Export unit value across markets: dampened by export subsidies

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Abstract

The export unit value is influenced by the characteristics of the export market destination. However, this influence is dampened when export subsidies are provided by the government on specific products to incentivize the exporters. We use firm-level data on Pakistani exporters merged with product-level data on the provision of export subsidies in this study. We find that the provision of export subsidies on the products exported dampens this relationship as some of the export market characteristics that otherwise influence export unit value become insignificant. We split the sample of firms according to the product classification of the products exported, such as differentiated industrial products and homogenous non-industrial products, and the size of total export sales to determine whether the provision of export subsidies dampens the impact of export market characteristics on export unit value across the different product classifications as well as across larger and smaller exporters. We believe that the results have implications for policymakers providing incentives to the exporters.

JEL code: F12; F13; L25; L52

1. Introduction

The relationship between export unit value and export market characteristics, suggesting that firms are likely to vary product quality across different destinations, is well documented. Several studies find that average export unit value reported by exporters is likely to be higher for products destined to richer, smaller, more distant, and more centrally located markets. Further, the government may intervene by providing export subsidies on exports to encourage firms to participate in exporting activities. As the provision of export subsidies can be crucial in defining the export strategy of firms, the influence of the export market characteristics on the export unit value set by firms may be dampened with the provision of export subsidies. Although, export subsidies can increase export volume, their provision may likely to dampen the impact of the export market characteristics on export unit value. This is one of the first studies to determine whether the influence of the characteristics of the export market on the export unit value varies for firms based on whether they are provided export subsidies from the government for the products they export.

Larger exporters are not only likely to earn greater revenues from exporting activities relative to smaller exporters but also sell to a larger number of export destinations. They are also more likely to access government support via export subsidies and other incentives. Larger exporters are also more likely to receive a larger amount of export subsidies relative to smaller exporters, particularly if export subsidies are provided ad valorem. The influence of the export market characteristics on export unit value may differ across smaller and larger exporters, with the latter reporting a greater level of significance for each variable as they are more likely to receive export subsidies. In addition, we split the products into industrial products and non-industrial products. Industrial products are more differentiated across varieties than non-industrial products. Firms exporting industrial products can benefit from greater price differentiation across exporters than firms exporting non-industrial products, reducing the size related
advantages otherwise benefitting larger firms. This suggests that characteristics of the export market may influence export unit value differently not only based on whether firms receive export subsidies but also vary across firms based on total export sales and the product classification.

The influence of export market characteristics on export unit value is estimated using OLS regressions at the product-level and at the firm-level. The product-level estimations include product fixed effects, and the firm-level estimations include firm-product fixed effects. As export unit value set by the firm is conditional on entry into a market, selection bias is likely to play an important role. We introduce a variable accounting for selection effect, estimated through a two-step and a three-step estimator, as a robustness check. Our results estimated using the OLS regressions hold. We add to the literature on trade policy as we find that the provision of export subsidies does dampen the influence of characteristics of the export market on export unit value reported by exporters across different firm sizes as well based on the classification of the products they export.

2. Literature Review

Several studies have linked the characteristics of the trading partners with the level of product quality of goods traded. Baldwin and Harrigan (2011), a seminal study using bilateral product-level data on US exports, interconnects product quality with geography. The authors report a positive relationship between export unit value and distance but a negative relationship with GDP, GDP per capita and remoteness. Harrigan, Ma and Shlychkov (2015) find that US firms are likely to compete on quality rather than price. While high-priced firms may sell in more distant markets, they may not necessarily export more expensive products to richer markets. Hummels and Skiba (2004) test the Alchian-Allen Conjecture, which suggests that the presence of lower per unit transaction costs lowers the price of higher quality goods, making it profitable to export high priced goods to distant markets. Bastos and Silva (2010) is one of the first studies to provide firm-level evidence on the characteristics of export destinations driving export quality as suggested by unit value of exports. The study uses data on Portuguese exporting firms and reports strong evidence of a positive relationship between export unit values and income of the export destinations, their size, and the distance between Portugal and its trading partners. Since exporters of high-quality and high-priced goods will find it profitable to export to richer and more distant markets, the findings suggest that self-selection within the heterogeneous firm model likely plays an important role. We report similar results in our study. However, Bastos and Silva (2010) lack in providing a clear explanation for their findings. Manova and Zhang (2012) address this gap as it further validates the findings that quality differentiation across firms plays an important role in increasing their export performance. Our study adds to the literature as it also reports that Pakistani exporters are likely to receive higher unit values on exports to richer and distant markets, while receive lower unit values on exports to larger and more remotely located markets.

One of the many ways in which policymakers can address market failures leading to inefficient allocation of resources is by providing firm-specific export subsidies. Nocco, Ottaviano and Salto (2019) suggest that a more efficient outcome can be achieved through export subsidies. Hence, export subsidies are an
important trade policy tool in developing countries. The per-unit transfer of subsidies should decrease as marginal costs of production increases, with low-cost firms subsidized and high-cost firms taxed on trade. Our study adopts the theoretical model introduced by Nocco et al. (2019) to determine the effectiveness of export subsidies as it considers how the impact of country characteristics differs for firms exporting products receiving export subsidies and firms exporting products not receiving export subsidies. Demidova and Rodriguez-Claire (2007) state that export subsidies may increase exports and the productivity level of exporters as it may positively influence the profits of exporters, encouraging more firms to export. Bagwell and Lee (2015) report that a small export subsidy can benefit the home country if transportation costs are low, and dispersion of firm productivity is high. Further, Defever and Riano (2012) differentiate between pure exporter subsidies and standard export subsidies. Pure exporter subsidies are provided to exporters who sell all their output abroad. According to their findings, pure exporter subsidies tend to reduce welfare. However, we do not differentiate between pure and standard export subsidies in this study. In addition, Lashkaripour and Lugovskyy (2022) find that unilateral adoption of industrial policies, such as export subsidies, can worsen the terms-of-trade of the exporting country and result in lowering welfare. The result is magnified in nationally differentiated industries, where exporting countries may enjoy higher market power. Pfluger and Russek (2014) explore the role of industrial policies with heterogeneous firms and find that a country can be forced into specialization of low value-added goods if asymmetries exist between trading partners in business conditions. This is an important finding as developing countries like Pakistan with a weaker business environment than several of its trading partners may not necessarily experience an increase in export unit values of their products receiving export subsidies. Harrison and Rodriguez-Claire (2010) suggest that lack of demand for more sophisticated goods in the domestic market may prevent the development of necessary sophistication for success in the international market. Hence, exporters provided with export subsidies may report lower levels of export unit value as they specialize in unsophisticated low value-added products relative to exporters that do not receive such provisions. Although, export subsidies may increase exports, it may not necessarily translate into higher export unit value. This is the main finding of our study.

Melitz and Redding (2015) pinpoint that tougher competition in larger export markets, which are characterized by a larger number of sellers and lower average prices, is likely to reduce the markups charged by the exporters. Exporters may find it not only hard to export to larger markets but also more difficult to survive in such markets, particularly firms incurring higher costs. This can increase the average size of the firms in the market as low-cost firms are provided an opportunity to expand their export sales. Mayer, Melitz and Ottaviano (2014) find that market size and geography have an important impact on the product mix exported by firms, such that firms typically skew the sales of the best performing products into bigger and more competitive destinations, increasing the share of their better performing products. Although, our study does not account for the product mix of the exporters, it does find that the increased competition and remoteness of the destination markets are likely to lower the markup reported by the exporters. Further, Mayer and Ottaviano (2008) suggest that larger exporters are likely to export more products to more locations than smaller exporters. Hence, we expect larger exporters to not only withstand tougher competition in foreign markets but also produce more varieties that are exported to a
wider range of destination markets. We contribute to the literature by determining whether larger exporters of products for which the government provides export subsidies report a dampening of the influence of export market characteristics on export unit value.

The Pakistani government uses export subsidies as an important policy instrument to incentivize exporters. Ahmad (2015) states the importance of enhancing export incentives in Pakistan, particularly for value-added textile exports, for firms to maintain export competitiveness. Haque and Kemal (2007) analyze the impact of subsidy schemes on exports originating from Pakistan. The authors, using country-level data, find that export financing as well as rebate and refunds have an insignificant impact on the exports from Pakistan in the long-run. Zia (2008), using unique loan-level panel data on Pakistani exporters, finds that larger firms not only seize an opportunity from subsidized loans provided to encourage exporting activities but are also more likely to remain unaffected by the removal of credit subsidies relative to smaller firms. Defever, Riano and Varela (2020) find that export finance schemes have a positive effect on the value of exports of participating firms. The main purpose of our study is to determine whether the influence of export market characteristics on export unit value differs for firms exporting products on which export subsidies are provided in comparison to firms that export products on which export subsidies are not provided.

3. Model

Nocco, Ottaviano, and Salto (2019) extend the theoretical model developed by Melitz and Ottaviano (2008). They incorporate the role of heterogeneous firms in a monopolistically competitive environment with differences in the level of toughness of competition across countries. In our study, we consider a global economy that consists of $M$ countries, indexed by $l = 1, \ldots, M$. Each country $l$ has $L_l$ consumers supplying one unit of labor to a perfectly competitive labor market. Every consumer in country $l$ may choose a traditional homogeneous good $h$ and a continuum of varieties of differentiated goods, denoted by $\Omega_l$ and indexed as $i \in \Omega_l$. The utility function for each consumer is presented in Eq. 1, where $q_{hl}^c$ and $q_{li}^c$ denote the consumption levels of traditional homogeneous goods and variety $i$ of the modern differentiated good by each consumer respectively:

$$U_l = q_{hl}^c + \alpha \int_{i \in \Omega_l} q_{li}^c (i) \, di - \frac{1}{2} \gamma \left( \int_{i \in \Omega_l} q_{li}^c (i) \right)^2 \, di - \frac{1}{2} \eta \left( \int_{i \in \Omega_l} q_{li}^c (i) \, di \right)^2$$

We assume that $\alpha$, $\eta$, and $\gamma$ are all positive, and that $\alpha$ and $\eta$ index the level of substitution between the traditional and the modern goods. An increase in $\alpha$ and a decrease in $\eta$ both shift out the demand of the differentiated goods relative to the homogeneous good. $\gamma$ indexes the level of product differentiation between the varieties. Higher the level of product differentiation, greater the weight to the distribution of consumption levels across the varieties of each product. When $\gamma = 0$, consumers consider the varieties to be perfect substitutes as they do not differentiate between varieties.
We assume labor to be the only input into production. The firms producing traditional goods employ labor under perfection competition with constant returns to scale, while the firms producing modern goods employ labor under conditions of monopolistic competition. Every firm produces a unique variety. All firms supplying differentiated varieties of the modern goods incur a sunk cost to design a blueprint of the variety and incur a marginal cost, \( v \), to produce each unit of output. The marginal cost is drawn from a continuous distribution with cumulative density function, \( G_l(v) = \left( \frac{v}{v_{M,l}} \right)^k \), \( v \in [0, v_{M,l}] \). The marginal productivity, \( 1/v \), is Pareto distributed with shape parameter, \( k \geq 1 \), such that \( \left[ \frac{1}{v_{M,l}}, \infty \right) \). Together with the fixed costs, the marginal costs indicate the state of technology in the respective countries. We also assume that all exporters in country \( l \) pay an iceberg transportation cost to ship their goods to country \( h \) such that \( \tau_{hl} > 1 \) units of a good be transported from country \( l \) for one unit of the good to arrive in country \( h \), where \( h \neq l \).

We assume that all consumers have a positive demand for the traditional good. The first order for utility maximization results in the following inverse demand for each variety \( i \) of the modern good:

\[
p_l(i) = \alpha - \gamma q^C_i(i) - \eta Q^C_l
\]

Where \( q^C_i(i) > 0, \quad p_l(i) \) denotes the price of variety \( i \) in country \( l \) and \( Q^C_l = \int_{i \in \Omega_l} q^C_i(i) \, di \) denotes the total individual demand of the differentiated varieties of the modern goods. The aggregate demand of variety \( i \) in country \( l \) is:

\[
q_l(i) \equiv L q^C_l(i) = \frac{\alpha L_l}{\eta N_l + \gamma} - \frac{L_l}{\gamma} p_l(i) + \frac{\eta N_l}{\eta N_l + \gamma} L_l \bar{p}_l \forall i \in \Omega^*_l
\]

where \( N_l \) is the number of consumed varieties in \( \Omega^*_l \) and the average price of each variety is \( \bar{p}_l = \frac{1}{N_l} \int_{i \in \Omega_l} p_l(i) \, di \). We assume that variety \( i \) belongs to \( \Omega^*_l \), which is the largest subset that satisfies the following:

\[
p_l(i) \leq \frac{1}{\eta N_l + \gamma} (\gamma \alpha + \eta N \bar{p}_l) \equiv p_{max}
\]

Where \( p_{max} \) is the price at which the demand of variety \( i \) in country \( l \) is zero.

Suppose firms selling modern goods set prices for each market that they sell. The quantity sold to market \( h \) by a firm producing in country \( l \) at marginal cost \( v \) is \( q_{lh}(v) \) at price, \( p_{lh}(v) \). The profit maximization level of output being sold to market \( h \) is, where only firms in country \( l \) with low enough marginal cost will be able to sell in market \( h \):
The profit maximizing price is $p^*_m(lh)(v) = \tau_{lh} \left( v^*_m(lh) + v \right) / 2$ and markup is $\mu^*_m(lh)(v) = \tau_{lh} \left( v^*_m(lh) - v \right) / 2$. The maximized profit is:

$$\pi^*_m(lh)(v) = \frac{L_h(\tau_{lh})^2(v^*_m(lh) - v)^2}{4\gamma}$$

We assume that $\tau_{lh}v^*_m(lh) = \tau_{hh}v^*_m(hh) = p^*_m(hh)$ and that $\tau_{hh} = 1$ and $\tau_{lh} > 1$. Firms incurring lower costs in selling to foreign markets will set lower prices and earn higher revenues relative to firms earning higher costs. However, low-cost firms do not necessarily pass on their cost differential to their consumers as they may set higher markups than firms incurring higher costs. In other words, two firms with different marginal costs will set prices that result in a higher price ratio than the ratio of their marginal costs. This difference will be greater if cutoff $v^*_m(lh)$ is larger.

We assume that exports of certain goods to country $h$ from country $l$ receive specific per-unit transfer from the government, $s_{hl}(v)$. This transfer payment subsidizes exports of low-cost varieties from country $l$ to country $h$. Each firm that receives export subsidies will now earn a revenue of $(p_l + s_{hl}(v) - \frac{\gamma}{L_h} q_{hl}(v))q_{hl}(v)$ and the corresponding production cost is $(\tau_{hl}(v))q_{hl}(v)$.

The profit generated by the firms receiving export subsidies is:

$$\pi^s_{hl}(v) = \left( p_l + s_{hl}(v) - \frac{\gamma}{L_l} q_{hl}(v) - (\tau_{hl}(v)) \right) q_{hl}(v)$$

$$= \frac{L_h(\tau_{lh})^2(v^*_m(lh) - v)^2}{4\gamma} + s_{hl}(v) \frac{L_h}{2\gamma} \tau_{lh}(v^*_m(lh) - v)$$

Suppose the cutoff rule for firms receiving subsidies is $v^*_m(\cdot)$ and $s^*_{hl}(v) = s_{hl}(v) \frac{L_h}{2\gamma} \tau_{lh}(v^*_m(lh) - v)$ for simplicity, the profit generated by subsidized firms will be:

$$\frac{L_h(\tau_{lh})^2(v^*_m(lh) - v)^2}{4\gamma} + s^*_{hl}(v) = \frac{L_h(\tau_{lh})^2(v^*_m(lh) - v)^2}{4\gamma}$$
Firms that were unable to export prior to the provision of export subsidies due to their high marginal costs will now be able to export as the cutoff, in terms of marginal cost, increases with the provision of per-unit export subsidies to firms. More low-cost firms benefit from export subsidies than high-cost firms as the former generate higher levels of markup. In this study, we differentiate the firms based on their size of export sales as larger firms are more likely to receive export subsidies than smaller firms given that the government provides export subsidies on the products they export. The former may likely benefit from the economies of scale, helping them to reduce their costs of production. Further, export subsidies can help compensate for the greater competition in the destination market and higher transportation costs reported by exporters.

Altomonte, Colantone and Pennings (2016) extend the Melitz and Ottaviano (2008) model by introducing asymmetry in the degree of product differentiation across varieties. They find that an increase in the level of product differentiation, determined by $\gamma$ in the model above, can result in a smaller productivity premium for exporters. Therefore, firms incurring higher marginal costs will be more likely to export their goods as the level of product differentiation increases. As export subsidies benefit low-cost firms more than high-cost firms, the price differential due to the provision of export subsidies is likely to be higher for firms exporting more differentiated industrial products. In other words, as the productivity premium is likely to be low due to higher levels of differentiation at the product-level, firms exporting products not eligible for export subsidies may export at higher export unit values than their counterparts who are exporting products eligible for export subsidies. This is less likely to be the case for exporters of less differentiated non-industrial products as they report a higher productivity premium.

Nocco, Ottaviano, and Salto (2019) highlight the fact that demand becomes more inelastic as consumption increases, resulting in larger markups for firms incurring lower levels of marginal costs as they do not fully transmit their lower cost advantage onto their prices. This allows inefficient firms with higher levels of marginal costs to compete against firms with lower levels of marginal costs. In essence, there will be a substantive presence of smaller exporters, in terms of total export sales, reporting higher levels of marginal costs competing against larger exporters within their industry.

The results in our study suggest that the export unit value set by firms exporting products on which export subsidies are provided is likely to be influenced differently by the characteristics of the export destinations in comparison to firms that export products on which export subsidies are not provided. Further, access to export subsidies may vary across firms based on the size of their total export sales, it is likely that the export market characteristics influence export unit value set by the larger exporters differently compared to the export unit value set by the smaller exporters.
4. Data

The transaction-level data on exports from Pakistan is provided by PRAL Custom House, Karachi. Although the data is reported for every transaction by firms to its export market at eight-digit product level, classified according to the Pakistan Customs Tariff, we aggregate the transactions so that each observation uniquely identifies at the firm-product-destination level. As the data includes all export transactions reported by the government in 2019 and the smallest transactions are more likely to involve data entry errors, we exclude the outliers falling below the three-percentile level from our study. There are 89,163 total observations at the firm-product-destination level and 21,689 observations at the product-destination level. There are 11,992 firms exporting 2,382 products at eight-digit level to 158 export destinations. We consider only those transactions for which the export quantities are categorized in terms of their weight.

A limitation of this study is that the dataset does not include data on the recipients of export subsidies on the firm-level. A dataset involving the provision of export subsidies at the firm-level is ideal for this study. However, due to its unavailability we make use of data on the provision of export subsidies at the product-level which serves as the next best alternative. We extract the data on export subsidies from Global Trade Alert database provided since 2008 and merge it with the firm-level data at HS six digit level as provided from the source. This database is one of the most comprehensive coverage on state policies impacting international trade. The relevant state interventions classified as export subsidies at the product-level include export subsidies, tax-based export incentives and trade finance as defined in the Global Trade Alert database. 7,831 firms export at least one of the 218 products reporting export subsidies. The government mostly provides tax-based export incentives to exporting firms.

We extract the data on GDP per capita at purchasing power parity (constant 2017 international dollars) and GDP at purchasing power parity (constant 2017 international dollars) from the World Development Indicators provided by the World Bank (2022). We extract the data on distance between Pakistan and its trading partners from CEPII’s ‘GeoDist’ database as referenced in Conte, Cotterlaz and Mayer (2022). We calculate the remoteness index using the data on GDP at purchasing power parity and distance.

We classify the products into industrial products and non-industrial products using the reference data available at World Bank’s World Integrated Trade Solution (WITS). This classification is available at the HS six-digit level. There are 1,930 industrial products and 452 non-industrial products. 10,064 firms export at least one industrial product and 2,755 firms export at least one non-industrial product. Approximately 55 percent of the firms exporting industrial products and non-industrial products are eligible for export subsidies.

We further classify the export firms according to the value of total exports, with larger firms classified as those reporting export sales larger than the median firm. Although, 50 percent of the firms are classified as larger exporters, they account for approximately 83 percent of all firm-product-destination observations. Approximately 56 percent of all firm-product-destination observations reported by larger
exporters and 53 percent reported by smaller exporters receive export subsidies. In essence, larger exporters are more likely to export a larger range of products to a larger number of export destination markets and report more observations than smaller exporters, but the larger exporters are almost as likely as smaller exporters to undertake transactions in which they are supported by the provision of export subsidies.

As a robustness check, we include a term accounting for the selection effect in this study. We consider all export transactions, reported at firm-product-destination level, totaling more than 1,500,000 Pakistani Rupees (approximately US$ 10,000). These transactions are more likely to be accurately documented by the data collection authority. The number of observations decrease to 47,002\(^9\) .\(^{10}\).

5. Econometric Specification

We first consider the impact of the characteristics of the export markets on the export unit value at the product-level. We sum the value and the total quantity of exports across all firms selling a given product at the eight-digit HS level to a particular market. We then divide the sum of the value of exports to the total quantity as calculated to obtain the average export unit value at the product level. We report the results from the following gravity equation in Tables 1 and 2:

\[
\ln \text{unitvalue}_{ik} = \beta_1 \ln Z_i + \gamma_k + \epsilon_{ik}
\]

The \(\text{unitvalue}_{ik}\) is the average export unit value calculated at the product-level, while \(Z_i\) denotes the characteristics of the destination markets. \(\gamma_k\) is product-level fixed effects and \(\epsilon_{ik} \sim N(0,1)\).

We consider the GDP per capita, GDP, distance from Pakistan and remoteness of the destination market. Manova and Zhang (2012) use the same variables in their product-level gravity equations determining the impact of the characteristics of export destinations on export unit values. It is expected that GDP per capita and distance will have a positive influence on the export unit value, while GDP and remoteness will have a negative influence. Exports to richer markets and to more distant markets will likely fetch a higher value at the product-level, while exports to larger markets are likely to report tougher competition. Firms that incur higher marginal costs may produce goods of higher quality and sell at a higher price. An increase in competition in the export destination may force such firms to lower their price. Exports to more centrally located markets will not only face greater competition from other exporters but also provide exporters from Pakistan an opportunity to expand their exporter network through a larger number of contacts available in the market\(^{11}\). Hence, a firm that is unable to build export networks by taking advantage of denser clusters of buyers around a particular location may sell at lower export unit value to locations that would otherwise exhibit tougher levels of competition. Further, the impact of GDP per capita, distance and remoteness may decrease for exporters of products on which export subsidies are provided as the extra source of revenue from the government may reduce the desire to export to destinations that can generate greater export unit value. In addition, the industrial products are more likely
to be differentiated than non-industrial products, such that a wider range of varieties with different unit values may cater to different export markets. One of the main concerns with the regressions at the aggregate product-level is that although the results are consistent based on the gravity model, the firm prices may not be consistent. Therefore, a more detailed analysis, which is disaggregated at the firm-level becomes necessary. The dataset provides an opportunity to examine the impact of country characteristics of the export destinations on export unit values reported at the firm-level.

We estimate the impact of country characteristics of the export destinations on the export unit values at the firm-level using the following equation:

\[
\ln \text{unitvalue}_{fik} = \beta_1 \ln Z_{ik} + \gamma_f + \epsilon_{fik}
\]

The \( \text{unitvalue}_{fik} \) is the average export unit value calculated at the firm-level, while \( Z_{ik} \) denotes the characteristics of the destination countries exported by each firm. \( \gamma_f \) is firm-product level fixed effect and \( \epsilon_{fik} \sim N(0,1) \).

The use of product fixed effects in Eq. 8 and firm-product fixed effects in Eq. 9 is likely to reduce the concerns on measurement errors. For instance, while products may be differentiated regardless of whether the firms are eligible for export subsidies as new products are introduced, firms may face varying constraints that impact their ability to diversify into new markets. Some firms may face relatively lower trade obstacles that could potentially increase the exports of a product across different export destinations. Further, it is unlikely that reverse causality between export unit value and the country characteristics of the export destinations is likely to exist, eliminating any possible endogeneity bias. Lastly, there is concern that export subsidies might be influenced by industry lobby groups and may be systematically related to export prices. However, lobby groups are likely to exist across several industries and not all lobby groups may successfully campaign for the provision of export subsidies on the products exported by their member firms.

We use the ordinary least square (OLS) regression technique to determine the impact of the characteristics of the exports markets on the unit value of exports from Pakistan. We first split the sample into industrial and non-industrial goods and then on whether the products exported are provided with export subsidies. Additionally, we split the sample of firms on their size of total export sales. Lastly, we also introduce a variable accounting for the selection effect into the main regressions using two-step and three-step estimations. We explain the process in Appendix A.

6. Results

6.1 Descriptive Analysis
We present the average export unit value and the country characteristics of export destination distributed by the product type in Fig. 1. The average export unit value of industrial products is more than five times the average export unit value of non-industrial products. This is important given that industrial products are more likely to be exported to distant markets, particularly as higher quality goods become less expensive at greater distances. While the average GDP per capita and the remoteness of the export destination for both industrial and non-industrial is similar, the average GDP and the distance from Pakistan is higher for industrial products. Although, the income level and centrality of the export destinations may not be different for exporters of industrial and non-industrial products, it is likely that industrial products are on average exported to larger markets and to markets located further from Pakistan. On one hand, the exporters of less differentiated non-industrial products prefer markets with less competition and incur lower iceberg transportation costs relative to exporters of more differentiated industrial products. On the other hand, the exporters of industrial products, benefitting from higher levels of differentiation, can compete in tougher markets and earn higher prices in more distant markets.

We present the average export unit value for industrial and non-industrial products based on whether the exporters export products for which export subsidies are provided in Fig. 2. On one hand, the average export unit value for industrial products on which export subsidies are provided is more than four times the average export unit value for industrial products on which export subsidies are not provided. On the other hand, the average export unit value for non-industrial products on which export subsidies are not provided is less than the average export unit value for non-industrial products on which export subsidies are provided. The findings on industrial products are consistent with the explanation in the theoretical discussion as the provision of export subsidies benefit exporters incurring lower marginal costs more than they benefit exporters incurring higher marginal costs. This is not the case with exporters of non-industrial products. While exporters of industrial products on which export subsidies are provided export products of lower export unit value, exporters of non-industrial products do not report such a pattern.

We find that in Fig. 3 the difference in the average export unit value for products on which export subsidies are provided and on products for which export subsidies are not provided is greater for larger exporters of industrial products than for smaller exporters of industrial products. The findings from the seminal paper of Das, Roberts and Tybout (2007) suggest that larger exporters may have greater learning efficiency, while Hu and Tan (2016) show that larger exporters may have a greater incentive to learn and benefit from an increase in total factor productivity. However, the incentive to learn is lower for exporters of more differentiated products as the substitutability across products is relatively lower. Hence, as the larger exporters may have a greater incentive to learn relative to smaller exporters, they are more likely to report greater differences in average export unit values than smaller exporters and take advantage of price differentials when exporting more differentiated industrial products. The difference in the unit values for products on which exports subsidies are provided and for products on which export subsidies are not provided also suggests that larger exporters are likely to be bigger beneficiaries of export subsidies than their smaller counterparts.
We present the scatterplot for the total export revenue earned from each export market and the average unit value of exports to each export market distributed by firm size and the provision of export subsidies for industrial products and non-industrial products in Fig. 4 and Fig. 5 respectively. The correlation for the larger exporters exporting products on which export subsidies is provided is different than the correlation for the smaller counterparts in both figures. The correlation in Fig. 4 suggests that larger exporters exporting industrial products on which export subsidies are provided may generate greater export value in markets where they are able to export at lower unit values. As stated in Manova and Zhang (2012), on one hand if the more productive firms are considered more efficient in terms of the unit cost incurred in production, they will offer their output at lower prices to generate greater export revenue. We observe this trend for larger exporters exporting products for which export subsidies are provided in Fig. 4. On the other hand, if more productive firms are competing to offer higher quality to their consumers, it will likely result in a positive correlation between average export unit value and total export revenue across markets. We observe a stronger positive correlation for smaller exporters in Fig. 4 but only a weak positive correlation for larger exporters in Fig. 5. Smaller exporters exporting industrial products are more likely to sell higher quality products to generate greater export revenue across markets, while smaller exporters exporting non-industrial products are more likely to compete on price to generate greater export revenue across markets. The lack of product differentiation for non-industrial products may reduce the ability of exporters to export higher quality products. It is regardless of the provision of export subsidies in both figures. In essence, the provision of export subsidies by the government impacts larger firms such that they benefit by reducing the export unit value to markets where they generate larger export revenue. The regression results in the following section determine whether the provision of export subsidies dampens the influence of the export market characteristics on export unit value.

6.2 Regression Results
We present the results for the regression of the characteristics of the export markets on export unit value at the product-level for the full sample of products, industrial products and non-industrial products in Table 1. GDP per capita and distance have a positive influence on export unit value, which is significant at 1 percent level in Columns 1 and 2. Remoteness has a negative influence, significant at 5 percent level in Columns 1 and 2. The export unit value is likely to be higher for exporters of industrial products to richer export destinations as well as destinations located at a greater distance. The export unit value is likely to be higher to export markets that are more centrally located. Manova and Zhang (2012) report a similar pattern for the impact of GDP per capita and the centrality of the export market on export unit value.
value. The export unit value of non-industrial products is positively influenced by distance at 1 percent level of significance, while the other destination characteristics remain insignificant. This suggests that the export unit value of non-industrial products is likely to be influenced only by the proximity of the export destination to Pakistan. The exporters will export products with higher export unit value to compensate for the higher iceberg transportation costs, particularly as the substitutability of the products is likely to be higher and exporting products with lower export unit values may not be profitable\textsuperscript{13}. Baldwin and Harrigan (2011), Hummels and Skiba (2004) and Martin (2012) report a positive impact of distance to the export destination on export unit value.
We present the results for the regression of the characteristics of the export markets on export unit value at the product-level for the full sample of products, industrial products and non-industrial products and distributed by the provision of export subsidies at the product-level in Table 2. GDP per capita is positive and significant at 1 percent level for the full sample of products and for the industrial products as reported in Columns 1, 2 and 3 and significant at 5 percent level in Column 4. However, it is negative but not insignificant in Column 5 and positive and significant at 10 percent level in Column 6. The results in Column 5 suggest the lack of differentiation at the product-level across markets for non-industrial products.
products across trading partners particularly when export subsidies are provided to the exporters. GDP at PPP remains insignificant across all columns, suggesting that market size is unlikely to influence export unit value at the product-level. Distance is positive and significant at 1 percent level for products receiving export subsidies in Columns 2, 4 and 6, while distance is positive and significant at 10 percent level in Columns 1 and 3 and positive but insignificant in Column 5. It is likely that the provision of export subsidies reduces the influence of distance on unit value of exports. Remoteness is negative and significant at 1 percent level in Column 2 and 4, negative and negative and significant at 1 percent level in Column 6. It is insignificant when export subsidies are provided to the exporters. This suggests that the provision of export subsidies on the products eliminates the influence of the remoteness of export markets on export unit value fetched by the exporters at the product-level. In essence, the influence of distance to the export markets from Pakistan and the centrality of the export markets is weakened with the provision of export subsidies to exporters at the product-level. This counters the Alchian–Allen effect, which is likely to be more strongly associated with the exports of products on which export subsidies are not provided. However, the influence of income is stronger at the product-level for the industrial products, indicating differentiation at the product-level regardless of the provision of export subsidies. Such is not the case for the exporters of non-industrial products. The next set of regressions consider the impact of the variables at the firm-level.
Table 3
Regression results for export unit value at the firm-level distributed by product classification

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>log(Unit value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td>Variables</td>
<td>Full</td>
</tr>
<tr>
<td></td>
<td>Industrial</td>
</tr>
<tr>
<td></td>
<td>Non-Industrial</td>
</tr>
<tr>
<td>log(GDP per capita)</td>
<td>0.04***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>log(GDP at PPP)</td>
<td>-0.01***</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
</tr>
<tr>
<td>log(Distance)</td>
<td>0.07***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
</tr>
<tr>
<td>log(Remoteness)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
</tr>
</tbody>
</table>

| Fixed-effects       |               |
|                     | Firm-product level |
|                     | Yes             |
|                     | Yes             |
|                     | Yes             |
| Observations        | 89,163          |
|                     | 72,783          |
|                     | 16,380          |
| R²                  | 0.93            |
|                     | 0.91            |
|                     | 0.96            |
| F-test, p-value     | 0               |
|                     | 0               |
|                     | 0               |

Clustered standard-errors at product-destination level in parentheses
Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

We present the results for the regression of the characteristics of the export markets on export unit value at the firm-level for the full sample of products, industrial products and non-industrial products in Table 3. GDP per capita is positive and significant at 1 percent level in Columns 1 and 2, while it is insignificant in Column 3. This is consistent with the assumption that industrial products are more likely to be differentiated such that the income level of the export markets influences the export unit value at the firm-level. GDP at PPP is negative and significant at 1 percent level in Columns 1 and 2, while it is insignificant in Column 3. Exporters of industrial products sell at a lower price to larger export markets, while exporters of non-industrial products are unlikely to be influenced by the market size of the export markets in setting their export unit value. Distance is positive and significant at 1 percent level in Columns 1 and 3 and
positive and significant at 5 percent level in Column 2, while remoteness is negative and significant at 5 percent level in Column 3 and insignificant in Columns 1 and 2. The exporters of non-industrial products are more likely to be influenced by the distance and the centrality of the export markets than the exporters of industrial products. The coefficient of distance and remoteness is also larger for exporters of non-industrial. The results in Table 3 suggests that exporters of industrial products are more likely to be influenced by the income level and the market size of the export markets but less likely to be influenced by the centrality of the export markets than the exporters of non-industrial products. This suggests that exporters of non-industrial goods are more likely to be sensitive to proximity and the centrality of the export markets, while exporters of industrial goods are more likely to be sensitive to their income-level and the market size.
We present the results for the regression of the characteristics of the export markets on export unit value at the firm-level for the full sample of products, industrial products and non-industrial products based on the provision of export subsidies at the product-level in Table 4. GDP per capita and distance are positive and significant at 1 percent level, GDP at PPP is negative and significant at 1 percent level in Columns 2 and 4. Remoteness is negative but remains statistically insignificant in Columns 2 and 4. GDP per capita and distance are positive and significant at 10 percent level and 1 percent level respectively, while GDP at
PPP and remoteness are negative and significant at 5 percent level in Column 6. The export unit value of industrial and non-industrial products on which export subsidies are not provided is likely to be greater when firms export to richer and more distant export destinations and lower when exported to larger markets. This correlation between distance and export unit value when export subsidies are not provided is consistent with the Alchian-Allen effect. Although, remoteness of the export destination is unlikely to impact the export value of industrial products on which export subsidies are not provided, it is likely to negatively influence the export value of non-industrial products on which export subsidies are not provided. None of the variables are significant at 10 percent level in Columns 1 and 5, suggesting that the selected characteristics of the export destinations are unlikely to influence the export unit value of products on which export subsidies are provided. This is an important finding for policymakers. GDP per capita and remoteness are positive and significant at 10 percent and 5 percent level respectively in Column 3, suggesting that firms exporting industrial products on which export subsidies are provided are likely to export higher unit values to richer and more remotely located export markets. Exporters of industrial products on which export subsidies are provided are likely to export higher quality products to less centrally located markets rather than more centrally located markets. In essence, export unit value of products exported by firms on which export subsidies are not provided are more likely to be influenced by the characteristics of the export markets. Further, export unit value of industrial products exported by firms on which export subsidies are provided is likely to be influenced by the income and the remoteness of the export markets, while the export unit value of non-industrial products exported by firms on which export subsidies are provided is unlikely to be significantly influenced by the characteristics of the export markets at 10 percent level\textsuperscript{14}. The provision of export subsidies on specific products is likely to weaken the impact of the variables accounting for the characteristics of the export markets on the export unit value of products exported by firms in Pakistan.
Table 5
Regression results for export unit value at the firm-level based on provision of export subsidies distributed by product classification and total size of export sales

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>log(Unit value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>(1) (2) (3) (4) (5) (6)</td>
</tr>
<tr>
<td></td>
<td>Full Industrial Non-Industrial</td>
</tr>
<tr>
<td>Export subsidies:</td>
<td>Yes No Yes No Yes No</td>
</tr>
<tr>
<td>Smaller exporters</td>
<td></td>
</tr>
<tr>
<td>log(GDP per capita)</td>
<td>0.04 0.11** 0.07 0.14** -0.12** 0.01</td>
</tr>
<tr>
<td>log(GDP at PPP)</td>
<td>0.02 -0.05** 0.009 -0.05** 0.08*** -0.05</td>
</tr>
<tr>
<td>log(Distance)</td>
<td>0.16* 0.23** 0.19** 0.19 -0.03 0.38***</td>
</tr>
<tr>
<td>log(Remoteness)</td>
<td>-0.09 -0.43* -0.12 -0.38 0.15 -0.46**</td>
</tr>
<tr>
<td>Observations</td>
<td>8,033 7,251 7,385 6,235 648 1,016</td>
</tr>
<tr>
<td>R²</td>
<td>0.95 0.97 0.94 0.97 0.98 0.99</td>
</tr>
<tr>
<td>F-test, p-value</td>
<td>0 0 0 0 0 0</td>
</tr>
<tr>
<td>Larger exporters</td>
<td></td>
</tr>
<tr>
<td>log(GDP per capita)</td>
<td>0.02 0.05*** 0.03* 0.06*** -0.01 0.02*</td>
</tr>
<tr>
<td>log(GDP at PPP)</td>
<td>-0.008 -0.02*** -0.01* -0.02*** 0.005 -0.02**</td>
</tr>
<tr>
<td>log(Distance)</td>
<td>0.03 0.10*** 0.007 0.08*** 0.08 0.13***</td>
</tr>
<tr>
<td>Observations</td>
<td>(0.03) (0.02) (0.03) (0.03) (0.06) (0.04)</td>
</tr>
</tbody>
</table>
Dependent variable: log(Unit value)

<table>
<thead>
<tr>
<th></th>
<th>log(Unit value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>log(Remoteness)</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>0.12**</td>
</tr>
<tr>
<td></td>
<td>-0.008</td>
</tr>
<tr>
<td></td>
<td>-0.12</td>
</tr>
<tr>
<td></td>
<td>-0.12*</td>
</tr>
<tr>
<td>(0.05)</td>
<td>(0.05)</td>
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<tr>
<td>(0.05)</td>
<td>(0.05)</td>
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<tr>
<td>(0.06)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>(0.06)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>41,447</td>
</tr>
<tr>
<td></td>
<td>32,432</td>
</tr>
<tr>
<td></td>
<td>34,991</td>
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<td></td>
<td>24,172</td>
</tr>
<tr>
<td></td>
<td>6,456</td>
</tr>
<tr>
<td></td>
<td>8,260</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
</tr>
<tr>
<td>F-test, p-value</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
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<td></td>
<td>0</td>
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<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Clustered (product & destination) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

All columns include firm-product level fixed effects

We present the results for the regression of the characteristics of the export markets on unit value at the firm-level for the full sample of products, industrial products and non-industrial products in Table 5. We further distribute the sample based on the provision of export subsidies at the product-level as well as on the total export sales reported by the firms. Considering the results of the regressions for smaller exporters, distance is the only variable that is significant in Columns 1, and 3. It is positive and significant at 10 percent level in Columns 1, and positive and significant at 5 percent level in Column 3. Although distance is positive and significant at 1 percent level in Column 6, remoteness is negative and significant at 5 percent level as well. Distance is also positive and significant at 10 percent level in Column 2. Smaller exporters are likely to set higher export unit values to more distant markets. GDP per capita is positive and significant at 10 percent level in Column 2 and at 5 percent level in Column 4. GDP at PPP is negative and significant at 5 percent level in Columns 2 and 4. Interestingly, the signs of the coefficients for GDP per capita and GDP at PPP flip in Column 5 where GDP per capita is negative and significant at 5 percent level and GDP at PPP is positive and significant at 1 percent level. The results suggests that export unit value of industrial products on which export subsidies are provided is likely to be higher for smaller firms exporting to less proximate markets. This is not the case for smaller exporters not receiving export subsidies as distance does not influence their export unit value. Smaller exporters exporting less differentiated non-industrial products may not generate enough economies of scale to set lower export unit values in tougher markets and higher export unit value in richer markets\(^{15}\).

Considering the results of the regressions for larger exporters, none of the variables are significant at 10 percent level in Columns 1 and 5. GDP per capita and remoteness positively influencing export unit value and GDP at PPP negatively influencing export unit value at 1 percent level of significance in Columns 2 and 4. The results in Columns 2 and 4 are similar, with GDP per capita and distance positively influencing unit value of exports and GDP at PPP negatively influencing unit value of exports. The coefficients in Columns 2 and 4 are all significant at 1 percent level. GDP per capita and distance is positive and
significant at 10 percent level and 5 percent level respectively in Column 6, while distance is positive and significant at 1 percent level. Remoteness is negative and significant at 10 percent level. This suggests that while export unit value reported by larger exporters of non-industrial goods on which export subsidies are provided are unlikely to be influenced by export destination characteristics, larger exporters not receiving export subsidies on non-industrial products are more likely to set export unit values as influenced by the characteristics of the export destination markets. Larger exporters of industrial products are more sensitive to the characteristics of the export markets as the export unit value they set is influenced by some of the characteristics regardless of the provision of export subsidies on the products they export. However, the magnitude of the coefficients and the statistical significance of GDP per capita and GDP at PPP is lower for larger exporters of industrial products on which export subsidies are provided. Further, while distance is insignificant for larger exporters of industrial goods export subsidies are provided, remoteness is positive and significant. This suggests that larger exporters are likely to report higher export unit value in more remotely located markets, while reducing their prices in tougher markets. This is consistent with Anderson et al. (2018), which reports that export unit value set by Indian firms decrease with an increase in the quality of products exported as they export the lowest priced goods to the more distant markets. The provision of export subsidies at the product-level induces larger exporters to lower the export unit value in export markets reporting tougher levels of competition. As the larger exporters are more likely to avail concessions from the government than their smaller counterparts, the provision of export subsidies at the product-level is likely dampening the influence of the characteristics of the export markets on the export unit value.

In summary, the export unit value set by firms exporting products on which export subsidies are not provided is more likely to be influenced by characteristics of the export markets than the export unit value set by firms exporting products on which export subsidies are provided. Further, the export unit value set by smaller exporters tends to be more sensitive to the characteristics of the export markets as they report greater coefficients in absolute terms than larger exporters. However, the influence of the different characteristics of the export markets is more statistically significant for larger exporters than it is for smaller exporters. Lastly, it is important to emphasize that the characteristics of the export markets may play a limited role in defining the export unit value set by firms exporting products on which export subsidies are provided relative to firms exporting products on which export subsidies are not provided.
Table 6
Regression results for export unit value at the firm-level based on provision of export subsidies distributed by product classification and total size of export sales using selection model

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>log(Unit value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>(1)   (2)   (3)   (4)   (5)   (6)</td>
</tr>
<tr>
<td></td>
<td>Full   Industrial   Non-Industrial</td>
</tr>
<tr>
<td>Export subsidies:</td>
<td>Yes No Yes No Yes No</td>
</tr>
<tr>
<td>Two-stage regression</td>
<td></td>
</tr>
<tr>
<td>log(GDP per capita)</td>
<td>0.02   0.05** 0.03** 0.06** -0.01 0.03*</td>
</tr>
<tr>
<td></td>
<td>(0.01) (0.02) (0.01) (0.03) (0.03) (0.02)</td>
</tr>
<tr>
<td>log(GDP at PPP)</td>
<td>0.002  -0.02*** -0.002 -0.02*** 0.01 -0.01</td>
</tr>
<tr>
<td></td>
<td>(0.005) (0.005) (0.004) (0.005) (0.01) (0.009)</td>
</tr>
<tr>
<td>log(Distance)</td>
<td>0.03   0.10*** 0.01 0.10*** 0.05 0.10***</td>
</tr>
<tr>
<td></td>
<td>(0.02) (0.03) (0.03) (0.03) (0.05) (0.03)</td>
</tr>
<tr>
<td>log(Remoteness)</td>
<td>0.06   -0.06 0.12** -0.05 -0.16* -0.05</td>
</tr>
<tr>
<td></td>
<td>(0.05) (0.06) (0.05) (0.08) (0.08) (0.06)</td>
</tr>
<tr>
<td>Selection effect</td>
<td>-0.01*** -0.002 -0.02*** -0.002 -0.004 -0.002</td>
</tr>
<tr>
<td></td>
<td>(0.004) (0.008) (0.005) (0.009) (0.007) (0.007)</td>
</tr>
<tr>
<td>Observations</td>
<td>27,591 19,411 22,220 14,883 5,371 4,528</td>
</tr>
<tr>
<td>R²</td>
<td>0.94   0.96 0.89 0.95 0.96 0.97</td>
</tr>
</tbody>
</table>

Three-stage regression

| log(GDP per capita) | 0.01 0.05** 0.02* 0.05** -0.01 0.03* |
|                     | (0.01) (0.02) (0.01) (0.02) (0.03) (0.02) |
| log(GDP at PPP)     | 0.0001 -0.02*** -0.005 -0.02*** 0.01 -0.01 |
|                     | (0.005) (0.005) (0.004) (0.006) (0.010) (0.010) |

All columns include firm-product level fixed effects
We include a variable accounting for the selection effect in Table 6. The procedure to determine the selection effect from the two-stage and the three stage estimations is explained in Appendix A. Although, the influence of export market characteristics on export unit value across all the columns is similar to that reported in Table 4, the selection effect is negative and significant at 1 percent level in Columns 1 and 3 in both the two-stage and the three-stage regressions. This suggests that selection effect is likely to influence export unit values in the full sample of products and the differentiated products on which export subsidies are provided, while the characteristics of the export markets are unlikely to play a significant role in influencing export unit values. The negative sign in the coefficient of the selection effect suggests that market-specific supply shocks are likely to influence the export unit value rather than demand shocks. Even though the magnitude of the effect is likely to be small as indicated by the size of the coefficient, the failure to include the selection effect may lead to an upward bias in the prediction of the export unit value. In essence, the entry of firms exporting differentiated products on which export subsidies are provided is likely to significantly influence export unit value. This is neither the case for firms exporting industrial products on which export subsidies are not provided nor for firms exporting non-industrial products regardless of whether they provided with export subsidies on the products they export.

7. Conclusion

Our study finds that the export unit value is likely to be influenced by the characteristics of the export markets differently based on whether export subsidies are provided on the products they export. The
study also finds that the export unit value is likely to be higher for exports destined to richer and more distant markets and likely to be lower for exports destined to larger and more remote markets. In other words, exports to more developed countries and more distant markets are likely to be of higher quality, while exports to tougher markets and more remote markets forces the exporters to lower their export unit value. However, the influence does change based on the size of export sales of firms and whether the firms export products on which export subsidies are provided. Among the variables accounting for the export market characteristics, remoteness reports the least influence on export unit value as it lacks significance when other characteristics are significant for exporters of products on which export subsidies are not provided. The provision of export subsidies dampens the influence of many of the characteristics of the export markets on the export unit value set by exporting firms.

Our study further splits exporters into larger and smaller exporters based on the relative size of total export sales as reported by the firms. Although, the coefficients reported by the smaller exporters is relatively larger, the influence of export market characteristics on export unit value for larger exporters exhibits a clearer pattern relative to the results reported for smaller exporters as determined by the level of statistical significance reported. The influence of the characteristics of the export markets on the export unit value set by smaller exporters, who are unlikely to take advantage from economies of scale and may not have substantial exporter networks in comparison to larger exporters, is likely to be limited relative to their larger counterparts in terms of their statistical significance reported.

In conclusion, our study adds to the literature on industrial policy as it concludes that the provision of export subsidies, even at the product-level, can dampen the influence of different characteristics of the export markets on the export unit value reported by exporting firms, particularly for exporters of industrial products in Pakistan. As export subsidies are important incentives adopted by policymakers to develop the export sectors, the implications of the results suggest that the provision of export subsidies, at the product-level, are likely to dampen the premium the exporters can otherwise generate from exporting to richer and more distant export destination markets. Further, exporters may not adjust their export unit value to accommodate for the increase toughness of competition in larger markets when exporting products on which export subsidies are provided. This may dampen their ability to compete in tougher export markets.

**Declarations**

**Data Availability Statement:** The data underlying this article are available in figshare, at https://doi.org/10.6084/m9.figshare.21353661. Identifiers are anonymized.

**Conflicting interest:** The authors have no conflicting interests to declare.

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Acknowledgement: We appreciate Trade Development Authority of Pakistan (TDAP) for acquiring the data for us and facilitating our study.

References


Footnotes

2. Exports from Pakistan in textile products increased more than 40 percent between 2020 and 2022, driven by generous subsidies offered to the producers to mitigate the adverse impact of COVID-19 pandemic on the economy.
3. We assume industrial products to be more differentiated across varieties relative to non-industrial products, and hence have a greater number of varieties for each product.
4. Besedina (2010) adopts a similar strategy as it determines the impact of per unit export subsidy on the profits of a subsidized firm.

5. We appreciate Trade Development Authority of Pakistan (TDAP) for acquiring the data for us and facilitating our study.

6. Export unit value reported in each observation is calculated based on the sum of all transactions undertaken by a firm to a particular destination at the eight-digit level in 2019.

7. The largest exporters are likely to be important recipients of export subsidies. Hence, we cannot exclude them from the study.

8. It is more than likely that only a subset of eligible exporters will likely avail export subsidies. Given that eligible exporters with higher levels of export sales are more likely to have availed export subsidies than firms with lower levels of export sales, we split the sample of exporters based on the size of export sales as part of the empirical strategy.

9. 59 percent of the transactions are on products on which export subsidies are provided in the truncated sample compared to 55 percent in the full sample. Further, 52 percent of transactions reporting less than US$ 10,000 are on products on which export subsidies is provided.

10. Exchange companies are likely to document transactions worth more than US$ 10,000 than transactions below it as per the regulations of the State Bank of Pakistan. Further, the export finance scheme is offered to exporters through formal banking channels. Therefore, it is likely that export transactions exceeding US$ 10,000 are likely to be formally documented and will more likely avail export subsidies through formal banking channels than transactions below US$ 10,000.

11. Production networks are more likely to exist in centrally located countries that are in closer proximity to large markets than in remote countries. Chaney (2014) states the importance of using existing networks by firms to remotely search for new consumers. A country that is more centrally located will likely have a larger number of contacts clustered within closer proximity, allowing firms to increase the number of contacts that can be informed about the quality of the products exported. This can result in higher export unit values in more centrally located markets.

12. Industrial products are mainly destined to Europe and the United States, while non-industrial products are mainly destined to more proximate locations in the Middle East that are likely to have a smaller market size but similar levels of GDP per capita and remoteness as more common European export markets.

13. Assuming iceberg transportation costs, consumers pay a higher export unit value in distant markets as exporters incur higher variable costs associated with transportation of the goods. Hence, consumers in distant markets will be provided with higher quality goods relative to consumers in more proximate markets.

14. A variable accounting for the selection effect is introduced later in this study to determine whether residuals estimated from the export participation equation influences export unit value.

15. As non-industrial goods are likely to be more similar across varieties, smaller exporters are less likely to attain economies of scale than larger exporters. This is likely to reduce their competitiveness in
markets preferred by larger exporters. Therefore, smaller exporters may set lower export unit values in less competitive markets and in richer markets.

16. As noted in Footnote 7, exporter networks can play an important role to increase exports in more centrally located markets. Larger exporters exporting products on which export subsidies are provided may not establish exporter networks that could help compete in more central markets. Hence, they may not generate sufficient knowledge that could otherwise increase their export unit value in such markets.

**Figures**

![Figure 1](image)

**Figure 1**

Average values of the variables distributed by product type
Figure 2

Average unit value (Rs/kg) for products by status on provision of export subsidies distributed by product type.
Figure 3

Average unit value (PKR/kg) for products by status on provision of export subsidies distributed by product type and size of export sales.
Figure 4

Scatterplot between average unit value of exports to export market (Rs/kg) and total exports to export markets from Pakistan for firms exporting industrial products distributed by status on provision of export subsidies and size of export sales.
Figure 5

Scatterplot between average unit value of exports to export market (Rs/kg) and total exports to export markets from Pakistan for firms exporting non-industrial products distributed by status on provision of export subsidies and size of export sales

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- AppendixA.docx