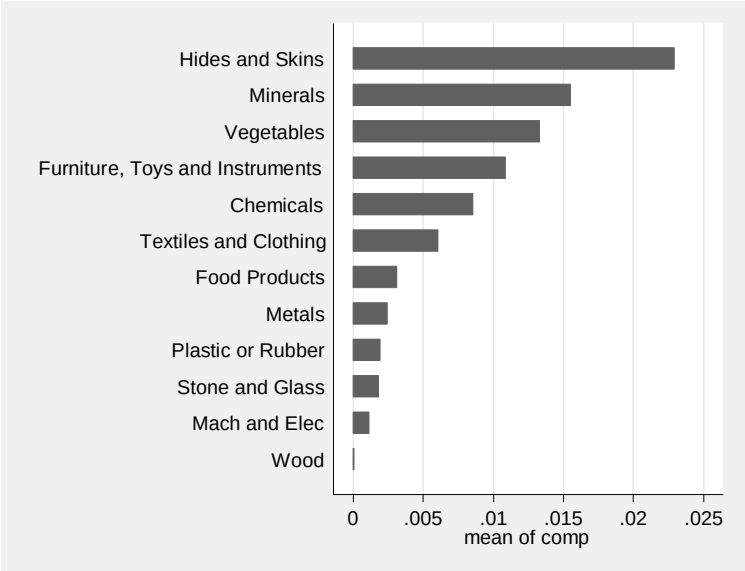
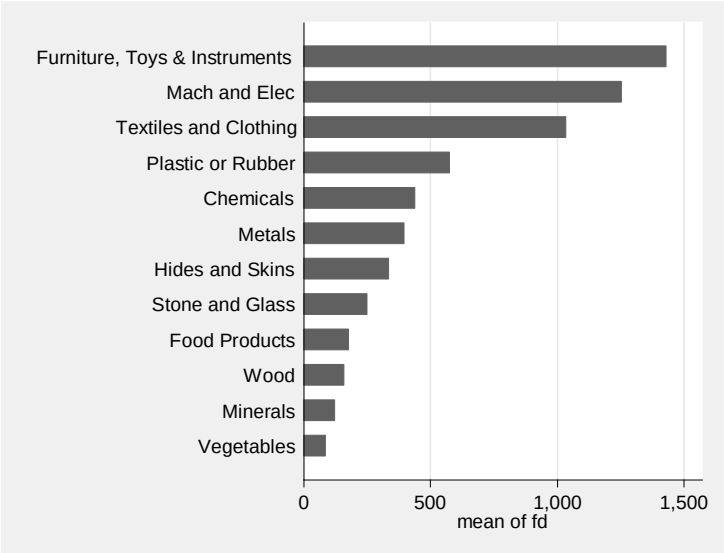


Figure C5. Mean foreign demand by sector (sample)

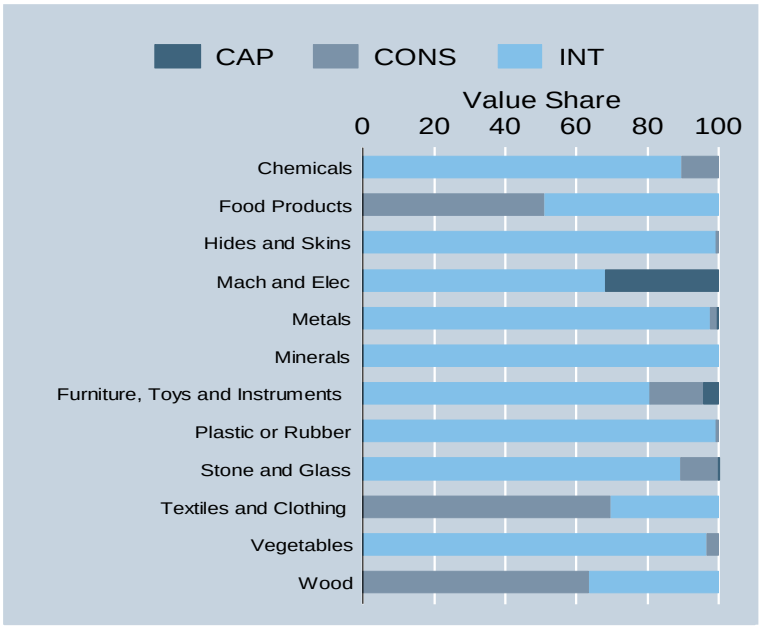


End-user Classification:

Table C4. End user good classification (Sample)

End user good classification	*Share of Obs.*	*Share of Value*
Capital Goods	2.85%	2.86%
Consumption Goods	34.98%	23.3%
Intermediate Goods	62.15%	73.1%

Figure C6. Export value share of product end user type in each sector (sample)



Source: Constructed by the authors.

Figure C7. Mean competitiveness effect by end user good classification (sample)

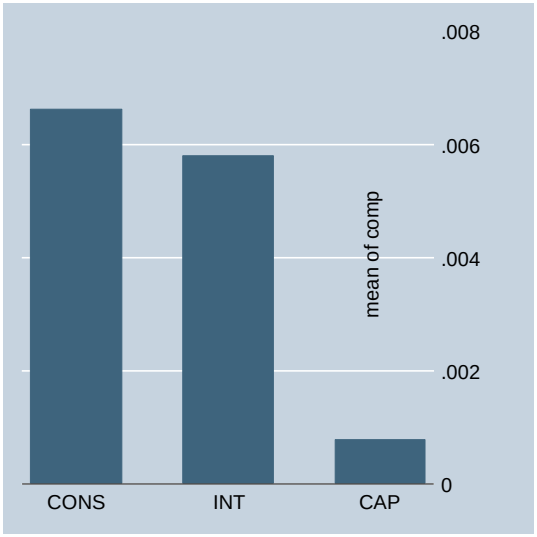
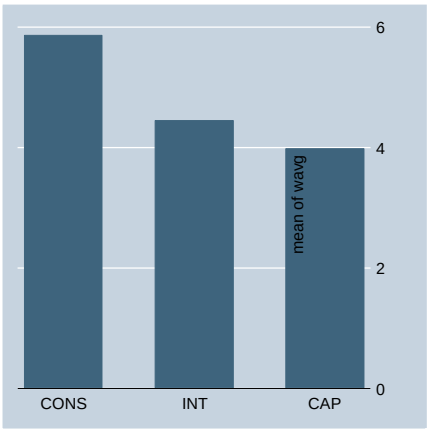


Figure C8. Mean tariff rates by product end user type (sample)

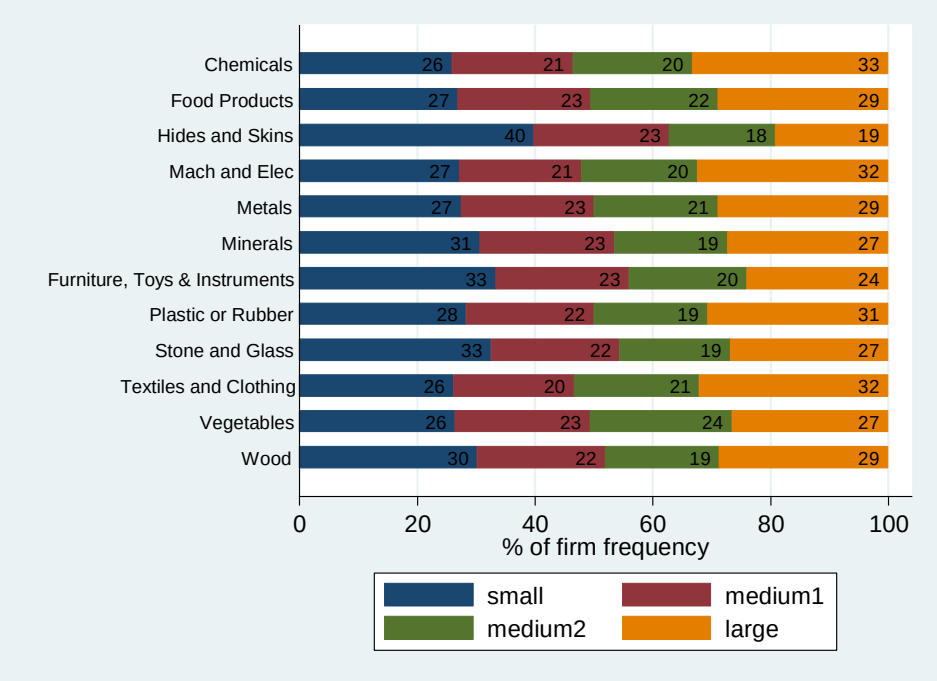


Exporter Sizes:

Table C5. Exporter size classification (Sample)

Exporter Size (5510 firms)	*Share of Obs.*	*Share of Value*
Small Exporters (<25 percentile)	8.57%	0.33%
Smaller Medium Exporters (>25 & <50 percentile)	11.19%	1.1%
Larger Medium Exporters (>50 & < 75 percentile)	16.0%	3.98%
Larger Exporters (>75 percentile)	64.24%	94.6%

Figure C9. Exporters distribution by exporter size and sector (Sample)



Source: Constructed by the authors.

Regions:

Table C6. Export destination regions classifications

UNAIDS classified regions	*Share of Obs.*	*Share of Value*
East Asia	2.79%	2.90%
Eastern Europe and Central Asia	1.11%	0.58%
Middle East and North Africa	38.27%	28.31%
North America	8.47%	11.7%
South America	1.14%	1.12%
South and South-East Asia	4.54%	4.70%
Sub-Saharan Africa	8.37%	6.60%
Western and Central Europe	35.30%	44.06%

Figure C10. Export value share by region in the whole sample in each year (sample)

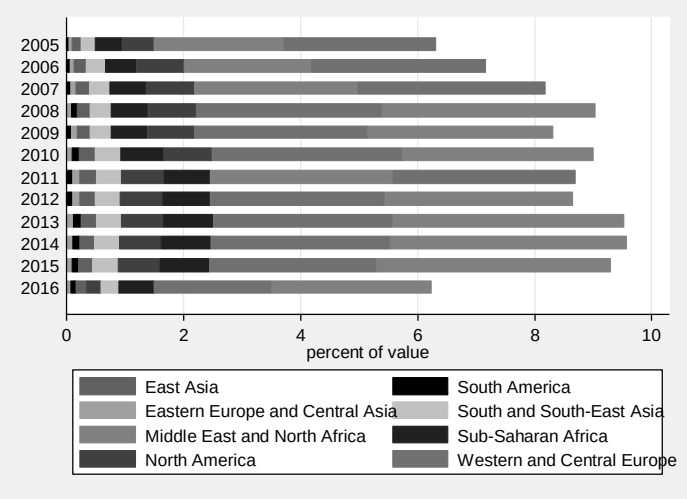


Figure C11. Mean competitiveness effect by region of destination (sample)

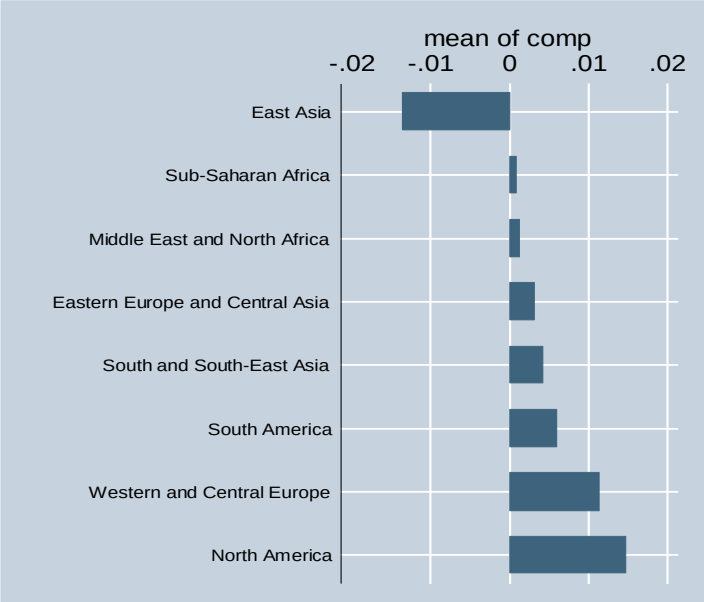


Figure C12. Mean tariff rate by region (sample)

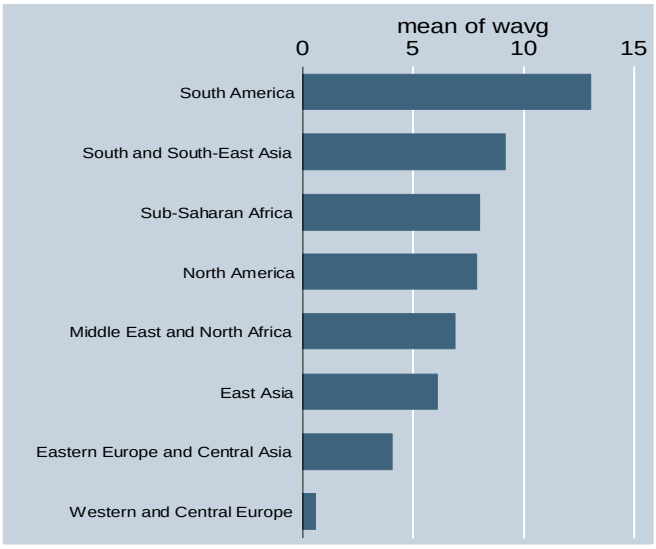
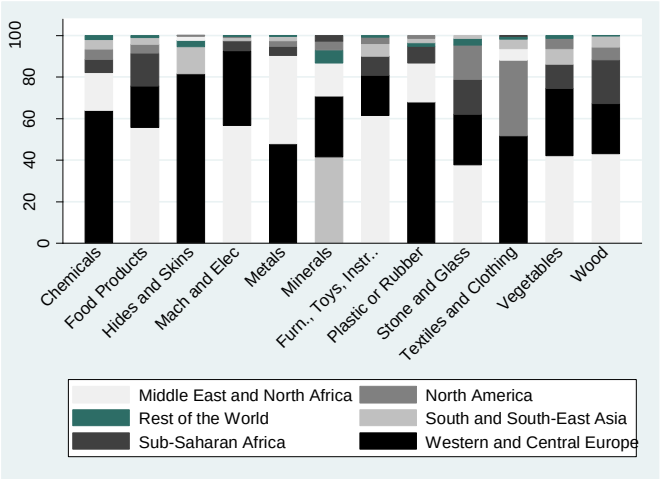


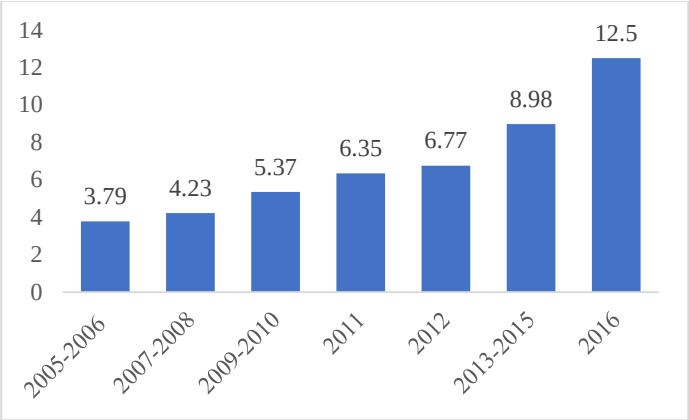
Figure C13. Export value share of destination regions in each sector (sample)



Source: Constructed by the authors.

Time Intervals:

Figure C14. RER mean by year-intervals



Source: Constructed by the authors.

Table C7. List of Egypt's Trading Partners included in the Analysis

84 Countries (or areas)		
Albania	Great Britain	Pakistan
Algeria	Greece	Portugal
Argentina	Guinea	Qatar
Australia	Hungary	Romania
Austria	India	Russia
Bahrain	Indonesia	Rwanda
Belgium	Iran	Republic of Korea
Benin	Ireland	Saudi Arabia
Brazil	Israel	Senegal
Bulgaria	Italy	Singapore
Cameroon	Japan	Slovakia
Canada	Jordan	Slovenia
Chile	Kenya	Somalia
China	Kuwait	South Africa
Colombia	Lebanon	Sri Lanka
Croatia	Lithuania	Sweden
Cyprus	Madagascar	Switzerland
Czech Republic	Malaysia	Thailand
Côte d'Ivoire	Malta	Tunisia
D. R. of the Congo	Mauritania	Turkey
Denmark	Mauritius	Uganda
Eritrea	Mexico	Ukraine
Ethiopia	Morocco	UAE
Finland	Netherlands	USA
France	New Zealand	Viet Nam
Gambia	Nigeria	Zambia
Georgia	Norway	Zimbabwe
Germany	Palestine	Taiwan

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