Working paper

International Growth Centre

Exports, imported intermediate input, and exchange rate volatility in Zambia

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August 2016

When citing this paper, please use the title and the following reference number:
F-89214-ZMB-1

DIRECTED BY LSE UNIVERSITY OF OXFORD

FUNDED BY UKaid from the British people

Executive summary

- A key challenge for the Zambian economy is the diversification of exports and growing non-traditional exports (NTEs). Zambian exports are currently highly concentrated and Zambia's export revenue is heavily dependent on the price of primary products. The Zambian Kwacha is affected by the copper price and this, and exchange rate volatility, may in turn hamper the development of NTEs.
- This paper uses micro-data on both imports and exports at the firm-country-product level to understand in more detail the import and export behaviour of firms and how this may be affected by exchange rate volatility. An understanding of this behaviour is essential to design policies which promote NTEs.
- The results confirm that Zambian trade values are highly concentrated and dominated by a small number of firms that participate continuously in the international market, for example approximately 80% of export value is accounted for by a small group of continuous exporters. However, there are a large number of firms (and varieties or country-product combinations) which export sporadically. This suggests that transforming sporadic exporters (or varieties) to continuous ones is one way to increase NTEs. This requires knowing more about how the characteristics of these two groups differ.
- Both sporadic import and export varieties are, on average, of lower product quality than continuous varieties. This is not fully explained by destination, for example only half of this observed difference in quality is because sporadically exported varieties go to low-quality destinations. The results show that certain firms export higher quality products, rather than both high and lower quality product varieties being exported within the same firm. These results also indicate that there are certain types of firms specialising in the (sporadic) trade of these low quality varieties.
- Importing is not associated with higher product quality for exporters. Generally, firm-level studies (on countries other than Zambia) find that firms that both export and import are more productive than non-traders. Although not directly comparable, since our data does not capture firm-level characteristics beyond trade, we would expect access to imports to be associated with higher product quality. This suggests that Zambian exporters are not importing the types of products which enable them to improve their product quality. This may be because factors in the global or regional value chains which facilitate these relationships are far from the activities of the traders in Zambia.
- Higher exchange rate volatility increases churn (entry and exit) in both the import and export market. Surprisingly a more volatile currency does not decrease export variety entry but rather increases it. The relationship between export variety churn and exchange rate volatility is higher amongst firms that import too. This suggests that sporadic trade participation may be

a response by firms to exchange rate volatility as they seek out short-term arbitrage opportunities rather than long-term stable trading relationships.

- The results in this paper suggest two areas where policy should focus.
    - The first is to build a pool of firms that can become continuous exporters. New firms, either local or through FDI, are one source of this pool. The other is by encouraging sporadic exporters to become continuous, although this is unlikely to be easy given that these firms are, on average, different to continuous exporters. These new continuous exporters will need to have the types of characteristics which successful exporting firms in other countries exhibit – higher productivity, higher capital intensity, access to imported intermediate inputs. Policies need to focus on the conditions, such as the business environment and productivity improvements, which facilitate this.
    - The second area is exchange rate volatility. The results in this paper indicate that volatility encourages a group of 'arbitragers' – firms which take advantage of this volatility to trade sporadically. A more stable exchange rate could encourage these firms to become fuller participants in the export market.

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1. Introduction

A key challenge for Zambia is export diversification. Currently, Zambian exports are highly concentrated in extractive industries, and for its level of development, Zambia has one of the highest degrees of export concentration in the world (Brülhart, Kukenova, and Dihel 2015). This makes Zambia's export revenue heavily dependent on movements in the price of primary products, particularly copper (Chipili 2015). It also means that the Zambian Kwacha is volatile. This volatility in turn makes it more difficult for other types of exports and thus potentially hampers export diversification.

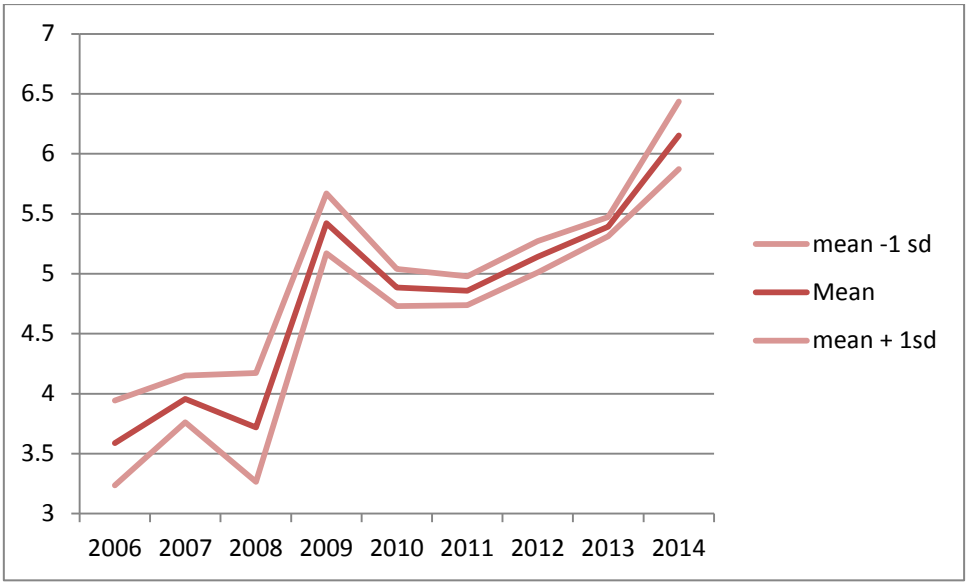
Theoretical models of trade at the firm level such as Melitz (2003) and empirical evidence (see for example Wagner, 2007 and Wagner, 2012) show the importance of productivity for exporting. Exporters are more productive, the number of export destinations increases with productivity, and firms that export to developed countries are more productive than those that export to developing countries. Although these 'stylised facts' are based mostly on research on developing countries mainly in Latin American, there is evidence of similar characteristics in other African countries (Rankin, Söderbom, and Teal, 2006; Matthee, Rankin, Naughtin and Bezuidenhout, 2016).

Although much of the existing empirical work has focused on the link between exporting and productivity, a number of recent studies have shown that importing matters too. Internationally, firms that export are also likely to be importers and two-way traders show higher productivity than either one-way traders or non-traders (Muûls and Pisu, 2009; Edwards, Sanfilippo and Sundaram, 2016; Wagner, 2012). Importing may be related to productivity because importers face similar fixed costs, such as sourcing suppliers, and transport costs, that exporters do. In addition importing might improve productivity through imported intermediates. These can be important for export performance through a number of different channels. Imported varieties may be cheaper than locally manufactured varieties; these varieties may not be available domestically; or these imported intermediates may embody technological developments, making exporters which use them more competitive on the international market. Edwards et al (2016) and Feng, Li, and Swenson (n.d.) show in particular that importing from advanced countries is associated with better export outcomes in the case of South Africa and China. This suggests that technology embodied in imported inputs is an important determinant of export performance.

Recently, two studies have looked at Zambian exporting using transaction level data ((Banda and Simumba, n.d.)Banda and Simumba, 2013; and Brülhart, Kukenova, and Dihel, 2015). A striking finding of both is that most Zambian exporting firms do not participate in the export market for very long. Although survival rates of exporters are correlated with the level of a country's development (Fernandes, Freund, and Pierola, 2015), Zambia is an outlier with much lower survival rates than

countries of a similar income, and in fact the lowest survival rates of approximately 40 comparator countries (Brülhart, Kukenova, and Dihel, 2015). This suggests that a key limiting factor for Zambian exports is the inability of to extend their export period beyond one year. Brülhart et al (2015) argue that access to imported intermediate inputs and exchange rate volatility are important factors which limit exporting in Zambia. One contribution of this paper is to examine this in greater detail.

Figure 1. Mean yearly Zambian Kwacha – United States Dollar exchange rate, and within year standard deviation



Like the two previous studies on Zambian exporters this paper also uses micro-level transaction data but extends the analysis to incorporate imports, links the export and import behaviour of firms and investigates how this might be related to exchange rate volatility. The paper finds that the sporadic trading which characterises much of Zambian trade, in terms of numbers of varieties and traders, is of lower value (and quality) product varieties. Furthermore, importing is associated with lower, rather than higher, quality exports and increased exchange rate volatility is associated with higher entry and exit of imports and exports. This suggests that Zambian firms are not importing the types of products which allow them to improve the quality of the products they produce and that this 'sporadic' trade participation may be a response by firms to exchange rate volatility as they seek out short-term arbitrage opportunities rather than long-term stable trading relationships. These results suggest that for Zambia to diversify its exports, there is a strong need for deliberate policy steps that promote production and trade in higher quality products.

The paper is structured as follows: Section 2 discusses the data; Section 3 presents descriptive results on traded products, trading firms and varieties; Section 4 investigates the relationship between

product quality and trade and the entry and exit of traders; Section 5 discusses the results and concludes.

2. Data and definitions

We use an updated version of the data from the Zambian Revenue Authority previously used by Banda and Simumba (2013) and Brülhart et al (2015). The data is similar in structure to the Exporter Dynamics Database (EDD) of the World Bank.[1] This data is at the trader (firm) level for each year over the period 2000-2013. Although anonymous, traders have the same unique identification number which allows import and export characteristics to be linked over time. The database contains information on the amount traded (in US$ and volume), the product, and destination or source.

In this paper we analyse this data at three levels.

- Product level. We aggregate across traders to construct unique products at the HS-6/8 level.
- Traders or firms. This is at the firm (or entity that trades) level.
- Variety. Varieties are defined as unique product by country combinations.

A focus of this paper is on the sporadic nature of Zambian trade (at the firm and variety level) and low survival probabilities, particularly in the export market. To do this, products, firms and varieties are classified according to their behaviour in consecutive three-year spells. Units that export (import) in all three years are defined as 'continuous' exporters (importers); units that do not export (import) in the previous year but export (import) in the current and following year are classified as 'entrants'; those that export (import) in the previous and current year but not in the following year are classified as 'exits'; and those that export (import) in only the current year but not in the previous or following year are classified as 'sporadic' exporters (importers). Analysis is done on the observation in the middle of the three year period.

[1] Fernandes, A., Freund, C. and M. Pierola (2016). "Exporter Behavior, Country Size and Stage of Development: Evidence from the Exporter Dynamics Database" Journal of Development Economics vol. 119, pp. 121-137.

3. Imports and exports: descriptive statistics

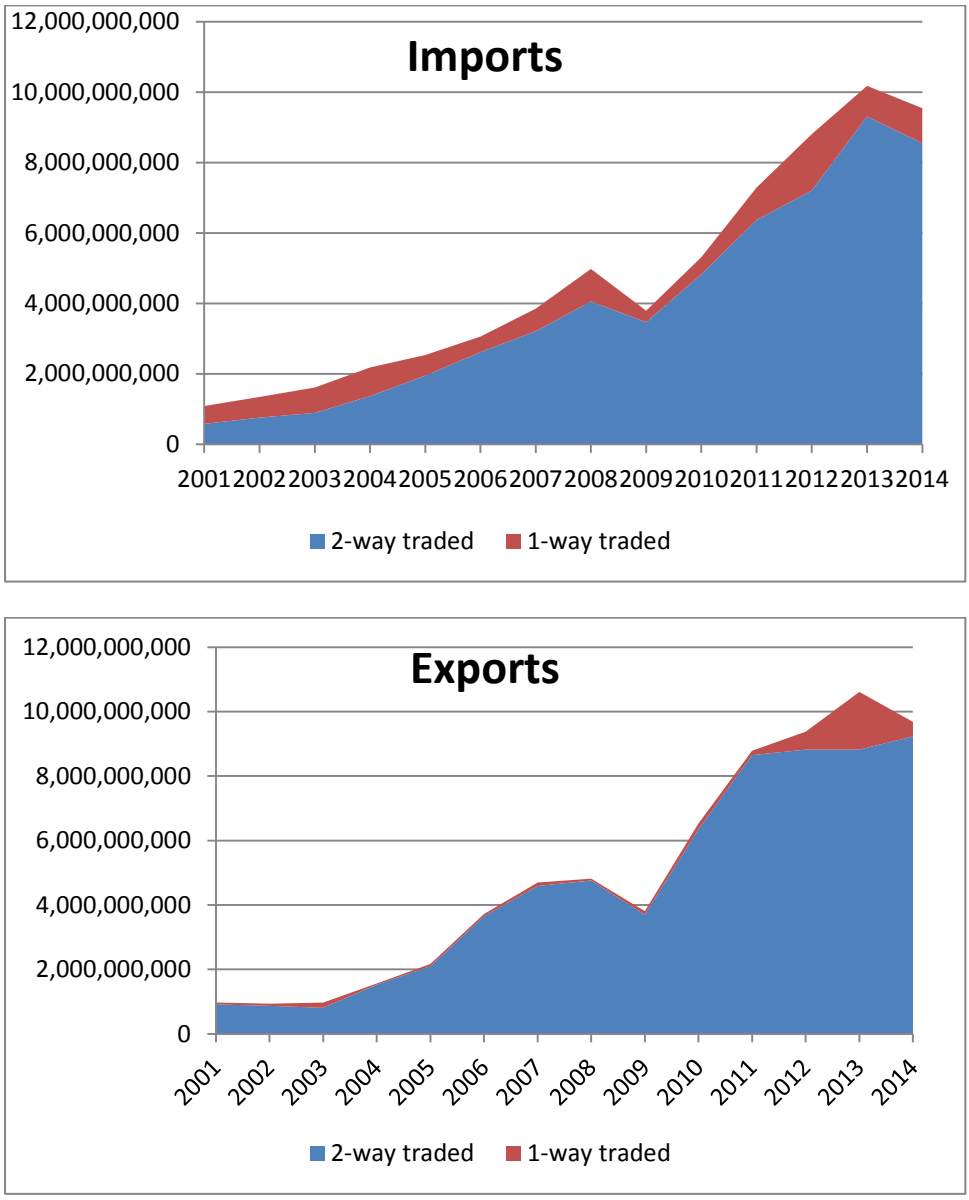
Product level

On average, Zambia trades between 4 100 and 4 600 products each year (Table 1). Although the number of traded products has increased slightly over the period, the relative share, and the absolute numbers, of exclusive imports and exclusive exports dropped. However, a simultaneous increase in absolute numbers and the relative share of products which are both imported and exported more than compensated for the decline and accounts for the increase in the number of traded products. The larger absolute increase in the number of two-way traded products (approximately 1 000) suggests that the expansion is not merely due to previously exclusive export and exclusive import products being both imported and exported but also reflects an expansion occurring at the extensive margin (i.e. a wider variety of products now being traded). The aggregate trade values are dominated by products which are both exported and imported (Figure 2).

Table 1. Number of products traded.

Y	Import only	Export only	Import and export	Total
2001	3 268	103	883	4 254
2002	3 118	115	971	4 204
2003	3 070	102	1 006	4 178
2004	2 990	93	1 133	4 216
2005	2 795	84	1 381	4 260
2006	2 520	88	1 700	4 308
2007	2 294	102	2 073	4 469
2008	2 028	101	2 168	4 297
2009	1 961	101	2 191	4 253
2010	2 188	81	2 027	4 296
2011	2 354	61	1 907	4 322
2012	2 419	78	2 056	4 553
2013	2 368	56	2 034	4 458
2014	2 405	75	1 941	4 421
Total	41 989	1 471	25 264	68 724

Figure 2. Export and import values: one-way (only imported or exported) and two-way (both imported and exported) traded products



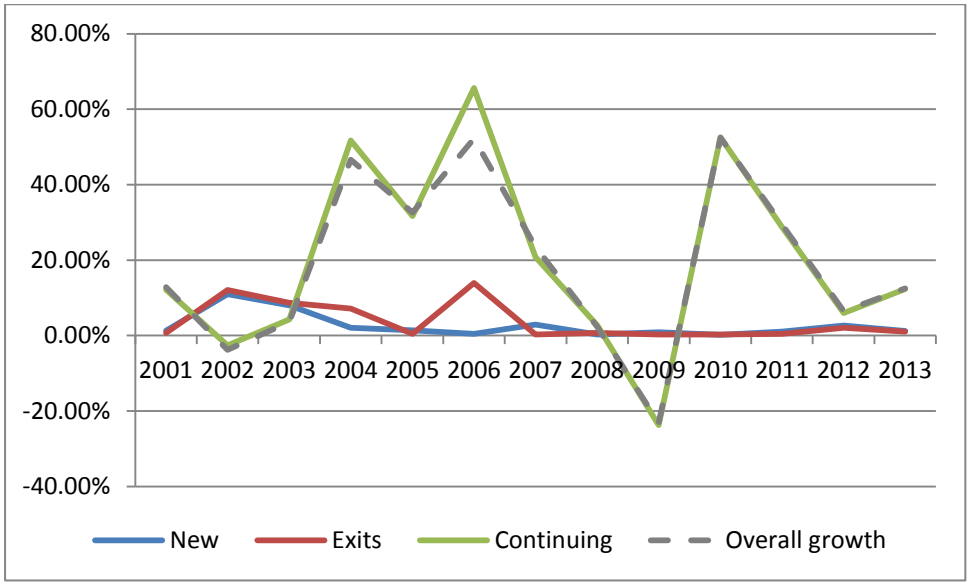
The bulk of growth in import value comes from products which are continuously imported (Figure 3). For exports, continuing products drive much of the export growth but there are more volatile. Although average import and export growth over the period is similar (19% compared to 17%) total export growth (a weighted average of the three series) exceeds 30% at four different times over the whole period and 50% at two different times whereas import growth only exceeds 30% at two different times and never exceeds 50% at any time.[2] Taken together these results indicate that almost all of the observed volatility (and growth) in trade values has been driven by expansion and

[2] Product classifications changed in 2002, 2007, and 2012 which explains the jumps in entry and exit in those years.

contraction at the intensive margin through existing products rather than the entry and exit of new products despite the increase in the number of products traded.

Figure 3. Zambian year-on-year import value growth, by product dynamics

Figure 4. Zambian year-on-year export value growth, by product dynamics



Trader (firm) level

Like with products, the bulk of both Zambian import and export value comes from firms that are continuously trading. Continuous importing firms account for more than 90% of import value, and continuous exporting firms account for more than 95% of export value in most years (Table 2 and Table 3). Trading value is also concentrated in firms which are two-way traders and firms which are either continuously importing or exporting (Table 4and Table 5). On average more than half of the value of Zambia's imports is due to firms that remain in both the import and export market for at least

three consecutive years. For exporters this value is even higher – 80% of export value comes from firms which have been active in the export market continuously for at least three years and which are also continuous importers.

Table 2. Import value by firm-level import behaviour

	Total imports	Continuous	Entrants	Exits	Sporadic
2001	1 090 033 727	95.19%	3.19%	1.01%	0.61%
2002	1 348 606 613	95.68%	2.73%	0.77%	0.83%
2003	1 614 616 560	93.59%	3.46%	2.30%	0.65%
2004	2 180 354 625	95.99%	2.91%	0.61%	0.49%
2005	2 536 164 964	89.56%	2.93%	6.94%	0.56%
2006	3 066 555 802	90.27%	8.46%	0.94%	0.33%
2007	3 854 546 487	91.78%	6.37%	1.28%	0.56%
2008	4 981 089 691	92.37%	5.74%	1.06%	0.84%
2009	3 792 811 368	94.35%	3.87%	1.06%	0.71%
2010	5 320 421 020	95.28%	3.33%	0.61%	0.78%
2011	7 294 013 214	94.71%	3.54%	0.56%	1.19%
2012	8 816 334 637	94.53%	3.36%	0.84%	1.27%
2013	10 182 087 175	82.31%	3.05%	12.07%	2.57%

Table 3. Export value by firm-level import behaviour

	Total exports	Continuous	Entrants	Exits	Sporadic
2001	974 976 079	96.55%	2.14%	0.38%	0.93%
2002	938 785 439	95.55%	1.35%	2.42%	0.68%
2003	973 401 294	97.56%	1.25%	0.72%	0.47%
2004	1 569 772 547	97.66%	1.05%	1.00%	0.28%
2005	2 175 775 782	91.45%	1.05%	4.33%	3.17%
2006	3 717 373 328	96.40%	3.24%	0.15%	0.22%
2007	4 700 771 683	97.86%	1.28%	0.46%	0.40%
2008	4 815 081 146	94.74%	3.64%	1.39%	0.24%
2009	3 812 747 598	98.07%	1.10%	0.43%	0.40%
2010	6 527 573 780	98.44%	0.50%	0.30%	0.38%
2011	8 786 298 516	98.72%	0.39%	0.18%	0.49%
2012	9 374 508 702	98.21%	0.80%	0.76%	0.50%
2013	9 682 172 960	90.27%	1.42%	7.63%	0.55%

These results also show the large absolute numbers of firms which operate sporadically in either the export or import markets. Approximately 45% of importing firms, and 40% of exporting firms, over this period were only active sporadically. This illustrates the concentration in the export market shown by Brülhart et al (2015) but also shows that this holds for importing too – less than half of the importing firms account for almost 80% of the value of imports. Furthermore, it shows that most of exporting and importing value is generated by a small number of firms that are two-way traders (on average 325 firms over this period).

Table 4. Import value (proportion) by importer and exporter type. 2000-2013

		Non-exporter	Exporter type				
Importer type			Continuous	Entry	Exit	Sporadic	Total
Continuous	%	13.70%	55.15%	3.37%	3.34%	2.08%	77.64%
	N	33 378	4 560	1 430	1 129	1 728	42 225
Entry	%	2.29%	0.03%	1.98%	0.00%	0.18%	4.48%
	N	28 504	166	652	42	468	29 832
Exit	%	3.30%	0.29%	0.03%	5.76%	3.81%	13.20%
	N	27 629	230	94	889	990	29 832
Sporadic	%	3.33%	0.00%	0.01%	0.03%	1.31%	4.69%
	N	87 653	117	126	169	1 315	89 380
Total	%	22.62%	55.47%	5.39%	9.14%	7.39%	100.00%
	N	177 164	5 073	2 302	2 229	4 501	191 269

Table 5. Export value (proportion) by importer and exporter type. 2000-2013

		Exporter type				
Importer type		Continuous	Entry	Exit	Sporadic	Total
Non-importer	%	0.66%	0.24%	0.33%	0.26%	1.49%
	N	872	1 023	1 096	3 378	6 369
Continuous	%	79.19%	0.35%	0.51%	0.09%	80.14%
	N	4 560	1 430	1 129	1 728	8 847
Entry	%	0.12%	2.38%	0.00%	0.11%	2.61%
	N	166	652	42	468	1 328
Exit	%	0.93%	0.04%	12.09%	0.56%	13.63%
	N	230	94	889	990	2 203
Sporadic	%	0.08%	0.02%	0.20%	1.83%	2.13%
	N	117	126	169	1 315	1 727
Total	%	80.98%	3.04%	13.13%	2.85%	100.00%
	N	5 945	3 325	3 325	7 879	20 474

Varieties

A third 'level' at which we examine trade is at the varieties-level – product-country-firm combinations. Figures 5 to 8 show import and export varieties by value and by numbers. The results for varieties is similar to those for products and firms: the bulk of traded value comes from a small number of continuous varieties (especially for exports). In addition to this, most of the growth of imports and exports comes from growth at the intensive variety margin – the increase in value of continuously traded varieties.

Export varieties are an order of magnitude lower than import varieties (peaking at over 12 000 varieties in 2010 compared to 115 000 import varieties in the same year) and for both exports and imports sporadic varieties outnumber all other types. Over the period as a whole the number of

varieties increased substantially. For imports there was a substantial increase after 2010; for exports the increase in varieties happened from the mid-2000s – between 2005 and 2010 export varieties trebled.

Figure 5. Import varieties, value

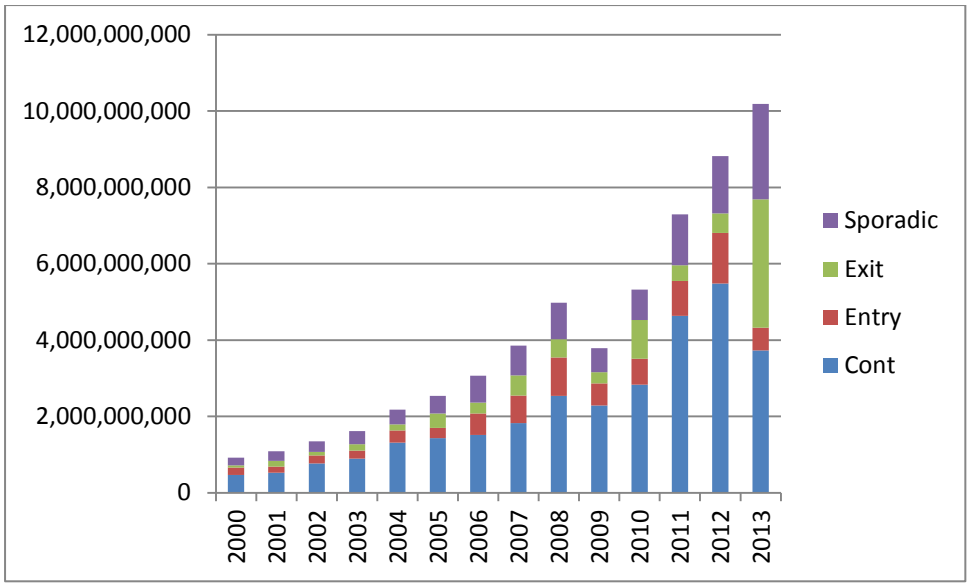


Figure 6. Export varieties, value

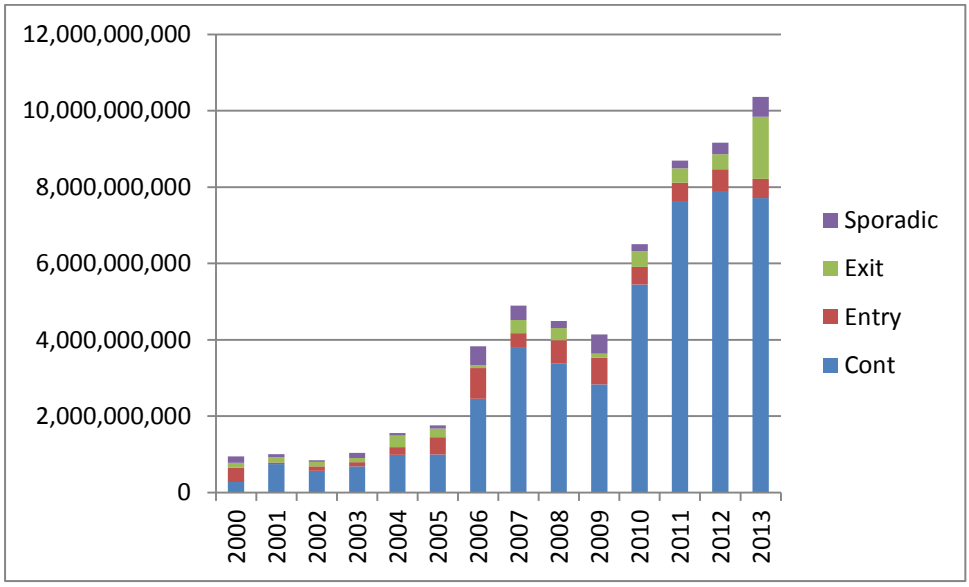


Figure 7. Import varieties, number

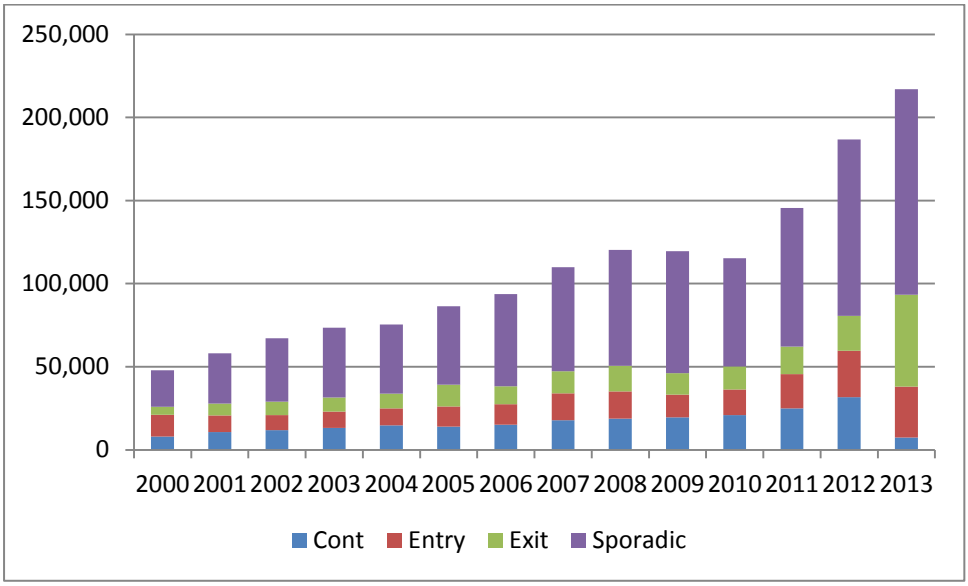
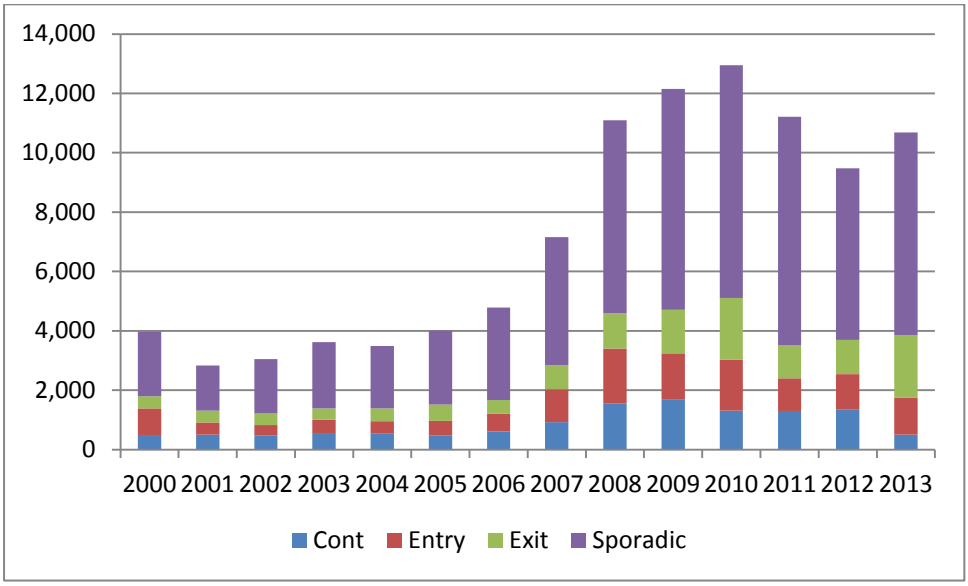


Figure 8. Export varieties, number



Tables 6 and 7 show that for varieties, unlike firms and products, there is little overlap between exporting and importing the same variety. The bulk of import (export) value comes from varieties which are continuously imported (exported) but not exported (imported). This suggests that two-way traders are exporting and importing different varieties. This demonstrates that specific import products are sourced from countries which are different from where exporting happens. The tables also show that non-continuous trading makes up a large proportion of traded value (non-continuous import varieties account for 55% of import value and non-continuous export varieties make up 35% of export value). This potentially reflects the failure of longstanding trader relationships not only on the export side but also sourcing which has implications for sustainability and negatively influences the likelihood to survive longer in trading.

Table 6. Import variety values and numbers, by import and export variety type

		Import variety				
Export variety		Continuous	Entry	Exit	Sporadic	Total
Non-export variety	Value	26 614 984 627	7 827 929 477	10 228 865 737	17 588 333 905	62 260 115 258
	n	221 347	225 447	224 912	1 211 896	1 883 602
Continuous	Value	1 131 737 225	31 730 128	30 209 213	7 213 762	1 200 890 317
	n	1 456	152	245	266	2 119
Entry	Value	660 711 705	172 949 701	19 896 707	10 469 981	864 028 112
	n	1 190	695	168	367	2 420
Exit	Value	687 894 383	7 342 631	159 628 463	14 885 956	869 751 428
	n	1 096	112	696	346	2 250
Sporadic	Value	1 175 418 394	197 686 557	421 766 446	256 782 162	2 051 653 579
	n	3 763	1 696	2 081	5 009	12 549
Total	Value	30 270 748 360	8 237 638 447	10 860 366 420	17 877 685 819	67 246 438 152
	n	228 852	228 102	228 102	1 217 884	1 902 940

Table 7. Export variety values and numbers, by import and export variety type

		Import variety					
Export variety		Non-import variety	Continuous	entry	exit	Sporadic	Total
Continuous	Value	43 754 351 902	384 105 860	244 888 158	380 110 322	620 117 368	45 383 573 485
	n	10 138	1 456	152	245	266	12 257
Entry	Value	5 931 721 465	63 568 880	125 705 977	46 918 847	476 519 883	6 644 434 992
	n	11 555	1 190	695	168	367	13 975
Exit	Value	8 997 178 516	36 061 011	7 110 520	143 642 157	142 051 262	9 326 043 379
	n	11 725	1 096	112	696	346	13 975
Sporadic	Value	8 691 657 423	75 193 677	64 053 638	127 482 162	164 067 997	9 122 455 352
	n	66 563	3 763	1 696	2 081	5 009	79 112
Total	Value	67 374 909 335	558 929 434	441 758 282	698 153 479	1 402 756 485	70 476 507 128
	n	99 981	7 505	2 655	3 190	5 988	119 319

The results from all three micro-aspects are consistent: although there are relatively large numbers of products, traders and varieties which sporadically participate in the international market, trade values, for both imports and exports, are dominated by a smaller group of units (at the product, firm and variety levels) which continuously trade. At the firm-level, the bulk of both export and import value has to do with these continuous traders which both export and import. At the variety level though, both import and export values are dominated by varieties which either export or import but do not do both. Thus the firms that dominate import and export values are not both importing and exporting the same varieties, but rather import from and export different products to different markets. A key question is what differentiates continuously traded varieties from those that are not, whether this is the same for imports and exports, and whether it is possible (or sensible) to convert sporadically traded varieties to continuously traded ones. To provide some policy guidance to this question, we estimate

several econometric specifications that help to investigate the quantitative linkages between micro trading characteristics and trading outcomes in the next section.

4. Econometric analysis

Product quality and trade behaviour

The descriptive statistics in this report and previous research using similar data show that in Zambia there are a large number of firms, and traded varieties, which trade or are traded sporadically. One approach to increasing Zambia's export value is to convert some of the sporadic exporters, and exported varieties, into continuous exporters. There are a number of potential explanations why so much trade may be sporadic. One important potential explanation is that Zambian products are not competitive enough or perhaps, Zambians trade inappropriate low value products that are not likely to succeed in international markets. The observed sporadic behaviour may be due to firms experimenting with trading and discovering which products to trade through learning by doing. The failure of other traders to learn or copy from the successful traders so that their can cut on back on persistent sporadic trade is a challenge. However, to keep the paper manageable, we focus the investigation on one product characteristic - product quality.

We construct a measure of quality that is standard in the literature – the per unit price at the variety level. We exploit the fact that firms often trade multiple varieties, across different destinations, products and time to identify whether sporadically traded varieties differ in quality from continuously traded ones. More formally we estimate the following specification:

$$Q_{ijkt} = T_{ijkt} + \lambda_i + \mu_j + \tau_t + \varepsilon_{ijkt}$$

Where Q is the natural logarithm of the pre unit price; T is a set of dummy variables for the traded behaviour of the variety (sporadic, entry or exit with continuous as the base); λ are product specific effects; μ are destination specific effects; τ are time specific effects; and ε is the usual residual term. The subscripts i, j, k, and t index products, destinations, firms and time. We estimate this specification for both imports and exports

Figure 9 plots the regression results for imports and exports. The results show that, on average, imported and exported varieties are lower quality when they start to be imported (or exported) and lower quality persists when they are sporadically traded in comparison to continuous varieties . Varieties that stop being imported are no different in terms of quality comparison to continuous imports but varieties that exit exporting are of lower quality. Much, but not all, of this difference is accounted for by the countries where these import originate or exports are destined. Characteristics of the origin effects account for all the difference between new and continuously imported varieties – new imports tend to come from countries which produce lower-cost products, and half the difference

between continuous and sporadic varieties. The results also indicate that Zambia is, on average, exiting higher-value imported varieties within countries.

About half of the quality difference for exported varieties is explained by destination characteristics. Varieties that enter or exit are lower quality, by about 2 to 3 percent, than continuously exported varieties. However, even after controlling for destinations, sporadically exported varieties are of lower quality (by approximately 8 percent) than continuously exported varieties. This suggests that it is not only destinations, but potentially something else like firm-specific characteristics, which accounts for the observed difference in product quality. To understand how variations is frim specific characteristics influence the quality and patterns of exporting, it is useful to match trader data at ZRA to firm level data which can produce deeper policy insights about which triggers policy can target and how sequencing of policy actions can be optimized to produce high end impacts.

Figure 9. Product quality differences relative to continuous importers.

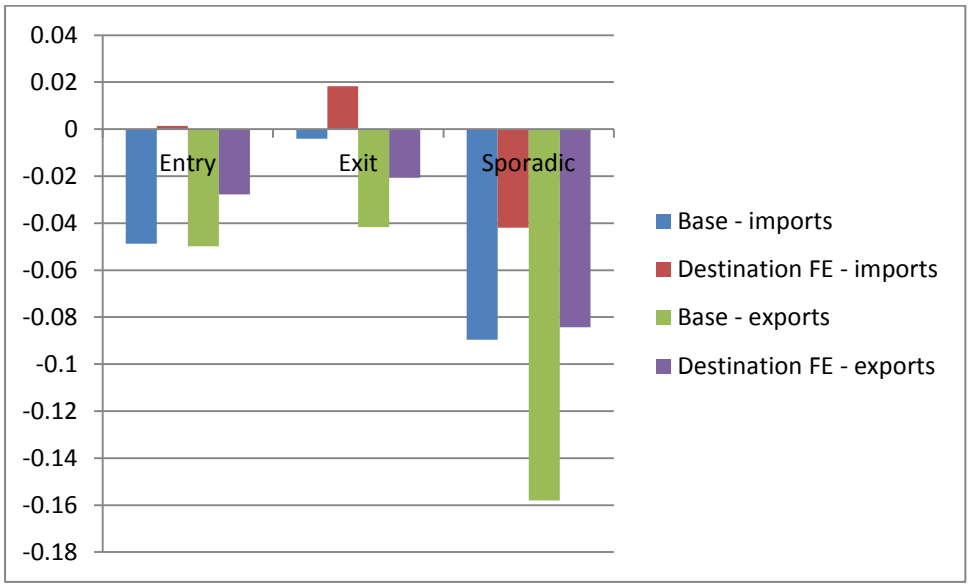
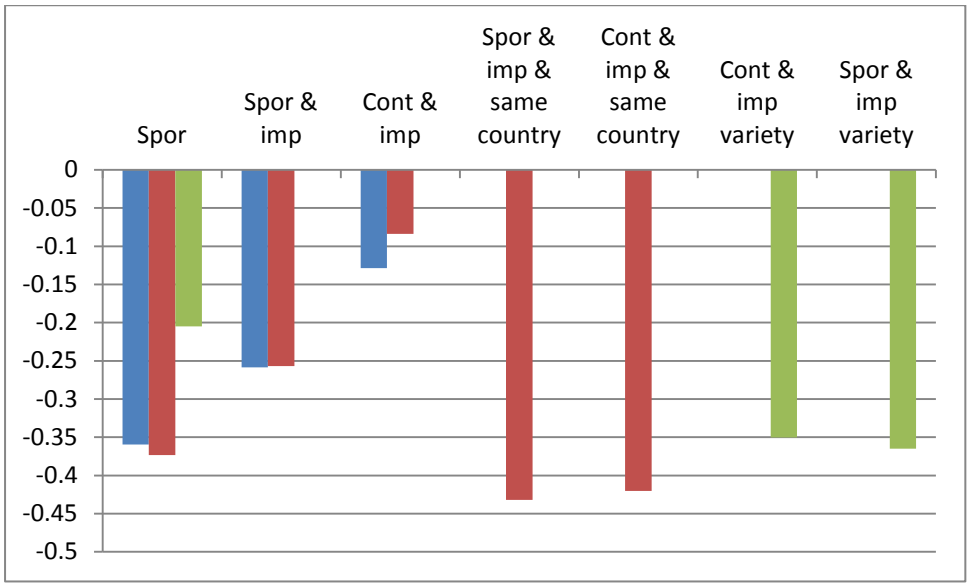


Figure 10. Product quality differences relative to continuous exporters, with different import characteristics.



Notes: Relative to continuous non-importing exporters.

Part of the gap between the product quality of sporadic and continuous exporters has to do with import behaviour (Figure 10). Sporadic exporters who do not import have lower product quality than those who do. However, the direction of this relationship is different for continuous exporters – those importing produce lower quality exports. This suggests that the higher quality observed for continuous exporters is not explained by access to imports, at least at the average level, through for example more technologically sophisticated intermediate inputs. The estimates also suggest that importing and exporting to the same country, or the same varieties, are associated with lower product quality.

The robust finding that sporadic exporters export lower quality products than continuous exporters and that there is no substantive positive relationship between importing and higher export quality suggest that sporadic Zambian exporters may be producing (or at least exporting) products which are of too low quality to succeed in the export market and that they are not importing the types of products which might enable them to improve their product quality. One explanation which fits these results is that these low-quality sporadic exporters (and importers) are firms which engage in arbitrage, either of imported goods, or of domestic goods, as a response to factors, such as exchange rate movements, which make this behaviour profitable.

Entry and exit

A key result from the descriptive results sections is that there are large numbers of product varieties which are sporadically imported and exported but they account for a relatively small amount of overall traded value. One way to increase export value is for these varieties to become continuously traded. One potential explanation for the observed large numbers of sporadic traders is exchange rate volatility, a variable that is amenable to central bank policy. High exchange rate volatility, and the uncertainty which accompanies it, tends to discourage the establishment of long-term international relationships with suppliers. Long-term export relationships need to be more profitable under high exchange rate volatility conditions to compensate for the increased risk during these periods. However, periods of high volatility can also encourage the short-term entry and exit of exporters and importers as they take advantage of arbitrage opportunities.

Volatility may also have an effect on product quality through a number of potential channels. Volatility that encourages sporadic trade means that there is limited opportunity to create trading relationships where learning can occur. Furthermore, trade in lower quality products may be a response to high volatility if these types of products are easier to sell, or can sell in smaller quantities than higher quality products. In this section we consider the relationship between product quality and import and export variety entry and exit and the role that exchange rate volatility plays.

Variety entry (exit) is defined as the start (stop) of trade to a specific country-product combination in a specific year. Exit is forward looking, and thus classified in the year prior to which no trade is observed. Product fixed-effects are used to control for product quality.

Table 9 shows the results for import variety entry and exit. The coefficients on product quality confirm the earlier results: varieties that enter, and varieties that exit, are on average of lower product quality than continuously imported varieties. Destination has little impact on the coefficient estimates of quality suggesting that this relationship holds across destinations – entry and exit is not driven by varieties imported from specific low quality destinations. The estimates also show that exchange rate volatility is positively related to both entry and exit of import varieties. This suggests that increased exchange rate volatility increases ‘churn’ in the import market. Exchange rate volatility is also associated with higher ‘churn’ for export varieties (Table 10 and Table 11) – higher volatility is associated with both higher entry, and higher exit, of export varieties. This suggests that periods of high volatility encourage ‘speculative’ trade as firms take advantage of potential arbitrage opportunities. However, the nature of relationship between exporting and exchange rate volatility does differ by whether the firm is an importer too.

Table 8. Import variety entry and exit

	(1)	(2)	(3)	(4)	(5)	(6)
	Import variety entry			Import variety exit		
Product quality	-0.0144***	-0.0120***	-0.0173***	-0.0175***	-0.0148***	-0.0216***
	(0.00224)	(0.00223)	(0.00264)	(0.00220)	(0.00219)	(0.00253)
Exchange rate volatility			18.37***			16.03***
			(1.347)			(1.296)
Destination controls	None	Fixed effects	Fixed effects	None	Fixed effects	Fixed effects
Year controls	Fixed effects	Fixed effects	Trend	Fixed effects	Fixed effects	Trend
Observations	19,317	19,317	15,056	19,317	19,317	15,056
R-squared	0.151	0.189	0.077	0.204	0.241	0.173
Number of products	2,237	2,237	1,782	2,237	2,237	1,782

Standard errors in parentheses, product fixed-effects included
*** p<0.01, ** p<0.05, * p<0.1

Importing firms are less likely to add varieties than non-importers, as are firms that already import from a specific country. As with the descriptive results presented earlier this suggests that exporting and importing within firms does not generally take place with the same country. Increased exchange rate volatility does increase variety entry in general but the impact differs between firms that import and those that do not. Amongst non-importers there is no significant relationship between exchange rate volatility and entry, whereas for importers exchange rate volatility increases variety entry.

Table 9. Export variety entry

	(1)	(2)	(3)	(4)	(5)	(6)
	Exporter entry					
				Imports		
					Exchange rate	
Product quality	-0.0050***	-0.0028***	-0.0022***	-0.0038***	-0.0032***	-0.0032***
	(0.000625)	(0.000633)	(0.000630)	(0.000727)	(0.000724)	(0.000724)
Importing firm			-0.0840***		-0.0746***	-0.113***
			(0.00367)		(0.00408)	(0.00989)
Import country			-0.0856***		-0.0853***	-0.0850***
			(0.00385)		(0.00448)	(0.00448)
Exchange rate volatility				2.220***	2.189***	-1.493
				(0.433)	(0.432)	(0.962)
Exchange rate volatility × importing firm						4.229***
						(0.987)
Destination controls	None	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
Year controls	Fixed effects	Fixed effects	Fixed effects	Trend	Trend	Trend
Observations	118,890	118,890	118,890	94,229	94,229	94,229
R-squared	0.028	0.047	0.056	0.022	0.030	0.030
Number of products	4,357	4,357	4,357	3,924	3,924	3,924

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The impact of exchange rate volatility on export variety exit also differs by import behaviour. Generally importing firms are less likely to exit varieties, and importing from a specific country also lessens the likelihood of a firm to stop exporting a variety from that country. As with imports, increased exchange rate volatility increases the probability of exit. This relationship is larger for firms that import too, suggesting that the impact of volatility may be magnified through imports. Column (7) reports the results only for varieties that entered exporting in the previous period. These results show a negative relationship between exchange rate volatility and exit amongst non-importers – increased volatility does not result in an increased likelihood of a newly entered variety exiting for non-importers. However, for importing firms the results are reversed – newly entered varieties in firms that import too are more likely to exit compared to non-importers when exchange rate volatility is high. Given that most exporters are importers too (Table 5) and that exporting firms that do not import account for less than 2% of total export value, the impact of the exchange rate through importing potentially affects aggregate exports substantially.

Table 10. Export variety exit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Exporter exit				Exporter exit for recent entrants
			Imports			imports Exchange rate	
Product quality	-0.0047***	-0.0025***	-0.0020***	-0.0033***	-0.0027***	-0.0027***	-0.0050*
	(0.000619)	(0.000627)	(0.000624)	(0.000704)	(0.000702)	(0.000702)	(0.00292)
Importing firm			-0.0736***		-0.0688***	-0.0980***	-0.167***
			(0.00364)		(0.00396)	(0.00958)	(0.0364)
Import country			-0.0786***		-0.0828***	-0.0826***	-0.0880***
			(0.00382)		(0.00434)	(0.00434)	(0.0180)
Exchange rate volatility				6.054***	6.024***	3.237***	-7.692**
				(0.420)	(0.418)	(0.932)	(3.313)
Exchange rate volatility × importing firm						3.203***	7.592**
						(0.957)	(3.371)
Destination controls	None	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
Year controls	Fixed effects	Fixed effects	Fixed effects	Trend	Trend	Trend	Trend
Observations	118,890	118,890	118,890	94,229	94,229	94,229	10,909
R-squared	0.047	0.067	0.074	0.061	0.069	0.069	0.092
Number of products	4,357	4,357	4,357	3,924	3,924	3,924	1,798

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Can sporadic exports be converted into continuous exports?

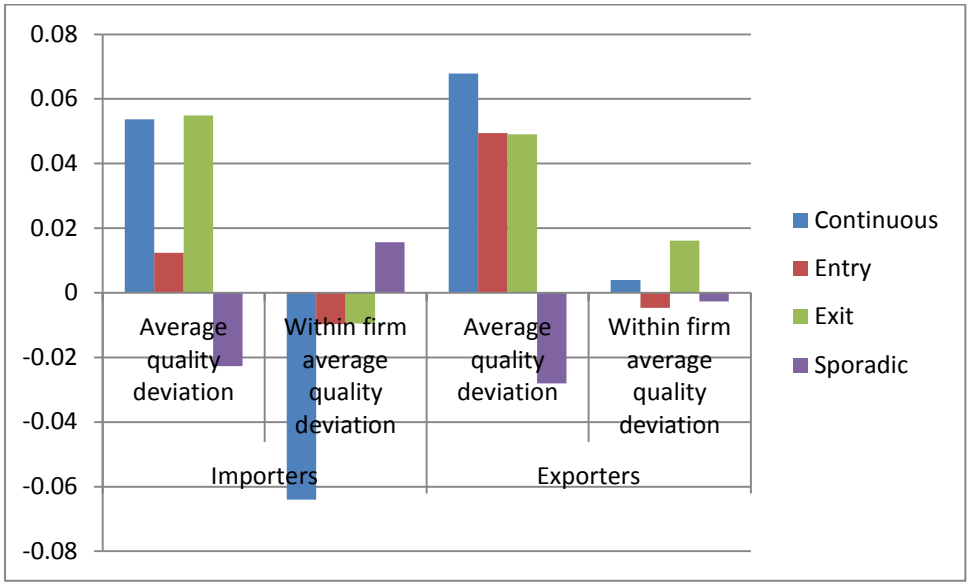
Given the high numbers of sporadically exported varieties, one way to increase non-traditional exports in Zambia would be to convert these into continuous exports. There are two underlying mechanisms through which this could happen: the first would be for sporadically exporting firms to become continuously exporting firms; the second would be to transition sporadically exported varieties within firms into continuously exported varieties. The previous results indicated that sporadically exported varieties are of lower quality, on average across firms, than continuous varieties

but did not examine whether this is the case within firms. We examine this in more detail in this section in order to understand whether these low-quality varieties are concentrated within firms or spread more widely across firms.

Figure 11 shows average deviations in product quality within years across firms and then within firms. The average deviation results are the same as the regression results presented earlier: for both importers and exporters continuous varieties are of higher quality than sporadic varieties. Within firms the results are differ. For importers, sporadically imported varieties are of higher quality compared to continuously imported varieties within the same firm. For exporters, there is no significant difference between the quality of continuous and sporadic exported varieties within firms that do both. These results suggest that for both exports and imports there are two 'types' of firms: firms which continuously trade the higher quality varieties; and firms that trade sporadically in the lower quality varieties.

These results suggest that growing continuous exports is not about converting sporadic varieties within firms which already export continuously to continuous varieties but rather either converting sporadically exporting firms to continuous exporters or through creating a new group of continuous exporters. Without matched firm data which would allow for an investigation of productivity or qualitative interviews it is difficult to know, but these results certainly suggest that these sporadically exporting firms are unlikely to have the characteristics to succeed as continuous exporters. These results also provide further evidence that there is a class of 'arbitragers' in Zambian trade – firms that sporadically trade and taking advantage of opportunities that may arise due to things like exchange rate movements.

Figure 11. Deviations in product quality across and within firms.



6. What do these results mean? Discussion and conclusions

A number of 'stylised' facts emerge from this study. First, trade values are dominated by relatively small numbers of continuous traders but there are a large number of firms who participate in trade sporadically. Although the number of traders who sporadically export is larger than firms that continuously export, 80% of total export value comes from continuous exporters compared to less than 2% from sporadic exporters. The variety results are similar – there are large numbers of country-product pairings which are sporadically exported but which contribute relatively little to overall export value. Both of these results suggest that converting at least some of these sporadic exporters or export varieties into continuous exporters and exports could be a viable strategy for growing aggregate Zambian exports. Knowing more about what differentiates sporadic from continuous exporters and varieties can help in designing policies to do this.

Second, both sporadic import and export varieties are, on average, of lower product quality than continuous varieties. This is not fully explained by destination, for example only half of this observed difference in quality is because sporadically exported varieties go to low-quality destinations. One potential explanation is that certain types of firms specialise in the trade of these low quality varieties.

Third, importing is not associated with higher product quality for exporters. Generally, firm-level studies find that firms that both export and import are more productive than non-traders. Although not directly comparable, since our data does not capture firm-level characteristics beyond trade, we would expect access to imports to be associated with higher product quality. This suggests that Zambian exporters are not importing the types of products which enable them to improve their product quality.

This may be because factors in the global or regional value chains which facilitate these relationships are far from the activities of the traders in Zambia.

Fourth, higher exchange rate volatility increases churn (entry and exit) in both the import and export market. Surprisingly a more volatile currency does not decrease export variety entry but rather increases it. The relationship between export variety churn and exchange rate volatility is higher amongst firms that import too. This suggests that sporadic trade participation may be a response by firms to exchange rate volatility as they seek out short-term arbitrage opportunities rather than long-term stable trading relationships.

Fifth, certain firms export higher quality products, rather than both high and lower quality product varieties being exported within the same firm. These results also indicate that there are certain types of firms specialising in the (sporadic) trade of these low quality varieties. This suggests that to grow continuous exports requires the creation of pool of firms that can become continuous exporters. These firms are likely to be more productive and more sophisticated than existing sporadic exporters.

These results suggest two areas where policy can focus if Zambia wants to reduce the concentration of its trade among a small group of products and firms. The first is improving the quality of products. As other research has shown, one avenue for this, which Zambia lacks, is through imports. Barriers which make the importing of inputs difficult, including non-tariff barriers, discourage this and prevent Zambian firms from becoming part of regional and global value chains. However, it is no just trade policies which limit product quality and sophistication. A small pool of specific relevant skills is often mentioned by businesses as a constraint in Zambia (Moono and Rankin, 2013). Higher quality products are likely to require more skilled workers. Uncertain local conditions, infrastructure constraints and limited access to finance can also discourage firms from investing in the plant and machinery, processes or training that are associated with higher quality products. Policies which encourage, and enable, firms to be more productive are also likely to produce a deeper pool of exporters.

The second is the exchange rate. It is likely that the association between exchange rate volatility and trade in lower quality varieties is bi-directional – volatility discourages long-term trade of higher quality varieties but this in turn restricts export diversification which would reduce volatility. However, there are also likely to be other factors, including policy uncertainty, which may discourage long-term trading relationships and encourage volatility.

Reduced exchange rate volatility and trade diversification are likely outcomes of a broad set of growth friendly policies and a supportive policy environment which will have a wider impact on economic growth and poverty reduction. These are worth implementing for their own sake.

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