The South African Exporter's Missing Productivity Premium:
A characteristic of the data or something more?

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Abstract

Despite it being a stylised fact that exporting firms exhibit a significant productivity premium relative to non-exporting firms, a handful of studies find otherwise. Such is the case for South African exporters who are found to be, in general, no more productive in terms of TFPR than non-exporters, despite being larger, more labour productive and paying higher wages. South African evidence, however, is based on small and limited survey datasets. This paper contributes to the expanding micro-trade literature by making use of two substantial, official datasets provided by Statistics South Africa (Stats SA) and the South African Revenue Service (SARS) to determine whether this finding of a missing productivity premium still holds for South African exporters. It will do so by following the now standard Bernard and Jensen (1999) methodology of estimating the Cobb Douglas productivity equation using OLS. A number of possible explanations for the missing productivity premium have been suggested in the literature, however given the previous lack of sufficient firm-level data over time, few of these explanations have been adequately tested in the South African context. This paper will therefore further add to the literature by exploiting these two rich datasets to determine why South African exporting firms appear to be no more productive than non-exporting firms.

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1. Introduction

It is well known by now that exporting encourages overall economic growth. South African policy makers' acknowledgement of the importance of export growth is evident in a number of policy documents, such as the National Development Plan (NDP) – 2030, the New Growth Path (2011) and the Industrial Policy Action Plan (IPAP) which all recognise the export sector as a generator of comprehensive, job-creating growth. In order to expand employment and bring about annual economic growth in excess of 5 percent the NDP suggests increasing exports, particularly in construction, mining and manufacturing. The New Growth Path (2011) further states that increasing exports particularly into the region and emerging economies will stimulate investment, productivity, employment and income.

This sentiment is echoed in a recent World Bank report which suggests three opportunities to stimulate export growth, and consequently employment, in South Africa: increased competition among firms; reduced infrastructure bottlenecks; and deeper regional trade integration (World Bank, 2014).

Export growth will ultimately lead to a higher standard of living. However, despite the emphasis on exports in government's growth strategies, very little research has been done on export dynamics at a micro-level in South Africa. Part of the reason for this is the limited access to good firm level data over time. A better understanding of the characteristics and behaviour of exporting firms, however, is crucial in order to design policies to increase exports.

Although there is a relatively large body of work on this topic, particularly in the developed country setting, it has essentially been macroeconomic in direction. According to Bernard, Eaton, Jensen and Kortum (2003) 'trade theory has been aimed at understanding aggregate evidence on such topics'. As highlighted by Edwards, Rankin and Schöer (2008), it is the sum of exports at the firm level which make up aggregate exports and it is therefore the actions and decisions of firms in which we should be interested. This is particularly the case in order to develop appropriate policies for improving South Africa's economic growth through exports.

International studies find that exporting firms are superior to non-exporting firms across a number of characteristics – most notably, exporters are more productive than non-exporters. It is therefore argued that increasing competition will allow 'good' firms to cross over some productivity threshold necessary for survival in the export market. South African literature, however, finds little evidence that exporters are more productive than non-exporters. It is only when firms export outside of Africa that productivity premiums are recognised(Rankin, 2001).

This paper adds to the literature on South African exporting firms through the use of two substantial firm-level datasets to analyse the export behaviour of firms in the manufacturing sector – a sector highlighted as one which is essential for low-skilled job creation (World Bank, 2014). This paper will attempt to replicate the findings of previous South African studies, which are based on small cross-sectional datasets, to determine whether South Africa indeed has a missing productivity premium, and, if so, examine how destination influences exporter behaviour.

The findings of this paper confirm that firms exporting outside of Africa do perform better in terms of productivity than firms exporting only within the region, particularly among medium and large firms. Furthermore, there is evidence to suggest that Africa-only exporters are less productive than non-exporters. Among micro and small firms however, exporting within Africa is associated with higher productivity than exporting internationally.

These contrasting results not only explain why there appears to be a missing productivity premium for South African exporters, but also highlight the importance of recognising exporter heterogeneity. Policies which encourage regional export growth, such as those suggested in the World Bank report, might be effective for micro and small exporters, but not necessarily for medium and large firms who experience the biggest productivity jump when exporting outside of Africa.

The following section presents a brief review of the literature on exporting firms and export destinations. Section 3 presents an overview of the two datasets used in the analysis. Descriptive statistics are presented in section 4. Section 5 and 6 discuss the methodology used and results respectively. Section 7 concludes.

2. Literature

International trade literature has advanced over the past few years as new theories have been developed which focus on the role of firm heterogeneity in trade. In particular are the seminal contributions of Bernard, Eaton, Jensen and Kortum (2003) and Melitz (2003). These new trade theories, along with the increase in the availability of well-rounded firm-level over time, have encouraged the study of issues related to export behaviour and export dynamics at the firm-level.

Much of this research has investigated the superior performance of exporters relative to non-exporters. International studies show that exporting firms are generally larger, more labour productive, as well as more capital- and skill-intensive than non-exporters. See for example Aw and Hwang (1995) for Taiwan; Bernard and Wagner (1997) for German manufacturers; Clerides, Lach and Tybout (1998) for Columbia, Mexico, and Morocco; Bernard and Jensen (1995 & 1999) for U.S firms and Castellani, Serti and Tomasi (2010) for Italy. Similar results have been found for Africa and South Africa. For example Van Biesebroeck (2005) finds that African exporters are over 200 per cent larger, 50 per cent more capital-intensive and 56 per cent more labour productive in terms of value-added per worker than their non-exporting counterparts. For South African firms, Rankin (2001) uses cross-sectional survey data to examine exporter characteristics and finds that, relative to non-exporters, South African exporters, on average, pay higher wages, employ more capital per worker and produce more output per worker. Comparable results are found by Edwards, Rankin and Schöer (2008) and Matthee and Krugell (2011).

While exporters are considered more productive than firms serving only the domestic market, exporters' heterogeneity is influenced by the foreign market (or destination) they serve. Here the international literature takes into account three broad strands: the accessibility of the foreign market (which is related to the self-selection and learning-by-doing hypotheses), the type of foreign market (e.g. high income or low income) and whether a single or multiple foreign markets are served.

A foreign market or export destination can be either close (which infers easy access) or distant (when entry is difficult). Entering these markets depends on the level of productivity

and ability of exporting firms, as the productive or able firms usually self-select into exporting (Wagner, 2012). In emerging and African countries, however, learning-by-exporting is becoming far more relevant to export success (Boermans, 2013). Here Colombian and African exporters provide good examples of how exporters' learning-by-doing can be achieved through regional trading. Eaton et al. (2007) find that Colombian exporters learn from exporting to neighbouring countries and subsequently use them as stepping stones into the international market when their productivity enhances. Similarly, Granér and Isaksson (2007) find that for Kenyan manufacturing firms there are some effects of learning-by exporting to the region, as the entry-level productivity requirement (or the technological distance) is low when exporting to the region. This, according to Boermans (2013), gives African firms the chance to become more productive where after they self-select into more developed (or technologically distant countries) that have higher entry costs and requirements. To this end, Boermans (2013) confirms firm heterogeneity in terms of exporting within and outside Africa. African firms exporting outside the continent are more capital and skilled-labour intensive and they have higher productivity levels than firms exporting within Africa. Exporting within Africa, he finds, actually decreases productivity.

Exporting to a high income country leads to higher productivity. This finding has been confirmed in many country-specific studies. These include Fernandes and Isgut (2009) and Tromifenko (2008) for Colombian firms, Pisu (2008) for Belgian firms, De Loecker (2007) for Slovenian firms, Park et al. (2010) for Chinese firms, Vacek (2010) for Czech firms, Bastos and Silva (2010) for Portuguese firms and Cebeci (2014) for Turkish firms.

Finally, exporter heterogeneity is also evidenced by the number of foreign markets served (i.e. single-destination versus multiple-destination exporters). There are fewer multi-destination exporters than single destination exporters, but they contribute most to total exports (Bernard et al., 2009; Wagner, 2012). For example, Bernard et al. (2009) using US data, find that multiple destination exporters make up 43.5 per cent of the total firms. However, their contribution to the total value was 96.3 per cent per cent. The exporters who exported to 10+ destinations contributed 85.6 per cent of the total value (these firms are rare, they accounted for only 7.7 per cent of total exporters in 2000). Productivity is also positively related to the number of destinations and the number of products exported (see

for example the German manufacturing sector case (Wagner, 2012) and that of the US manufacturing firms (Bernard et al., 2011)). Apart from productivity differentials, Bernard et al. (2009) show that there is a positive relationship between the number of destinations served and the number of workers per firm.

Exploring the relationship between firm performance and export destination has been somewhat difficult in the South African context due to limited access to detailed firm-level panel data. There are however, some indicative results obtained by employing mainly cross-sectional datasets. Destination clearly matters in the South African context, as evidenced by Rankin (2001) who shows that there is no productivity premium between exporters and non-exporters. It is only when these exporters trade outside of Africa that they exhibit a significant productivity premium. Furthermore, using a different dataset, Rankin and Schöer (2013) consider the link between firm-level wages and export destination. Their findings indicate that exporting outside Africa results in higher firm-level wages and that firms exporting in the region pay lower wages than their domestic counterparts.

In conclusion, destination matters – in terms of accessibility, type of export market and the number of destinations served. In South Africa, firm-level destination dynamics warrants detailed investigation for a number of reasons. Firstly, South Africa is located far from the developed markets which makes exporting to them difficult (in terms of accessibility and transport costs). This can influence productivity gains from exports to these markets. Secondly, although regional trade is encouraged, there is little evidence to indicate any positive export premium when exporting within Africa whereas exporting outside Africa translates into higher wages. Although regional trade might provide the opportunity to learn from exports, the importance of exporting to developed countries is again underscored. This paper therefore contributes to the literature by providing such a detailed destination-oriented, firm-performance investigation by using two sets of official firm-level data, namely Statistics South Africa's Large Sample Survey of manufacturing firms and the newly available South African Revenue Services' company income tax data combined with customs transactions data.

3. **Data**

This study makes use of two official datasets, which allows for a comparison of results. The first is collected by Statistics South Africa (Stats SA) in its Large Sample Surveys of manufacturing firms (LSS). These surveys are used for the purposes of calculating the national accounts and although designed to be cross-sectional in nature many firms can be linked between the years to create a panel dataset. There are approximately 10 000 manufacturing firms in each of the rounds (2005 and 2008).

This sample dataset contains information on industrial classification, employment, imports and exports, income and expenditure, profit or loss, inventories, carrying value of assets as well as details of products manufactured. To compare 2005 data to 2008, the 2008 data was deflated using industry level deflators, except for wages which are deflated by the CPI.

While useful for estimating exporter characteristics and productivity premiums, no information on destinations is available in this dataset. In order to examine destinations as potential explanation for South Africa's missing productivity premium, this paper turns to an additional set of data.

This second dataset used is generated from population tax return data provided by the South African Revenue Service (SARS). This is the first time that a population dataset of this detail for South African firms has been released for analysis by researchers. Information from three separate datasets is combined into one dataset that can be used to compare results from the LSS. These datasets are the Company Income Tax (CIT) return data, the customs transactions data, and the Pay as You Earn employee data (IRP5).

The CIT data is available for the tax years 2009 to 2013, however the form used to generate the CIT return data was significantly changed in March of 2013 to accommodate the fact that larger firms require more detailed questioning relative to smaller firms. As such the CIT data is divided into two groups: those firms which completed the old CIT form (known as the IT14), and those which completed the newer, more detailed form (known as the ITR14). As the data currently stands, these groups of data remain separate. As such, this paper makes use only of 2013 data (from the ITR14 form), since this data is the most complete, and most detailed (since very few firms completed the old version of the form for the 2013 tax year). Further research will be done on the preceding years once the IT14 and ITR14 datasets have been merged.

This dataset contains information on the company's balance sheet and income statement as well as extensive information on tax allowances and deductions. It does not include any information on exporting or total employment. This information is obtained from the customs transactions and IRP5 dataset respectively.

The customs transactions data includes information on products, destinations, quantities, values and tariff rates applied for exports and imports. For this paper, only exports are examined. From this data, the total customs value of exports per firm is calculated, along with the total number of destinations. This data is then merged to the CIT data in order to calculate the number of exporters and non-exporters in the dataset, as well as other firm-level descriptive statistics.

The IRP5 employee data contains information on unemployment insurance fund contributions, total employee tax amount, provident fund contributions, taxable income etc. It also allows for the calculation of number employees per firm. This information is merged to the CIT data.

The final CIT-IRP5-Customs dataset contains relevant information for 538 000 firms for the tax year 2013[5], 20 800 of which are manufacturing firms.

4. Descriptives

This section presents a brief picture of exporting and non-exporting manufacturing firms in South Africa. In terms of the propensity to export, exporting within the manufacturing sector is quite rare (figure 1). Among all manufacturing firms, less than a third export (26% in 2005, 30% in 2008 and 24% in 2013). This finding is not dissimilar to that of U.S. manufacturing firms, 27 percent of which export (Bernard *et al*, 2007). When the sample is restricted to only medium and large firms the proportion of exporting firms increases (33% in 2005, 42% in 2008 and 50% in 2013). It is anticipated that samples consisting of larger firms will have a higher share of exporters since, given the sunk costs associated with exporting, smaller firms are less likely to trade.

Figure 1: Proportion of Exporters

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[5] Tax year 2013 refers to the period March 2012 to February 2013.
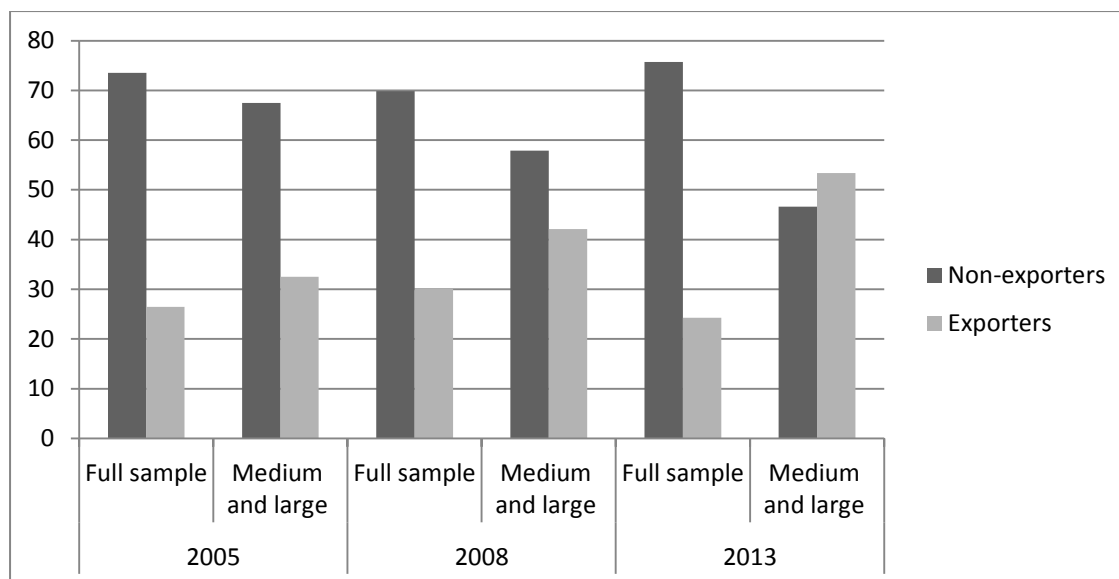
Source: Authors own calculations using LSS data for 2005 and 2008 and SARS data. For 2013

Not only is exporting rare among South African manufacturers, but as figure 2 indicates, very few South African manufacturing firms specialize in exporting. Given that a firm exports, few exporters export more than 50 percent of their total output (36% in 2005 and 27% in 2008). Further, the average (median) exporter exported around 18 (7.5) percent of total output in 2005 and 12 (5) percent in 2008. The SARS data shows similar findings: fewer than 10 percent of exporters exporting more than 50 percent of total sales with the average (median) exporter exported around only 21 (4) percent.

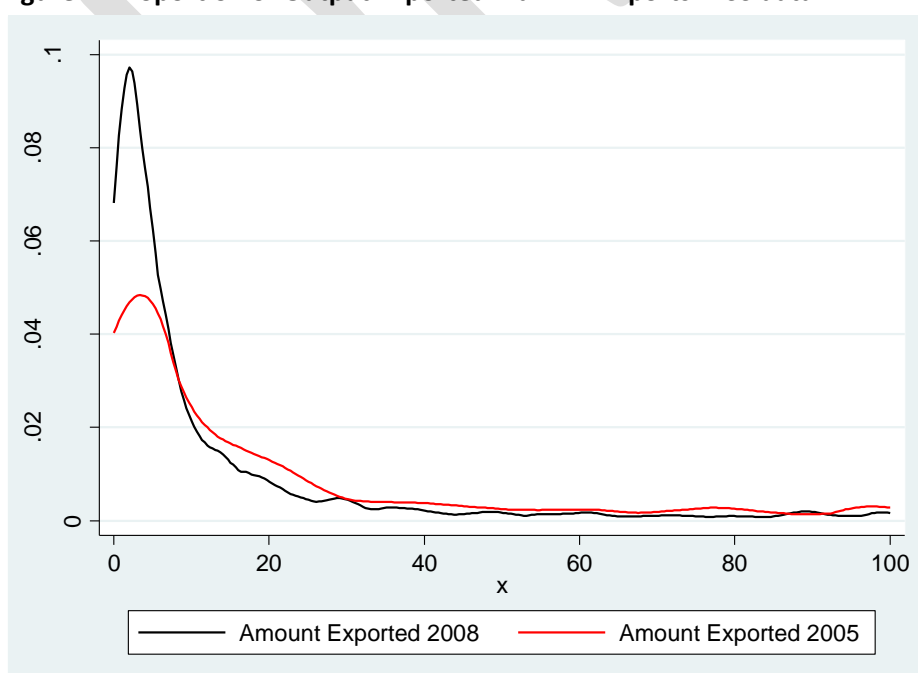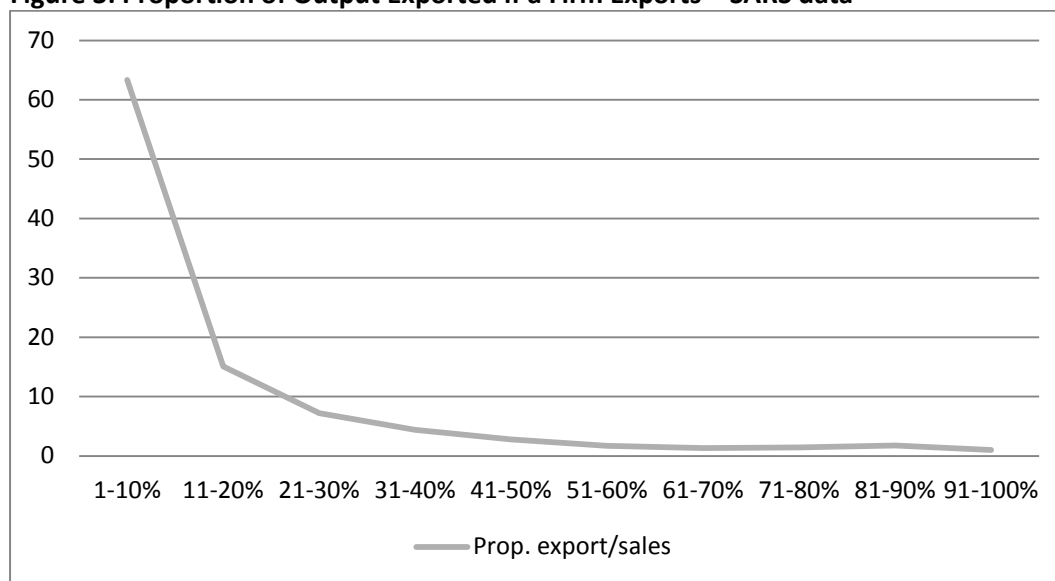**Figure 2: Proportion of Output Exported if a Firm Exports –LSS data**

Figure 3: Proportion of Output Exported if a Firm Exports – SARS data

Source: Authors own calculations using SARS data.

Looking at destinations served by manufacturing exporters in South Africa, it is found that a large proportion (63%) of South African exporters export to multiple destinations and these multiple-destination exporters contribute 97 percent to total export value. The proportion of multi-destination exporters within Africa relative to the proportion of multi-destination exporters outside of Africa is 46 and 54 percent respectively. However, multi-destination exporters within Africa account for only 7 percent of total export value compared to the 90 percent contribution of multi-destination outside Africa exporters. These figures suggest that, as in other studies, destination is a notable form of heterogeneity among exporters.

According to the international trade literature, exporters exhibit superior characteristics relative to their domestic counterparts. It is now a stylised fact that exporters are larger, have higher levels of labour productivity and pay higher wages than non-exporters. Following the methodology used by Bernard and Jensen (1995) export premia for a number of firm characteristics are estimated using regressions of the general form

$$\ln(X)_i = \alpha + \beta Exporter_i + \delta Industry_i + \mu_i \qquad (1)$$

where $(X)_i$ is a vector of firm characteristics; $Exporter_i$ is a dummy variable that takes the value one if a firm exports and zero otherwise; $Industry_i$ is a control dummy for five digit SIC industry; and β represents the export premia which indicates the average percentage difference between exporters and non-exporters. For the LSS dataset the regression also

includes a year dummy to control for year fixed effects between 2005 and 2008. A second set of regressions are run for the SARS dataset which control for firm size as measured by the (log) total number of employees. The paper further restricts the regressions above to medium and large firms. The results for the medium and large firms are presented in the Appendix.

Table 1 reports the export premia for the general case of exporters relative to their domestic counterparts for both the LSS sample data and the SARS population data. The table indicates that for exporters relative to non-exporters the export premia are positive and significant for all characteristics. Exporters are notably larger, both in terms of output and number of employees, more labour productive, pay higher wages and are more capital and intermediate input intensive than non-exporters. Even after controlling for firm size, relative to non-exporters, exporters produce 85 percent more output per worker, pay 58 percent higher wages and are 70 and 97 percent more capital and intermediate input intensive respectively. Similarly for medium and large exporters (see table A1).

Table 1. Manufacturing Exporter Premia – Exporters versus Non-exporters

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
LSS data						
Exporter	1.161***	0.840***	0.417***	0.435***	0.292***	0.489***
	(0.0385)	(0.0294)	(0.0231)	(0.0176)	(0.0345)	(0.0245)
				-		
Exporter*2008	-0.00308	-0.0560	-0.0205	0.132***	0.408***	0.0428
	(0.0500)	(0.0381)	(0.0300)	(0.0228)	(0.0448)	(0.0317)
2008	0.446***	0.386***	0.138***	0.356***	-0.00327	0.00224
	(0.0256)	(0.0187)	(0.0154)	(0.0112)	(0.0222)	(0.0156)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*21,237*	*23,758*	*21,152*	*23,747*	*22,995*	*23,751*
SARS data						
Exporter	2.068***	0.828***	0.661***	1.655***	0.704***	0.797***
	(0.0317)	(0.0238)	(0.0230)	(0.0309)	(0.0533)	(0.0278)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No

SARS - Controlling for firm size

Exporter			0.848***	0.580***	0.704***	0.966***
			(0.0235)	(0.0223)	(0.0559)	(0.0287)
Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations	*17,721*	*11,878*	*11,762*	*11,403*	*11,042*	*11,447*

Source: Authors own calculation using the LSS data and SARS data

Notes: ***p<0.01   **p<0.05   *p<0.1

(Is significant at the 1% level, 5% level and 10% level respectively)

Values are given in natural logarithms.

As previous African studies have shown, firms that export to destinations within Africa only exhibit different characteristics to those that export outside of Africa. Table 2 contains the results of export premia regressions for firms which export to Africa only. These regressions were run for the SARS data only, since no information on destinations is available in the LSS data.

The results indicate that firms exporting to destinations within Africa only, while still significantly different to non-exporters, exhibit poorer performance premia relative to firms which export to destinations outside of Africa across all characteristics. These findings hold after controlling for firm size as well as for medium and large exporters (see table A2).

Table 2. Manufacturing Exporter Premia using SARS data – Africa-only exporters

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	2.445***	1.135***	0.738***	2.044***	0.924***	0.866***
	(0.0441)	(0.0322)	(0.0313)	(0.0427)	(0.0723)	(0.0378)
Africa Only Dummy	-0.664***	-0.539***	-0.134***	-0.683***	-0.385***	-0.121***
	(0.0540)	(0.0382)	(0.0371)	(0.0519)	(0.0854)	(0.0446)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Controlling for firm size						
Exporter			1.003***	0.747***	0.938***	1.107***
			(0.0320)	(0.0303)	(0.0760)	(0.0391)
Africa Only Dummy			-0.258***	-0.279***	-0.391***	-0.234***
			(0.0363)	(0.0344)	(0.0861)	(0.0442)

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Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations	*17,721*	*11,878*	*11,762*	*16,035*	*11,042*	*11,447*

Source: Authors own calculation using SARS data
Notes: ***p<0.01   **p<0.05   *p<0.1
(Is significant at the 1% level, 5% level and 10% level respectively)
Values are given in natural logarithms.

Not only does the destination matter, but so too does the number of destinations served. As table 3 reports, multiple-destination exporters are significantly larger, more labour productive, pay higher wages and are significantly more capital and intermediate input intensive than single destination exporters, who in turn are more significant than non-exporters, even after controlling for firm size. Similar results are found after restricting the estimation to medium and large firms (table A3).

Table 3. Manufacturing Exporter Premia – Multiple Destinations

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	1.214***	0.310***	0.399***	0.855***	0.423***	0.490***
	(0.0510)	(0.0379)	(0.0368)	(0.0495)	(0.0851)	(0.0443)
Multiple Dest. Dummy	1.224***	0.725***	0.368***	1.140***	0.395***	0.431***
	(0.0577)	(0.0416)	(0.0404)	(0.0556)	(0.0933)	(0.0485)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Controlling for firm size						
Exporter			0.476***	0.297***	0.427***	0.559***
			(0.0357)	(0.0340)	(0.0854)	(0.0436)
Multiple Dest. Dummy			0.545***	0.413***	0.406***	0.596***
			(0.0396)	(0.0377)	(0.0945)	(0.0482)
Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations	*17,721*	*11,878*	*11,762*	*16,035*	*11,042*	*11,447*

Source: Authors own calculation
Notes: ***p<0.01   **p<0.05   *p<0.1

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(Is significant at the 1% level, 5% level and 10% level respectively)
Values are given in natural logarithms.

Given that exports outside of Africa as well as exports to multiple-destinations result in superior performance premia, it serves to examine the characteristics of firms who export to multiple destinations within Africa relative to those that export outside of Africa. These premia are reported in table 4. Firms which export to multiple destinations outside of Africa exhibit superior characteristics relative to all other exporters. Firms which export to multiple destinations within Africa are larger, more labour-productive, pay higher wages and employ more capital and intermediate inputs per worker than firms which export to single destinations (both inside and outside of Africa). Restricting the estimation to only medium and large firms, table A4, yields similar results (with the exception of capital intensity). Interestingly, table 4 further indicates that firms which export to a single destination within Africa seem to perform better than firms which export to a single destination outside of Africa (with the exception of capital per worker, and after controlling for firm size, wages). However this result is not significant, suggesting that destination matters little when exporting to a single terminus. Once the estimation is restricted to medium and large firms, the results indicate the inverse: firms exporting to a single destination outside of Africa exhibit superior premia to firms exporting to a single destination within Africa.

Table 4. Manufacturing Exporter Premia – Multiple Destinations Within and Outside Africa

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	1.101***	0.309***	0.379***	0.754***	0.680***	0.427***
	(0.114)	(0.0853)	(0.0832)	(0.111)	(0.192)	(0.101)
Africa Only Dummy	0.139	0.00266	0.0245	0.125	-0.310	0.0756
	(0.125)	(0.0926)	(0.0902)	(0.121)	(0.209)	(0.109)
Multiple Dest. Dummy	1.534***	0.932***	0.406***	1.468***	0.275	0.495***
	(0.121)	(0.0891)	(0.0869)	(0.117)	(0.201)	(0.105)
Interaction: Afri*Multi-dest	-0.572***	-0.443***	-0.0619	-0.619***	0.0150	-0.0796
	(0.140)	(0.102)	(0.0997)	(0.135)	(0.230)	(0.120)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Controlling for firm size						
Exporter			0.456***	0.412***	0.686***	0.498***
			(0.0805)	(0.0767)	(0.192)	(0.0986)

Africa Only Dummy			0.0258	-0.138*	-0.309	0.0746
			(0.0873)	(0.0832)	(0.209)	(0.107)
Multiple Dest. Dummy			0.635***	0.389***	0.295	0.706***
			(0.0844)	(0.0804)	(0.202)	(0.103)
Interaction: Afri*Multi-dest			-0.169*	-0.0491	0.00608	-0.176
			(0.0965)	(0.0918)	(0.230)	(0.118)
Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations	*17,721*	*11,878*	*11,762*	*16,035*	*11,042*	*11,447*

Source: Authors own calculation
Notes: ***p<0.01   **p<0.05   *p<0.1
         (Is significant at the 1% level, 5% level and 10% level respectively)
         Values are given in natural logarithms.

Overall, the results indicate that the stylised facts of exporting hold true for South African manufacturing exporters. Further, as previously found destination matters both in terms of within and outside of Africa exports as well as the number of markets served. Africa-only exporters are inferior to international (outside Africa) exporters and multiple destination exporters are superior to single destination exporters. Exporting to multiple destinations outside of Africa results in the largest export premia, however when exporting to only one destination firms which export within Africa perform better than those which export to one destination internationally. This is not true for medium and large exporters who regardless of the number of destinations, exhibit higher premia when exporting outside of Africa. The next section goes a step further to examine how exporting and destinations relate to firm performance in terms of total factor productivity.

5. Econometric Methodology – Productivity Premium

Production function analysis enables inference about the productivity difference between traders and non-traders. One can deduce these productivity differences from the estimated production functions because the coefficient of the expected trade status dummy variable gives the percentage difference between the productivity of traders and non-traders (Yasar, Nelson, & Rejesus, 2006).

The South African manufacturing firms will be approximated by a Cobb Douglas specification:

$$ln(^{Y_i}/_{L_i}) = \ \alpha_i + \beta_1(EX_i) + \beta_2(ln\,^{K_i}/_{L_i}) + \beta_3\left(ln\,^{I}/_{L_i}\right) + \beta_4(\ln L_i) + \beta_5(Ind_i) + \mu_i \qquad (2)$$

where i is the firm subscript, $^{Y}/_{L}$ is real output per worker, $^{K}/_{L}$ represents real capital per worker, and $^{I}/_{L}$ represents real intermediate inputs per worker, Ind is a vector of industry characteristics (measured at the 5 digit SIC), and μ_i is the residual.

The variable EX_{it} is a dummy variable that will represent exports status. It takes the form $EX_{it} = 1$ if the firm exports; $EX_{it} = 0$ otherwise.

For both the LSS sample data and the SARS population data, the coefficients will be estimated by Ordinary Least Squares (OLS) regressions. Specifically β_2 , β_3 and β_4 are the elasticity of output productivity with respect to capital per worker, intermediate inputs per worker and labour respectively. The coefficient of interest, β_1, signifies productivity differences between exporting firms and domestic traders. Industries are explicitly included in the regression equation to account for some of the heterogeneity in this sample. In addition, fixed effects estimation will be run on the LSS sample data and will include a year dummy to control for year fixed effects between 2005 and 2008.

Following the process in section 3, the productivity premia are estimated for exporters in general, Africa-only exporters, multiple destination exporters as well as the interaction between multiple destinations and Africa. The results are presented and discussed in the following section.

6. Productivity – Results

In contrast to the international literature, previous South African studies have found that despite exhibiting superior export premia across a number of characteristics, exporters are no more productive than non-exporters and it is only when exporting outside of Africa that the productivity premium becomes significant (see Rankin (2001)).

As previously mentioned, South African studies have been limited by inaccessibility to good firm-level data. This paper uses official tax statistics population data and attempts to reproduce the findings of the South African studies to determine whether or not South African exporters exhibit productivity premiums relative to non-exporters. The results of

equation (2) are presented in table 5 for the LSS sample data and in table 6 for the SARS population data.

According to the data contained in the LSS sample, no productivity premium exists for exporters in 2005. Indeed among medium to large firms, exporters are less productive than non-exporters, although this effect disappears in the fixed effects estimations. The OLS estimates indicate that exporters in 2008, however, exhibit a positive and significant productivity premium of between 4 and 7 percent, with fixed effects estimating premium of between 10 and 18 percent.

Table 5. OLS Estimation of Exporter Productivity Premium – LSS data

	Ordinary Least Squares		Fixed Effects	
VARIABLES	(1) All firms	(2) Medium-Large	(1) All firms	(2) Medium-Large
Exporter	9.94e-05	-0.0249*	-0.0247	-0.0302
	(0.0133)	(0.0139)	(0.0189)	(0.0196)
Exporter*2008	-0.0148	0.0105	0.0549**	0.0673***
	(0.0158)	(0.0165)	(0.0217)	(0.0232)
2008	0.0798***	0.0547***	0.0796***	0.0722***
	(0.00946)	(0.0107)	(0.0129)	(0.0145)
ll	-0.0131***	-0.0186***	-0.114***	-0.172***
	(0.00291)	(0.00351)	(0.0152)	(0.0202)
lkl	0.0378***	0.0420***	0.0164*	0.0170*
	(0.00316)	(0.00353)	(0.00847)	(0.00943)
lil	0.858***	0.865***	0.770***	0.745***
	(0.00421)	(0.00494)	(0.0155)	(0.0184)
Industry controls	Yes	Yes	Yes	Yes
Observations	9,358	7,330	9,358	7,330
R-squared	0.880	0.886	0.751	0.777
Number of nent_num			7,246	5,590

Source: Authors own calculation using LSS data
Notes: ***p<0.01   **p<0.05   *p<0.1
    (Is significant at the 1% level, 5% level and 10% level respectively)
    .

Table 6. OLS Estimation of Exporter Productivity Premium – SARS data

	Standard		Africa		Multiple Destinations		Interaction		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All firms	Medium-Large	All firms	Medium-Large	All firms	Medium-Large	All firms	Medium-Large	Micro or Small
Exporter	0.0745***	0.0472***	0.119***	0.0897***	0.0114	-0.00633	0.0302	0.0631*	-0.0211
	(0.00897)	(0.0101)	(0.0120)	(0.0123)	(0.0131)	(0.0159)	(0.0294)	(0.0342)	(0.0417)
Africa_only			-0.0727***	-0.0763***			-0.0218	-0.0839**	0.0664
			(0.0131)	(0.0128)			(0.0317)	(0.0368)	(0.0451)
Multi-dest.					0.0959***	0.0699***	0.105***	0.0305	0.0800*
					(0.0144)	(0.0160)	(0.0308)	(0.0347)	(0.0469)
Africa*Multi-dest.							-0.0349	0.0207	-0.0491
							(0.0351)	(0.0392)	(0.0544)
ll	-0.0749***	-0.0814***	-0.0774***	-0.0861***	-0.0790***	-0.0851***	-0.0801***	-0.0878***	-0.177***
	(0.00330)	(0.00466)	(0.00332)	(0.00471)	(0.00334)	(0.00473)	(0.00336)	(0.00475)	(0.00602)
lkl	0.0293***	0.0274***	0.0290***	0.0267***	0.0292***	0.0273***	0.0290***	0.0267***	0.0265***
	(0.00154)	(0.00219)	(0.00154)	(0.00218)	(0.00154)	(0.00218)	(0.00154)	(0.00218)	(0.00196)
lil	0.746***	0.793***	0.745***	0.790***	0.744***	0.790***	0.743***	0.789***	0.637***
	(0.00298)	(0.00452)	(0.00298)	(0.00452)	(0.00299)	(0.00455)	(0.00299)	(0.00454)	(0.00483)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	*10,722*	*4,325*	*10,722*	*4,325*	*10,722*	*4,325*	*10,722*	*4,325*	*6,397*
R-squared	0.894	0.929	0.894	0.929	0.894	0.929	0.895	0.929	0.839

Source: Authors own calculation using SARS data

Notes: ***p<0.01   **p<0.05   *p<0.1

(Is significant at the 1% level, 5% level and 10% level respectively)

At a first glance the SARS data shows that exporters are indeed significantly more productive than non-exporters, around 7 percent (table 6). This premium decreases slightly when the estimation is restricted to medium and large firms only to around 5 percent. Columns (3) and (4) show the productivity premium for exports within Africa only. Firms that export to destinations only within Africa are around 7 percent less productive than firms which export outside of Africa; however they are still around 5 percent more productive than non-exporters. Interestingly, for medium and large firms Africa-only exporters are no more productive than their domestic counterparts (0.089 – 0.076) whereas outside-Africa exporters have a productivity premium of about 9 percent over non-exporters.

In terms of multiple destinations, columns (5) and (6) show that firms which export to multiple destinations are significantly more productive than single-destination exporters and non-exporters. Further, there is no significant productivity difference between single destination exporters and firms producing for the domestic market, regardless of firm size.

The combined Africa-only, multiple destination estimations are interesting (columns (7) and (8)) particularly for medium and large firms. Within Africa, single destination exporters are less productive than non-exporters whereas multiple destination exporters are only 3 percent more productive than their domestic counterparts. Firms which export to multiple destinations outside of Africa are 9 percent more productive than non-exporters and single destination exports outside of Africa result in a productivity premium of 6 percent relative to non-exporters. These exporters are also more productive than both single destination Africa-only exporters as well as multiple destination Africa-only exporters.

For medium to large exporters the results indicate that the biggest productivity jump is from exporting outside of Africa. For smaller firms the result of this estimation is given in column (9) of table 5 which shows that for small firms, the productivity jump comes not from exporting outside of Africa, but rather from multiple destinations. Indeed, smaller exporters benefit from a greater productivity premium when they export within Africa relative to outside of Africa. Overall, it is multiple destinations that matters for productivity regardless of whether it is within Africa or outside Africa.

7. Concluding Remarks

A number of stylised facts have emerged regarding the export environment in recent international literature. This paper finds similar results for the South African export environment. Using a large, official panel dataset of South African manufacturing firms, this paper finds exporters to be superior to non-exporters across a number of dimensions. Exporters are larger, more labour productive and capital intensive and pay higher wages than firms that sell domestically only.

In the South African manufacturing sector exporting in general does not make a difference to productivity gains. However, firms that export to multiple destinations outside of Africa are significantly more productive than firms which export to a single destination outside of Africa; firms which export within Africa (regardless of the total number of markets); and firms which sell domestically only. This is particularly true for medium and large firms. Micro to small firms, in contrast, exhibit higher productivity gains from exporting within Africa. Multiple destination exporters are still more productive than single destination exporters among micro and small firms.

Overall the results imply that it is important for policy makers to know that all exports should not be treated as homogeneous. Smaller firms should indeed be encouraged to increase exports regionally, as suggested in the World Bank report. The productivity threshold is likely to be lower within the region, which will allow the smaller, less productive firms to enter the export market. This could provide a stepping stone for smaller firms who, as they learn and grow, become productive enough to enter the more competitive international markets.

However, while encouraging regional exporting among micro and small firms may be good for growth, it is not necessarily the case for medium and large firms. Instead, these firms should be encouraged to export to multiple destinations in general (and multiple destinations outside of Africa in particular) which will likely improve efficiency, technological knowledge, employment opportunities and ultimately overall economic growth.

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Table A1. Medium to Large Exporters -Export Premia

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
LSS data						
Exporter	0.127***	0.109***	0.0150	0.158***	0.215***	0.0457
	(0.0441)	(0.0401)	(0.0314)	(0.0242)	(0.0438)	(0.0328)
Exporter*2008	0.0807	0.0807	0.00190	-0.0220	0.196***	-0.0135
	(0.0551)	(0.0502)	(0.0393)	(0.0303)	(0.0549)	(0.0411)
2008	-0.307***	-0.227***	-0.0658***	0.157***	-0.103***	-0.145***
	(0.0356)	(0.0322)	(0.0255)	(0.0194)	(0.0354)	(0.0264)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*8,447*	*8,635*	*8,408*	*8,632*	*8,528*	*8,631*
SARS data						
Exporter	0.656***	0.420***	0.174***	0.695***	0.237***	0.181***
	(0.0337)	(0.0363)	(0.0342)	(0.0424)	(0.0716)	(0.0385)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*5,360*	*4,680*	*4,642*	*5,191*	*4,401*	*4,583*
Controlling for firm-size						
Exporter			0.385***	0.348***	0.349***	0.402***
			(0.0295)	(0.0338)	(0.0720)	(0.0340)
SARS - Controlling for firm size						
Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations			*4,642*	*4,570*	*4,401*	*4,583*

Source: Authors own calculations

Notes: ***p<0.01   **p<0.05   *p<0.1

   (Is significant at the 1% level, 5% level and 10% level respectively)

   Values are given in natural logarithms.

Table A2. Medium to Large Exporters – Export Premia within Africa

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	0.942***	0.647***	0.221***	1.024***	0.401***	0.210***
	(0.0405)	(0.0434)	(0.0413)	(0.0509)	(0.0862)	(0.0466)
Africa Only Exporter Dummy	-0.553***	-0.439***	-0.0908**	-0.636***	-0.316***	-0.0561
	(0.0446)	(0.0470)	(0.0445)	(0.0559)	(0.0928)	(0.0500)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*5,360*	*4,680*	*4,642*	*5,191*	*4,401*	*4,583*
Controlling for firm-size						
Exporter			0.552***	0.529***	0.585***	0.557***
			(0.0357)	(0.0409)	(0.0873)	(0.0413)
Africa Only Exporter Dummy			-0.311***	-0.335***	-0.438***	-0.288***
			(0.0379)	(0.0434)	(0.0926)	(0.0437)
Industry controls			Yes	Yes	Yes	Yes
Firm size control			Yes	Yes	Yes	Yes
Observations			*4,642*	*4,570*	*4,401*	*4,583*

Source: Authors own calculations using SARS data
Notes: ***p<0.01   **p<0.05   *p<0.1
          (Is significant at the 1% level, 5% level and 10% level respectively)
          Values are given in natural logarithms.

Table A3. Medium to Large Exporters – Export Premia for multiple Destinations

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	0.106*	0.00726	0.0402	0.139**	0.127	0.0404
	(0.0552)	(0.0591)	(0.0559)	(0.0696)	(0.117)	(0.0629)
Multiple Dest. Exporter Dummy	0.691***	0.517***	0.168***	0.699***	0.138	0.177***
	(0.0554)	(0.0587)	(0.0555)	(0.0697)	(0.116)	(0.0623)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*5,360*	*4,680*	*4,642*	*5,191*	*4,401*	*4,583*

Controlling for firm-size

Exporter	0.0485	0.0702	0.126	0.0508
	(0.0471)	(0.0542)	(0.116)	(0.0543)
Multiple Dest. Exporter Dummy	0.429***	0.355***	0.286**	0.448***
	(0.0472)	(0.0542)	(0.116)	(0.0543)
Industry controls	Yes	Yes	Yes	Yes
Firm size control	Yes	Yes	Yes	Yes
Observations	*4,642*	*4,570*	*4,401*	*4,583*

Source: Authors own calculations using SARS data
Notes: ***p<0.01   **p<0.05   *p<0.1
   (Is significant at the 1% level, 5% level and 10% level respectively)
   Values are given in natural logarithms.

Table A4. Medium to Large Exporters – Export Premia for Multiple Destinations with Africa

	Output	No of employees	Output per worker	Labour Cost	Capital per worker	Intermediate Inputs per worker
Exporter	0.228*	0.0281	0.142	0.426***	0.651***	0.0600
	(0.117)	(0.127)	(0.120)	(0.150)	(0.251)	(0.136)
Africa Only Exporter Dummy	-0.148	-0.0259	-0.124	-0.349**	-0.638**	-0.0239
	(0.126)	(0.137)	(0.130)	(0.162)	(0.270)	(0.147)
Multiple Dest. Exporter Dummy	0.772***	0.667***	0.0860	0.646***	-0.268	0.163
	(0.118)	(0.128)	(0.122)	(0.152)	(0.253)	(0.138)
Interaction: Afri*Multi-dest	-0.315**	-0.363**	0.0790	-0.186	0.373	0.0104
	(0.135)	(0.145)	(0.138)	(0.172)	(0.288)	(0.156)
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm size control	No	No	No	No	No	No
Observations	*5,360*	*4,680*	*4,642*	*5,191*	*4,401*	*4,583*

Source: Authors own calculations using SARS data
Notes: ***p<0.01   **p<0.05   *p<0.1
   (Is significant at the 1% level, 5% level and 10% level respectively)
   Values are given in natural logarithms.