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EXTRACTING VALUE IN SOUTH-SOUTH AND SOUTH-NORTH VALUE CHAINS

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Abstract

We exploit a detailed dataset of the activities reported by 515 East African firms in three international value chains at the task level. We design a methodology that can quantify the position of individual firms in international value chains, based on the share of a chain's total value added that firms can extract. We then include this variable as a determinant of value trade and find that it is associated with higher value chain trade at the extensive margin and lower value chain trade at the intensive margin. The latter effect is mainly driven by firms engaged in South-North value chains. In South-South value chains, the share of value-added is positively correlated with firms' sales.

Keywords: International Value Chains; Value-added; South-South trade; Trade in Tasks

JEL classifications: F14, F15, F18, F23, F61, F63, O19

Introduction

The nature of international trade is drastically changing. Whereas trade used to be predominantly in final goods, technological advancements and transport cost reductions have made it possible and profitable to separate the production process into individual tasks that can be sourced all over the world, creating the notion of international value chains. Within this new paradigm, production processes optimize via a combination of technology and know-how from developed countries, which we shall refer to as the North, with low labour costs in developing countries, which we shall refer to as the South.

Connecting to these international value chains (IVCs) provides many opportunities for firms in developing countries. For example, it is argued that IVCs provide a stepping stone to further internationalization, allowing firms to reap the benefits of internationalization without having to develop the full value chain of a particular product (Giovannetti, Marvasi, & Sanfilippo, 2015; Pietrobelli & Rabellotti, 2006, 2011). However, there are various challenges as well, with one of the main ones being that developing country-firms can get stuck in the lower value-added parts of IVCs.

While international value chains tend to be predominantly North-North or North-South, the rise of BRICS countries has contributed to the rise of South-South value chains. Representative of the increasing importance of emerging countries flows; South-South trade in goods has largely increased over the past two decades, while global value chains have expanded. Emerging economics have become a key driver of global economic growth, the main destination for capital goods from developing countries and an important source of foreign direct investment. It is expected that by 2025, global economic growth will be predominantly generated in emerging economies, while annual consumption in these countries is believed to reach USD 30 trillion. Approximately one third (31%) of global FDI outflows are generated by companies from emerging investor countries, particularly towards the manufacturing and service sectors of other developing countries. More than 50% of all high-technology products destined to developing countries originate from emerging countries.

The rise of South-South trade is particularly interesting from a development perspective. It is widely recognized that trade and FDI can generate spillovers to local economies. Despite Northern economies having typically superior technology to the South, South-South trade is thought to bring significant benefits to developing countries that North-South. This has to do with the technology gap (Nelson and Phelps, 1996; Borenzstein et al. 1998; Gelb, 2005) between North-South, i.e. the technological distance from domestic products and capital investment to the foreign ones. With South-South trade, countries can benefit from more affordable, less complex and more adaptable technology, which they can absorb better and so internalize external knowledge flows. Their unique expertise and knowledge in developing new technologies, increasing productive capacities and achieving value addition towards a structural transformation of the economy is relevant for other countries avid to follow a similar development path.

Research into the effects of international value chains, and particularly South-South IVCs, on firms of developing countries is scarce. This is particularly due to a scarcity of data. While much is being done on the macro-level collection of data on trade in value-added[2], micro level sources remain scarce[3] (Gereffi & Sturgeon, 2009). Even when detailed data exists, there is no general method to quantify firms' positions in IVCs.

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[2] Notable examples are the World-Input-Output-Data (WIOD) (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015), Trade in Value-added (TiVA) , and Eora ((Lenzen, Moran, Kanemoto, & Geschke, 2013). Particularly the latter one is being used extensive to investigate the role of developing countries in global value chains, due to its extensive country coverage

[3] A notable exception is a survey executed by MET (Monitoraggio Economia e Territorio) on over 25000 Italian firms, including direct information on their involvement in supply chains. This data is used notably by Giovannetti, Marvasi and Sanfilippo (2015)

To that extent, this paper uses a firm level database with detailed information on the activities of 515 East African firms involved in 3 different international value chains. The main novelty of the database is that it allows us to analyse their activities in value chains at the task level, which is in line with a recent call in the literature (Fontagné & Harrison, 2017; Grossman & Rossi-Hansberg, 2008). As an indication of this, we can refer to Gereffi and Sturgeon (2009, p.30)

> *"Perhaps the most pressing need is for new kinds of data to be collected, data that shed light on the position of domestic firms, establishments and workers in GVCs. As a partial solution to this data gap, we advocate the collection of establishment-level economic data according to a standardized set of generic business functions. We share with Lall the desire to move beyond given industry and product classifications, and to create broad analytical frameworks and data collection tools to examine aspects of global integration that cut across specific industries and countries (Sturgeon & Gereffi, 2009, p. 30)"*

Our data does exactly that. It goes beyond industry and product classifications, which we use to shed light on the position of domestic firms in international value chains. While we do not provide a standardized set of generic business functions, we do provide a methodology that can be widely applied to quantify this position of domestic firms in international value chains. Specifically, our paper contributes to the literature in 3 ways.

Firstly, as stated, we provide a methodology to quantify firms' position in IVCs by calculating the share of the chain's total value-added that the firm can extract. Doing so, we find that these East African firms manage to extract on average merely 25 % of a chain's total value-added, meaning that the remaining 75 % of the value chain is added outside of the firm. Descriptive statistics further show that firms engaged in IVCs tend to extract significantly more value added. For example, firms that import raw materials and simultaneously export, extract 36 % of a value chain. Interestingly, we also find that firms that export to the South, rather than the North extract greater shares of value added (See Figure 7 for more details).

The empirical exercise has two separate goals: to examine the determinants of IVC trade both at the intensive and extensive margin, and to examine differences between firms engaging in South-South vis-à-vis South-North value chains. Here, we show that while value-added shares are significantly and positively correlated with firms' propensity to engage in IVCs, they are significantly negatively correlated to a firms' export share of total sales. This latter effect is mainly driven by firms that are engaged in South-North, rather than South-South value chains. These results suggest, that while South-North value chains may provide firms with better prices or, potentially, higher volumes, South-South value chains might provide better avenues for moving up the value chain.

This paper is structured as follows. Since the database is a critical driver of this paper, we begin by describing this data first. After that, we will describe how we identify international value chain activity, the geographic diversification of different chains (i.e. South-South vs. South-North chains) and, crucially, how we calculate the share of a chain's value that individual firms can extract. After this, we will describe the empirical methodology along with the results before giving some concluding remarks and thoughts for future research.

Data description

This paper makes use of a detailed firm level dataset that was collected under the ITC project *"Supporting Indian Trade and Investment for Africa (SITA)"*. A total of 515 firms located in Ethiopia (183), Kenya (96), Tanzania (105) and Uganda (131) were interviewed in 2015. What these firms have in common is that they are all engaged in national or international value chains. By that we mean that none of them produce either of these products from start to finish, but rather contribute a share of the total value-added. Firms can be engaged in 1 of the following 3 value chains: Cotton, textile and Apparel

(henceforth CTA); Pulses or; Sunflower oil. Before we specify how we identify IVC engagement, we first present various novel aspects of the database.

The database is extremely detailed in identifying firm activities with respect to the firms' workforce; ownership; trade activities; performance indicators and production activities. With regards to performance indicators, the data includes not only information on production volumes; wages and sales, but also more direct measures of firms' ability to perform successfully in international value chains.

However, arguably more interesting is the information collected regarding the firm's precise tasks executed within the value chain. This fits well into the current trade paradigm that argues that trade needs to be analysed, no longer at the product level, but more detailed at the business function (C. Brown, Sturgeon, & Lane, 2014; S. P. Brown, 2008; Sturgeon & Gereffi, 2009), occupational[4] (Lanz, Miroudot, & Nordås, 2011) or even task level (Fontagné & Harrison, 2017; Grossman & Rossi-Hansberg, 2008), as depicted in Figure 1.

Figure 1 Analysing trade in tasks.
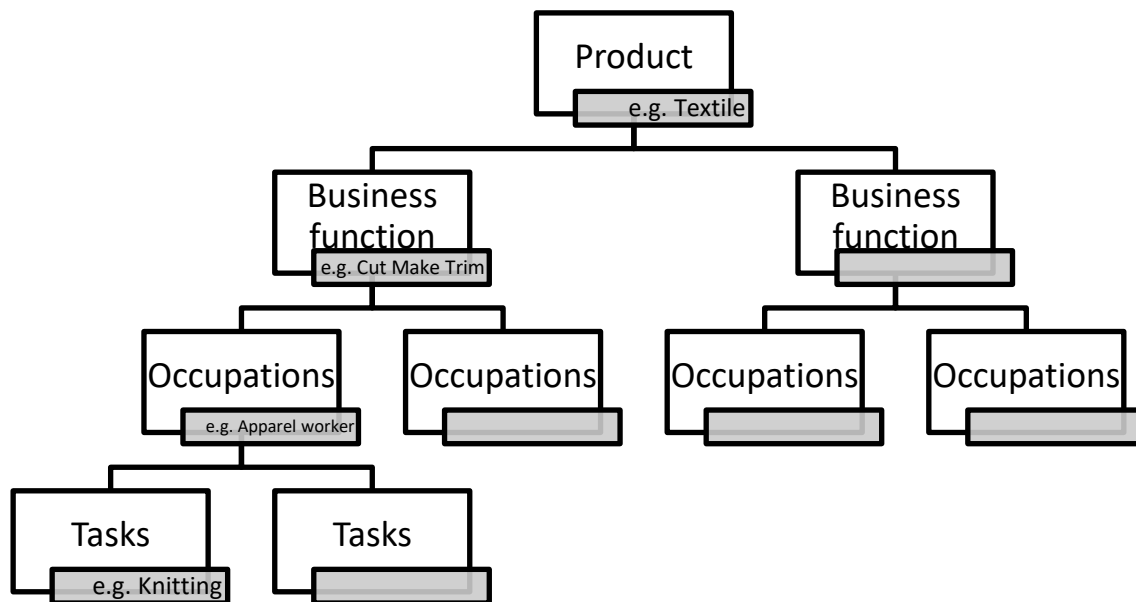
Source: Adapted from Elms et al. (2013)

Our database provides information of the product level (which is either CTA; pulses or sunflower oil), the business function (which are the value chain stages), as well as the task level. As one example, CTA can be broken down into the following four business functions: Cut, Make and Trim (CMT); Original Equipment Manufacturer (OEM); Original Design Manufacturer (ODM), and; Original Brand Manufacturer (OBM) (Gereffi & Frederick, 2010). In turn, our data allows these business functions to be broken down into specific tasks. For example, CMT can be broken down into ginning; spinning; knitting / weaving; wet processing; dyeing and garmenting. This information allows us to provide a detailed mapping of the three value chains in this dataset, as will be done in the next section.

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[4] The Occupational Information Network (O*Net) sponsored by the US Department of Labour provides a good example of classifying occupations based on worker characteristics, worker requirements, experience requirements, occupational requirements, workforce characteristics and occupation-specific information

Sampling methodology[5]

The data described in this paper was collected following a rigorous process, which can be summarized in three steps:

1. Using a wide variety of sources (e.g. business registries, ministries, ITC customer relationship management etc.), the SITA team firstly identified all (i.e. as many as possible) the companies within a country-sector, termed the "universe of firms".
2. This "universe of firms" was filtered on the basis of ITC target groups, which are:
   a. Firm size: You only include Small and Medium sized firms, based on national MSME definitions.
   b. Value chain activity: Processors and exporters
   c. Geographical location
3. Applying these filters resulted in a subsample, referred to as "Sample Framework", which was targeted for interviews. Out of this Sample Framework, the SITA team managed to interview 78 % of the firms (Table 1).

Table 1 Response rates

Country	Sample framework / companies registered in the ITC SITA database	Sample size / companies within the survey	Percentage
Ethiopia	189	183	97%
Kenia	120	96	80%
Tanzania	192	105	55%
Uganda	155	125	81%
Total	656	509	78%

Identification strategy

This section will explain how we use the data to identify and measure crucial aspects, such as international value chain participation, the geographic diversification of different value chains and crucially: the share of value that each firm extracts from the value chain.

Identifying International Value Chains

There is no universally agreed measure for trade via international value chains. However, a range of indirect proxies exist, both at the micro and macro level, to identify this type of trade (See (Amador & Cabral, 2014) for a good overview). At the macro level, a lot of progress has been made recently, by the construction of international input-output tables, which measure the international trade in value-added. Furthermore, such tables can be decomposed to construct well known macro level proxies for international value chain trade, such as Vertical Specialization (VS), VS1, VS1* and VAX.

At the micro level, IVC trade has been measured by combining information on the firm's import and export activities (Fajnzylber & Fernandes, 2009; Shepherd & Stone, 2013). In line with the traditional definition by Hummels, Ishii and Yi (2001), engaging in IVCs critically includes an import, as well as an export component. Ideally, firms import intermediates that they process further, and then export.

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[5] Please note that this is still work in progress. ITC is currently still working with local partners to get more information on step 1: The universe of firms as well as step 2: the filtering of this database.

This measure of IVCs, however, is fairly strict. As explained in Baldwin and Lopez-Gonzalez (2015), trade via international value chains can be measured according to different levels of specificity. At the broadest level, one can use trade in intermediate goods. More specifically, one can look at imports that are used to produce exports. The most restrictive measure of GVC trade are re-exports and re-imports. For the purpose of this paper, we classify firms into 4 types, where the latter 3 are all types of IVC engagement (Table 2):

Table 2 Grouping firms based on their IVC engagement

Firm type	Number of firms
1. **Does not import, nor export**	200
2. **Imports raw materials only**	136
3. **Exports only**	89
4. **Imports raw materials and exports**	86

Identifying the geographic diversification of the chain

The data includes information on the top 3 export destinations of individual firms, along with a percentage breakdown of the amount of exports going to each destination. We use this information to identify whether firms are predominantly engaged in South-South or South-North value chains, where the South is identified as Least Developed Countries (LDCs), BRICS and developing countries (See Table 4 in Appendix A for a full breakdown of destination countries into South-South or South-North value chains). Specifically, we identify a firm as being (predominantly) engaged in South-South (South-North) value chains when it exports predominantly (>50%) of its exports to firms of the global South (North).[6] Doing so breaks our sample down as shown in Table 3.

Table 3 Breakdown of value chains

Type of value chain	Number of firms	Percentage
Domestic	317	64 %
South – South	89	18 %
South – North	83	17 %
Diversified	3	1 %
Total	492	100 %

Table 3 firstly shows that the majority of firms are not connected to international value chains, but rather sell their outputs domestically. The split between firms connected to South-South vs. South-North is fairly equal: 18 % vs 17%.

Figure 2 shows a more detailed breakdown of the destination market of exporters. The four groups in the middle represent the countries of our sample: Ethiopia, Kenya, Uganda and Tanzania. Export destinations that are located in the global North are grouped North of these countries, while export destinations that are located in the global South are grouped South of these countries. Furthermore, the size of individual bubbles represents the number of firms that export to that destination while the

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[6] Alternatively, we could have applied a stricter cut-off than 50%. For example, we could have applied a 100% cut-off, and classify all the other options, i.e. firms selling both to the North and South into a "diversified" group. However, doing so would have cut our sample of South-South and South-North significantly so that we chose against that.

size of the linkages between home and partner countries represents the sum of firms' export shares from the respective home and partner countries.

Figure 2 A mapping of geographic IVC diversification
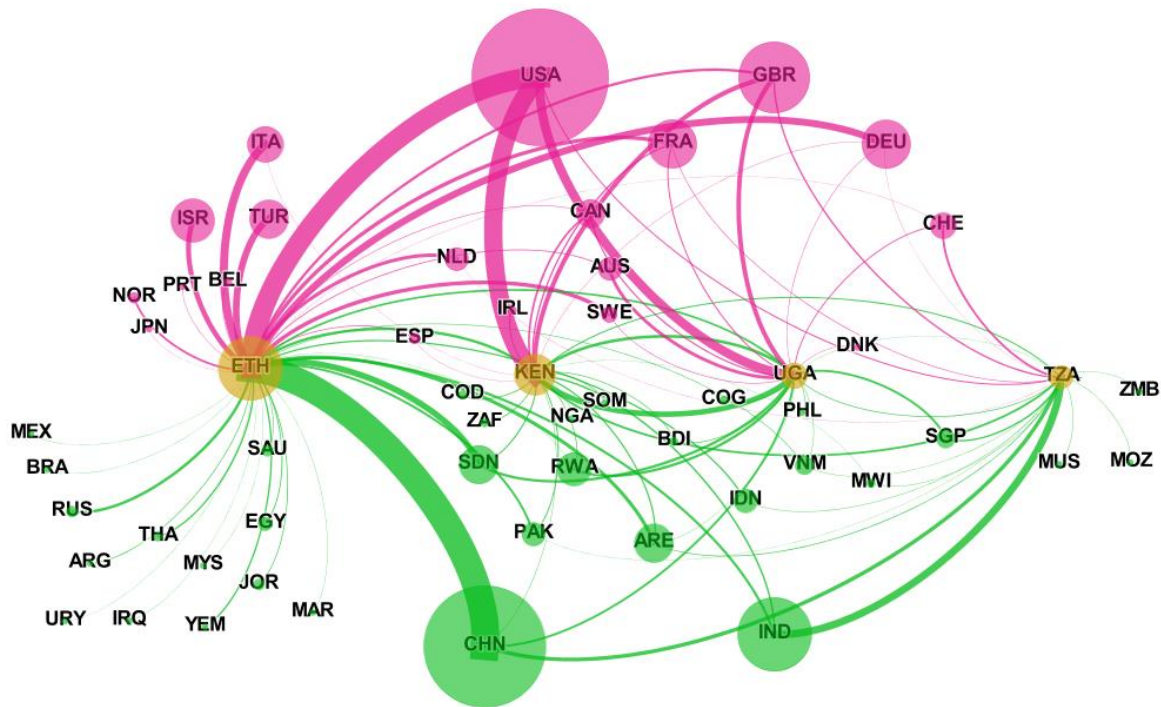
This figure clearly shows the main export destinations. The main export destination is the United States, since 53 exporters indicated this is one of their 3 main export destinations, followed by China (47), India (28) and Great Britain (27) (See Table 4 in Appendix A).

The figure also shows that Ethiopia is most diversified in its export destinations, since they have 40 distinct export partners, which is significantly more than Kenya (22), Uganda (20) and Tanzania (22). Kenya appears to be the country most significantly engaged in regional trade, with export partners such as Somalia, Nigeria, South Africa, Cote d'Ivoire, Rwanda, Sudan, Ethiopia, Uganda and Tanzania.

Finally, our sample of firms export to 36 distinct destinations in the South and 20 distinct destinations in the North.

Calculating the value-added share per bundle of tasks

Our data allows us to respond to a call in the literature to quantify the position of firms in value chains. We suggest doing so by calculating the share of a chain's total value added that a firm extracts. To calculate value added, we follow the accounting methodology used in input-output tables. Here, an industry's total value of output (OU) equals the total value of intermediate consumption (IC) + value added (e.g. labour compensation, VA). In other words, value added is the difference between total output and the costs of intermediate consumption: VA = OU – IC.

At a product level, the total value of output, or total value added, equals the sales price of the final good. The value added at intermediate stages can be calculated in a similar way as is done in IO tables: the difference between the sales price of the intermediate good (OU) – the costs of intermediate consumption (IC). Note that this measure of value added is different from revenue, since it accounts for

the costs of intermediate inputs, while it is also different from profits, since costs of production such as labour costs are still included.

Specifically, we take a three-step approach to calculate the value-added share that firms can extract from the value chain:

1. **Map the value chain.** We map each value chain into individual stages and tasks that are necessary to bring a product from its original conception to final consumption.
2. **Valuate individual stages.** This is done per the methodology described above: the difference between the sales price (OU) – the costs of intermediate consumption (IC). Further note that we calculate this in percentage terms to allow comparability between value chains and that the sales price of the final good represents 100% of the chains' value added.
3. **Assign value added shares to individual firms.** Since our data allows us to identify exactly which stage(s) of the production process each individual firm engages in, and since we know from step 2 what the specific value added of each stage is, we can calculate the value-added share that each firm is able to extract from the value chain.

Steps 1 and 2 are done based on a literature review. We will now show how we execute steps 1-3 for each international value chain that we can identify in the data.

Cotton, Textile and Apparel

The Cotton, Textile and Apparel (CTA) value chain is one of the IVCs that has been most researched. To that extent, we will use the canonical breakdown of different activities within this chain into 4 functional groups: Cut, Make, Trim (CMT), Original Equipment Manufacturer (OEM), Original Design Manufacturer (ODM) and Original Brand Manufacturer (OBM) (Gereffi, 1999; Gereffi & Frederick, 2010; Gereffi & Memedovic, 2003). In the boxes below each functional group, Figure 3 furthermore assigns the tasks identified in the SITA survey to each of those functional groups. Value-added shares are assigned according to the following intuition. Since Original Brand Manufacturers are assumed to control all the identified stages, they receive 100 % of the chains value-added. In line with Frederick (2014), we then assign a cumulative 25 percentile to the other functional groups, with the exception of CMT. Having 6 distinct tasks, each firm can extract a maximum of 30 % if they engage in all the tasks.
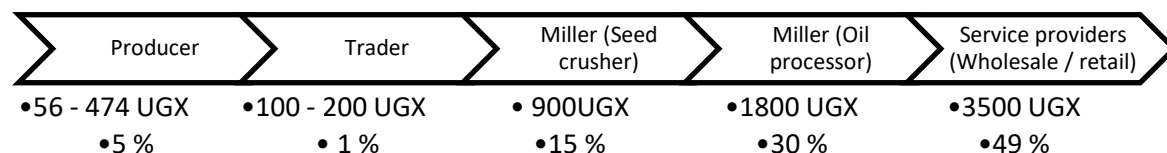
Figure 3 Mapping the CTA IVC
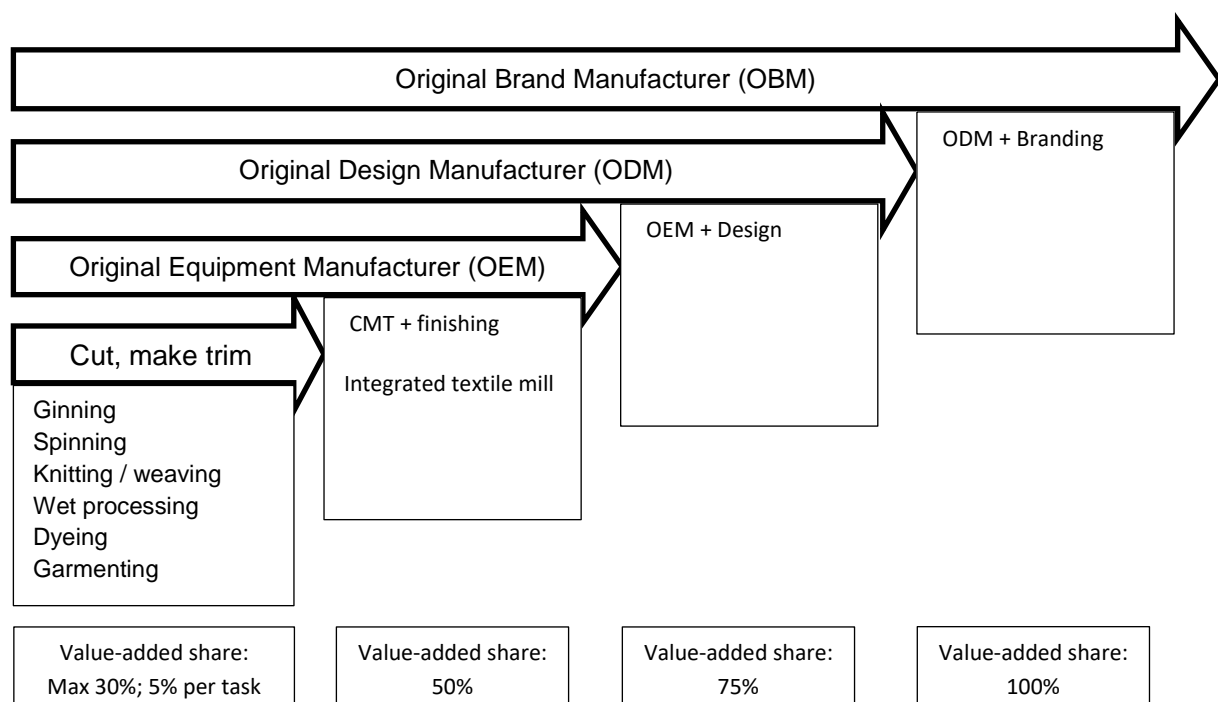
Sunflower oil

Dalipagic and Elepu (2014) produced a detailed mapping of five crop commodities in Northern Uganda. Since this is one of the two countries for which we have data on the sunflower oil industry, we will follow this as our guide to calculate value-added shares. Figure 3 shows how much value each IVC participant contributes to one litre sunflower oil sold for 7500 Ugandan Shilling (UGX).

Figure 4 A mapping of the East African Sunflower value chain

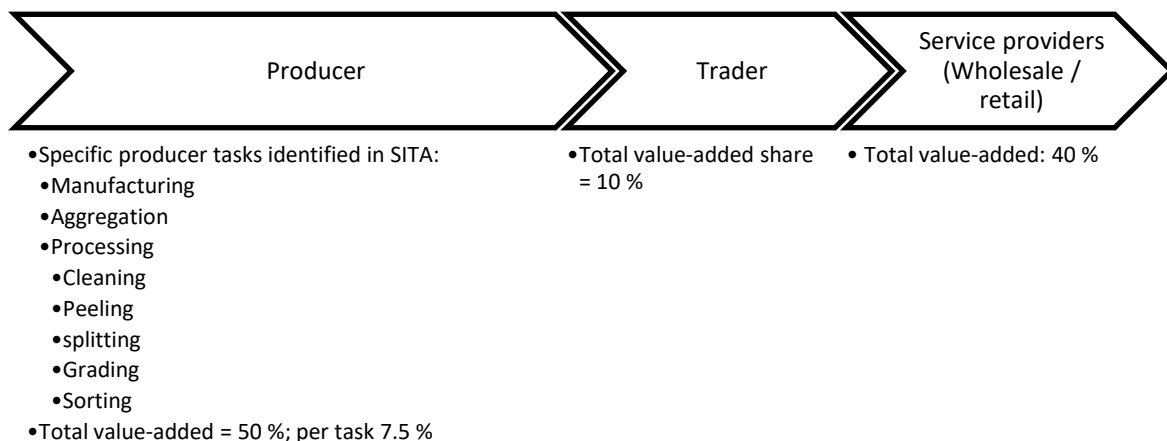| Producer	Trader	Miller (Seed crusher)	Miller (Oil processor)	Service providers (Wholesale / retail)
•56 - 474 UGX	•100 - 200 UGX	• 900UGX	•1800 UGX	•3500 UGX
•5 %	• 1 %	•15 %	•30 %	•49 %

Source: based on (Dalipagic & Elepu, 2014). "Miller" has been split into seed crusher and oil processors. Based on ITC value chain roadmaps (2016), oil processor extract twice as much value-added as seed crushers.

Pulses

While both the cotton, textile apparel, as well as the sunflower oil value chains are characterized by the bulk of value-added in the final stages of the chain, the majority of value-added in the pulses value chain is in the initial production stage. We refer to UNDP (UNDP, 2012) and FAO (Rashid, Yigra, Behute, & Lemma, 2010) who mapped the bean sub sector in Uganda. Their findings are used to produce Figure 3, which maps three main players: producers, traders and service providers (wholesalers and retailers). The report by UNDP found that bean flours are eventually sold for 8000 Ugandan Shilling, of which processor received 48 %, retailers 25 %, while open market traders receive 27%. Similarly, a dry bean was sold for 649 UGX/kg, with the bulk of value-added again by processors (54%), followed by retailers (35%), village collectors (8%) and wholesalers (4%).We generalize these for the three main groups identified in Figure 5, assigning 50% to producers, 10% to traders and 40% to service providers, which are wholesalers and retailers. Finally, the SITA data identifies 7 individual tasks that are part of producers, so that we assign 50/7 ≈ 7.5 % per task.

Figure 5 The pulses value chain

Producer	Trader	Service providers (Wholesale / retail)
•Specific producer tasks identified in SITA:	•Total value-added share = 10 %	• Total value-added: 40 %
•Manufacturing		
•Aggregation		
•Processing		
•Cleaning		
•Peeling		
•splitting		
•Grading		
•Sorting		
•Total value-added = 50 %; per task 7.5 %		

Knowing the value-added per stage and task, as well as the specific tasks individual firms are engaged in, we can calculate the average value-added that the firms from our sample extract from the value chain. Figure 6 shows that this average lies at 25 % in the Cotton, Textile and Apparel (CTA), 23% in the Sunflower Oil and 29 % in the Pulses value chain.

Figure 6 Average value-added extracted per sector
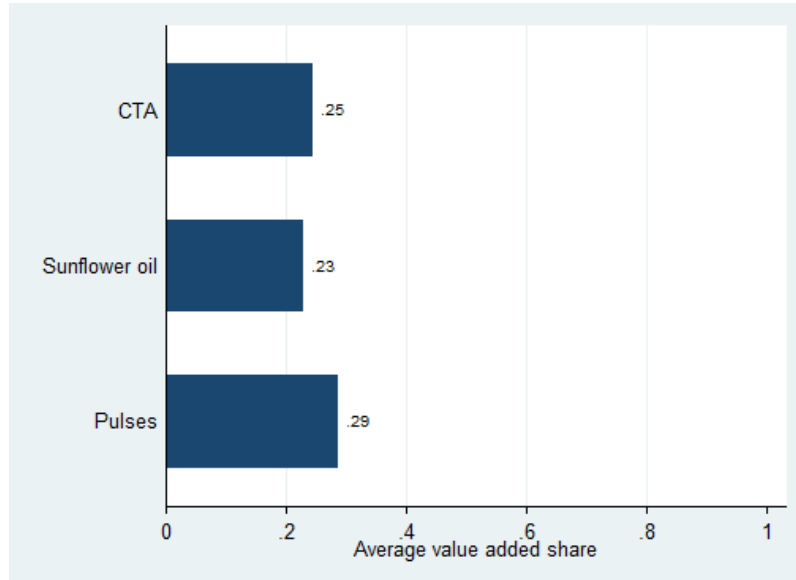
Mapping East African International Value Chains

Now that we have explained the identification of IVC engagement, the diversification of different chains and the calculation of how much value-added each firm can extract from these chains, we can get an overall view of these firms' IVC activity. To that extent, Figure 7 shows the average value-added shares extracted by these East African firms according to their IVC engagement.

Figure 7 Average value-added extracted for different types of IVC engagement
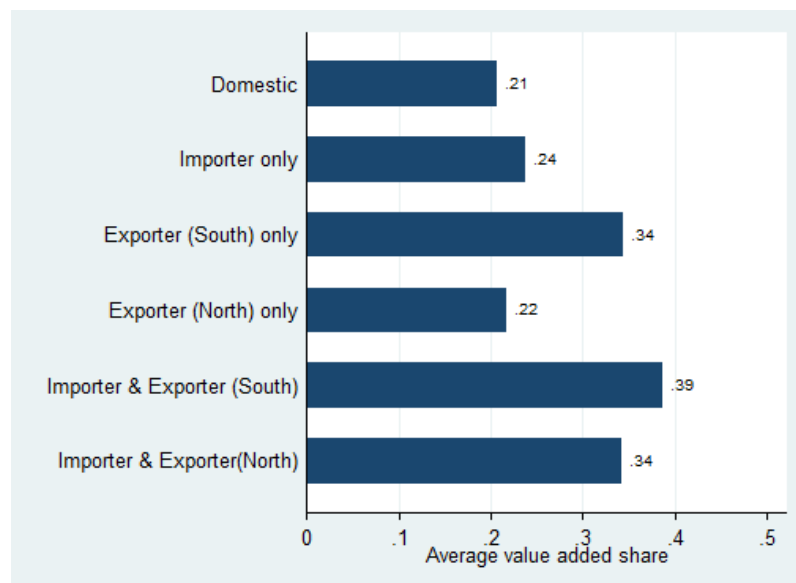

Figure 7 shows that domestic firms extract, on average, only 21 % of a total chain's value-added. This increases as the firm starts to trade across the border. Firms that merely import raw materials and sell

domestically, tend to extract 24% of a chain's total value-added. Exporting also increases this share, while doing both importing and exporting is correlated with the highest value-added shares. One final interesting point is that exporting to the South, as opposed to the North, is associated with higher value-added shares. For example, firms that import raw materials and export to the South tend to extract on average 39 % of a chain's total value-added while firms that import and export only to the North tend to extract 5 percentage points less.

Econometric model

The purpose of the empirical exercise is twofold: 1) to investigate firm determinants of IVC participation and 2) to investigate differences between engaging in South-South vis-à-vis South-North value chains. Both of these research questions will be examined at the extensive (the number of firms engaged in IVC trade) and the intensive margin (the share of sales traded) of IVC trade. These research questions can all be estimated with the following generalized linear model:

$$E\big(Y_{cjf}\big|X_f, Z_{cj}\big) = G\big(X_f\alpha + Z_{cj}\beta\big) = \frac{\exp\big(X_f\alpha + Z_{cj}\beta\big)}{1 + \exp\big(X_f\alpha + Z_{cj}\beta\big)} \tag{1}$$

Where the outcome variable Y_{cjf}, that we will specify shortly, can be predicted linearly with a vector of firm specific variables X_f and country-industry specific variables Z_{cj}. See Appendix C for a more detailed explanation of this empirical model.

The first research question focuses on the determinants of firm participation in IVCs. At the extensive margin, the outcome variable Y_{cjf} can be defined as:

$$Y^1_{cjf} = \begin{cases} 0 \; if \; firm \; is \; not \; in \; IVC \\ 1 \; if \; firm \; is \; in \; IVC \end{cases}$$

Since Y^1_{cjf} is a binary variable distributed as {0,1}, equation (1) will take the form of a standard logistics regression model. When estimating the effects at the intensive margin, the outcome variable Y^2_{cjf} is defined as the export share of sales, or:

$$Y^2_{cjf} = \frac{Export \; sales}{total \; sales}$$

Since Y^2_{cjf} is a fraction that naturally ranges from [0,1], equation (1) should be estimated using a fractional logit model, as per Papke and Wooldridge (1996).[7]

Equation (1) can also be used to estimate the determinants of engaging with Northern vis-à-vis Southern value chains. In that case, the outcome variable Y will be defined as:

$$Y^3_{cjf} = \begin{cases} 0 \; if \; firm \; is \; predominantly \; engaged \; in \; S-S \\ 1 \; if \; firm \; is \; predominantly \; engaged \; in \; S-N \end{cases}$$

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[7] The differences between a traditional logistics model and a fractional logistics model are of a technical nature. For example, while they both assume the outcome variable is distributed along a Bernoulli distribution, the fractional logit uses quasi likelihood methods to account for the overdispersion (i.e. greater variability) that results from the dependent variable *ranging between* 0 and 1, rather than *being* 0 or 1. Furthermore, the fractional logit model has to use robust standard errors, while the traditional logit model does not necessarily need to do so. Finally, there are key differences in the interpretation, which will be discussed in the analysis of the result.

Just like Y^1_{cjf}, Y^3_{cjf} is a dummy variable that will be estimated using a standard logistics regression model. Instead, when estimating how much a firm trades through a particular value chain, the outcome variable Y^4_{cjf} is defined as the share of sales/exports that go to the North, or:

$$Y^4_{cjf} = \frac{Export\ sales\ to\ North}{Total\ export\ sales}$$

Both Y^1_{cjf} and Y^2_{cjf} will be predicted using the same set of firm specific variables X_f and country-sector control variables Z_{cj}. Besides the main variable of interest, which is the value-added shares that a firm extracts from a chain, we include 7 additional firm specific control variables. In doing so, we follow Wignaraja (2013), who did a literature review on critical SME characteristics that determine successful IVC participation. He identifies 6 critical variables: Firm size; Foreign ownership; Firm age, Access to credit; Human capital and; Technological capabilities. Although our database has information on the first 5 variables, we include only the first four into our firm specific variable vector X_f.[8] Furthermore, we identified 2 additional variables that would affect firms' ability to engage with international value chains. These are: the type of ownership and sales per person.

The second research question, captured by dependent variables Y^3_{cjf} and Y^4_{cjf}, are largely predicted by the same variables, bar a few small differences. Namely, in predicting the likelihood that a firm is engaged in a Northern value chain rather than a Southern value chain, one critical variable that should be considered is the compliance of firms with international quality standards. There is a growing literature that says that Northern value chains are characterized by more stringent quality standards than Southern value chains (Horner & Murphy, 2017; Kaplinsky & Farooki, 2011). Therefore, we expect that the compliance with international quality standards will be positively correlated with engagement in North vis-à-vis Southern value chains. Indeed, the descriptive statistics as captured by Figure 8 suggest that South-North chains require greater awareness and understanding of, as well as compliance with international quality standards.

Figure 8 International Quality Standards in South-South and South-North value chains

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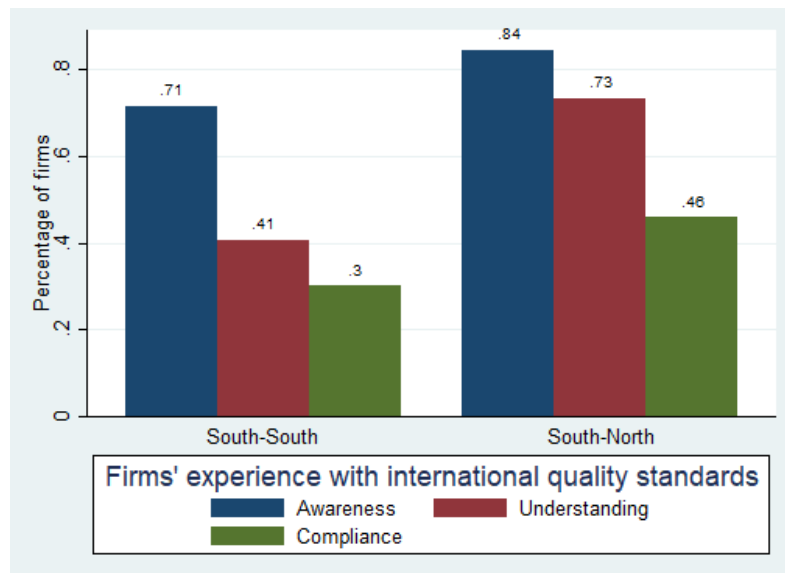
[8] Although we have data on human capital, in the form of the percentage of machine operators that have at least a secondary education, we left this out of the equation due to the relatively large amount of missing values, which significantly decreased our sample size. Its effect, however, was non-significant and also did not change the other variables. These results are available upon request.

The second and final difference is that we use wages rather than sales per person as a proxy for the revenue gained from the value chain. The reason for using wages rather than sales per person is that the sales numbers have various significant outliers.[9] Furthermore, assuming perfect competition where firms' marginal revenue (proxied via sales per person) are equal to marginal costs (proxied via wages), both variables can be expected to be good predictors of firm performance.

All the explanatory variables can be found in Table 5 of Appendix B.

Econometric findings

Appendix D provides the empirical findings in tabular output. Table 6 and Table 7, respectively, show firm determinants of engaging in international value chains, at the extensive and intensive margin of IVC trade. Specifically, Table 6 shows that firms that are engaged in international value chains tend to extract higher shares of value-added, be larger, have higher sales per person, be located in export processing zones, be less financially constrained and foreign owned (although these latter two results are not significant). These results are in line with the literature on international firms, that says that such firms tend to be more productive, measured via a range of indicators. Zooming in on our main variable of interest, the value-added shares, Table 6 shows that a 1% increase in the value added share is associated with a 3.0% increase in the probability that a firm imports raw materials, 3.2% increase in the probability that the firm exports and 4.2% increase in the probability that the firm both imports raw materials and also exports. Indeed, we see a firms' extraction of value-added as a proxy of firm productivity as well.[10]

Table 7 shows a very interesting result. In contrast to Table 6, Table 7 shows that value-added shares are negatively correlated with firm exports. Specifically, it shows that a 1% increase in value added shares is associated with 1.7% lower export share of sales. Note that the key difference between both tables is that in Table 6, the dependent variable is a binary variable identifying whether the firm is in an IVC or not (=Extensive margin of IVC trade), while in Table 7, it is the export share of total sales (=intensive margin of IVC trade). Therefore, these results suggest that while higher value-added shares, as a proxy of firm productivity, allow firms to take the hurdle to enter international markets, firms do better to specialize in low value-added activities to increase further exports once they have entered international markets. This finding asks for further investigation into the types of value chains that firms can engage with, which is what we do next.

Table 8 shows determinants that can explain whether a firm engages in South-North or South-South value chains. Here, we firstly see similar effects as described by Table 6, which is that more productive

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[9] For example, sales per person can go up to 100.000 USD in the pulses sector of Tanzania and sunflower oil sector in Uganda, while the average sales per person in the Tanzanian pulses sector (26.000 USD) and Ethiopian pulses sector (21000) also exceed that of Kenya (3500) extremely.

[10] In an earlier draft of this paper, we looked closer at the direction of this correlation. Specifically, we were interested whether engaging in *inter*-national value chains would allow firms to increase their value-added shares, i.e. allow them to move up the value chain. We used two methodologies to examine this causation. Firstly, we used instrumental variables to proxy for IVC engagement, e.g. by using the information whether a firm is located in an export processing zone or the availability of export market information. While these instruments passed the first stage relevance test, they were not significantly correlated with value-added shares. Secondly, we looked at whether indirect exporters, rather than direct exporters, extracted significantly higher value-added shares than purely domestic firms. The rationale was that while indirect exporters are engaged in international value chains since they ultimately produce for foreign buyers, they do not have the high productivity that international firms typically have. In other words, using indirect exports allows us to isolate the effect of IVCs from the generic productivity effect of exporting. Both methods showed no significant correlation with value-added shares, leading us to believe that the correlation between IVC engagement and value-added shares is such that the latter, via a type of productivity proxy, affects the former, rather than the other way around.

firms, i.e. those that are large, pay higher wages and are better certified, tend to engage in South-North value chains rather than South-South value chains. On the other hand, the negative coefficient on value-added shares suggests that firms engaging in South-North value chains extract significantly lower value-added shares than firms in South-South value chains, something we already observed from Figure 7. Specifically, Table 8 shows that a 1 % increase in value added is associated with a 3.9% decrease of engaging with Northern value chains as opposed to Southern value chains.

At the intensive margin, Table 9 largely confirms the findings that we just described. Whether we take the exports to a particular region (South or North) as a share of total exports (columns 1 and 2) or total sales (columns 3 and 4), we find the same findings: The share of exports to the North is negatively correlated with the value-added share while it is positively correlated with wages and the compliance with international quality standards. Specifically, a 1 % increase in value added shares is associated with 3% lower share of total sales exported to the North and 4.7% higher share of total sales exported to the South (Table 9, columns 3-4). These results add to the findings from Table 7 that showed a negative correlation with increased exports and value-added shares. Table 9 shows that this is driven by South-North chains, while South-South chains actually allows firms to move up the value chain, which can be summarized by Figure 9.

Figure 9. Increased IVC trade at the intensive margin is negatively correlated with value-added shares in South-North value chains, while it is positively correlated inSouth-South value chains
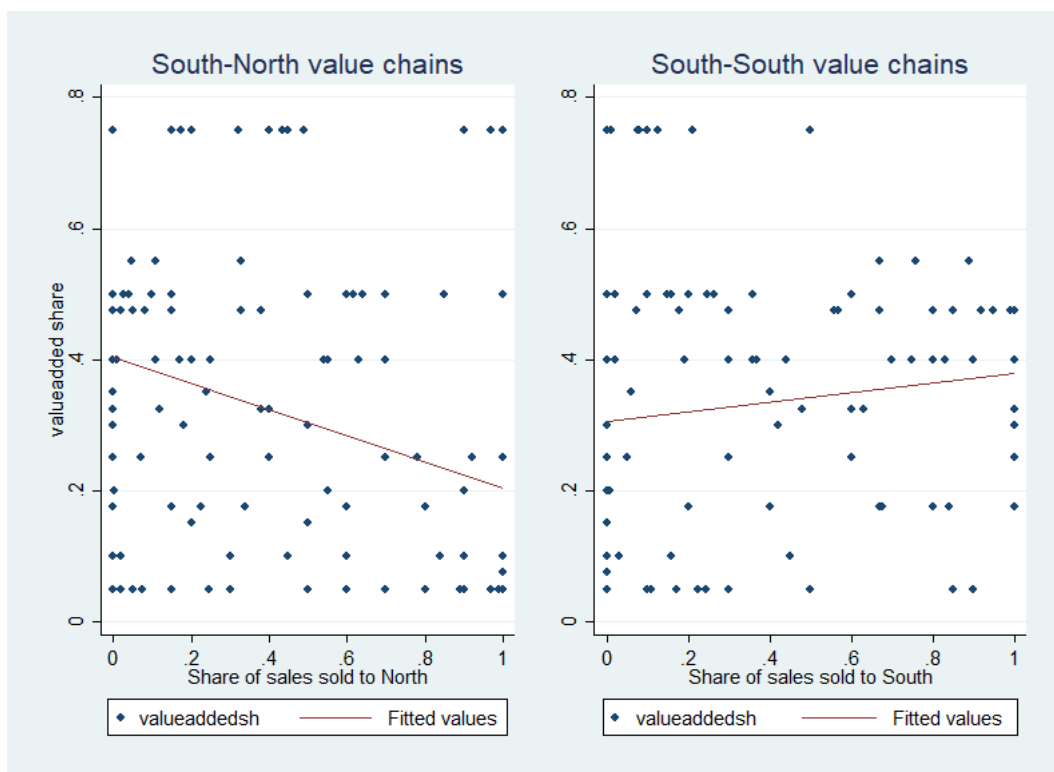
In conclusion, these results suggest that more productive firms are more likely to export. As a new measure of IVC-specific firm performance, we quantified firms' positions in IVCs by calculating the value-added that a firm extracts from a value chain. The results show that while this value-added share is significantly correlated with firms' propensity to engage in IVCs, it is significantly negatively correlated to a firms' export share of total sales. Additional research shows that this latter effect is mainly driven by firms that are engaged in South-North, rather than South-South value chains. These results suggest,

that while South-North value chains may provide firms with better prices or, potentially, higher volumes, South-South value chains might provide better avenues for moving up the value chain.

Limitations

We are aware of several limitations in this research. Despite the novelty of the data, certain aspects such as the representativeness of the data, the lack of panel data and the construction of specific variables hinder inferential and inductive analysis.

Firstly, although the SITA team did extensive work to cover an as large as possible share of firms within the target group, it is unclear exactly to what extent the current sample represents not only those target groups but also the larger universe of firms within specific country-sectors as described in the Sampling methodology. In the future, we hope to include survey weights for individual observations to better represent individual country-sectors.

Secondly, our results consist of interpretation of correlations and is absent from causal evidence. While it is true that, for example, firms with higher value added tend to be engaged in IVCs, the explanation for this can differ. It might be such that connecting to IVCs allows firms to move up the value chain, while it is also possible that higher value added, as a proxy of firm productivity, allow firms to overcome IVC entry barriers. As noted in footnote 10, we attempted various methodologies to prove causation, but were unable to do so. The use of panel data, which would be possible by implementing a second survey, would open the door to additional tools to proof such causal connections between variables and thus add great value to the research.

Thirdly, various variables such as the sales information, production volume and the export shares suffer imperfections. Most importantly for our analysis, export shares are recorded directly, where it would have been better to collect both total sales and export sales separately. Currently, the negative correlation between value added shares and the share of total sales that are exported to the North is based on the implicit assumption that sales are kept constant and that the sales to the North are affected. However, it could also be that higher value-added shares are correlated with higher overall sales that are sold domestically or exported to the North.

Nonetheless, we believe that the correlations presented in this paper, as well as the methodology to quantify developing country firms in international value chains by the value-added shares that they extract adds significant value to the literature, as summarized in the next section.

Conclusion and summarizing thoughts

This paper proposed a methodology to calculate the share of value-added that firms can extract from (inter)national value chains. Following this approach, we showed that East African firms that do not import or export manage to extract, on average, 21 % of chains total value-added. International firms, i.e. those that import and/or export tend to extract significantly higher value-added shares with the top example being firms that both import raw materials and export to the south extracting 39 % (Figure 7).

In the empirical exercise, we found that firms that are larger, have higher sales per person, are located in an export processing zone (EPZ), have some foreign ownership and extract larger value-added shares, tend to be engaged in international value chains. While this suggests that larger value-added shares increase IVC trade at the extensive margin, we also found that it is *negatively* associated with IVC trade at the intensive margin. In other words, while higher value-added shares increase the likelihood that a firm can overcome IVC entry barriers, if it wants to increase exports after that, the results suggest that it is better to specialize in low value-added tasks.

In the second part of the empirical analysis, however, we found a significant difference between engaging in South-South and South-North value chains. Firstly, we saw that firms in South-North chains tend to be slightly larger and earn higher wages than firms in South-South chains. However, we also saw that they tend to comply more with international quality standards, suggesting that the entry barriers to South-North chains are larger than those in South-South chains. Crucially, however, firms in South-North chains extract significantly lower value-added shares from value chains than do firms in South-South chains. This is true both at the extensive and intensive margin of IVC trade with the North vis-à-vis the South.

These results are in line with the small, but growing, literature on South-South trade. South-North value chains typically have higher entry barriers, in the form of certifications requirements (Diaz Rios & Jaffee, 2008; Horner & Murphy, 2017; Kaplinsky & Farooki, 2011; Kaplinsky, Terheggen, & Tijaja, 2011; Krishnan, 2017), as South-South chains tend to place greater emphasis on price competitiveness rather than standards and may also exhibit lower product requirements (Kaplinsky et al., 2011). As a result, it is often thought that while South-North chains may pose higher entry barriers, they also provide higher prices, larger volumes and better wages. This paper adds to that body of literature that, if a firm wants to move up the value chain by increasing its value-added shares, engaging with South-South chains may be the best avenue to do so. This can be explained from the perspective that specialization into low vs. high value-added tasks is less defined in the case of South – South versus South – North chains. Furthermore, we can refer to the technology gap that is smaller between the former than the latter, allowing firms in developing countries to increase their absorbed spillovers from international value chains. These findings are in line with the literature (Amighini & Sanfilippo, 2014) that Southern trade flows have greater spillover potential than South – North trade flows.

These results present developing country firms with a strategic trade-off. One the one hand, despite the stricter entry requirements, firms might still want to focus on connecting to South-North chains, as it may promise higher volumes, better prices and possibly higher wages in the short term. On the other hand, if firms' predominant goal is to move up the value chain and learn by doing, engaging with South-South chains may offer the best option.

Appendix A. Overview of the global North and South

Table 4 Breakdown of export destinations into global North / South divide

Country	SS	Number of firms that export to this market
Argentina	South	1
Australia	North	8
Belgium	North	2
Brazil	South	1
Burundi	South	2
Canada	North	10
China	South	47
Congo	South	2
Democratic Republic of the Congo	South	2
Denmark	North	1
Egypt	South	4
France	North	18
Germany	North	18
India	South	28
Indonesia	South	8
Iraq	South	1
Ireland	North	2
Israel	North	16
Italy	North	13
Japan	North	1
Jordan	South	3
Kenya	South	15
Malawi	South	2
Malaysia	South	1
Mauritius	South	1
Mexico	South	1
Morocco	South	1
Mozambique	South	1
Netherlands	North	8
Nigeria	South	1
Norway	North	3
Pakistan	South	8
Philippines	South	1
Portugal	North	1
Russian Federation	South	3
Rwanda	South	12
Saudi Arabia	South	3
Singapore	South	6
Somalia	South	1
South Africa	South	2

Spain	North	3
Sudan (North + South)	South	14
Sweden	North	5
Switzerland	North	9
Tanzania, United Republic of	South	8
Thailand	South	2
Turkey	North	16
Uganda	South	9
United Arab Emirates	South	14
United Kingdom	North	27
United States of America	North	53
Uruguay	South	1
Viet Nam	South	6
Yemen	South	1
Zambia	South	1

Appendix B. Summary of explanatory variables

Table 5 Key variables used in the empirical estimation

Variable	Explanation	Observations	Used to predict
Firm specific control variables, X_f			
Value-added share	Continuous variable, ranging from 0 to 1	509	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Firm size	Categorical variable, 3 options 0. Small (< 10 employees) 1. Medium (10 – 50 employees) 2. Large (> 50 employees)	500	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Foreign ownership	Categorical variable, 3 options: 1. 0 % foreign owned 2. 1-50 % foreign owned 3. 51-100 % foreign owned	502	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Access to credit	Categorical variable, 3 options: 1. Firm does not need direct investment 2. Would welcome direct investment 3. Actively seeking an investor	482	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Sales per person (USD)	Continuous variable ranging from 2 USD – 100.000 USD	427	Y^1_{cjf}, Y^2_{cjf}
Wage per person (USD)	Continuous variable ranging from 0 to 1500 USD	413	Y^3_{cjf}, Y^4_{cjf}
EPZ	A dummy variable indicating: 0. If a firm is not located in an export processing zone 1. If a firm is located in an export processing zone	515	Y^1_{cjf}, Y^2_{cjf}
Standard compliance	A dummy variable indicating whether an exporter: 0. Does not comply with international quality standards 1. Does comply with international quality standards	372	Y^3_{cjf}, Y^4_{cjf}
Firm age	Categorical variable, 5 options: 1. <1 year 2. 1-5 years 3. 6-10 years 4. 11-20 years 5. More than 20 years	510	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Type of ownership	Categorical variable, 6 options 1. Sole proprietorship 2. Partnership (General / Limited) 3. Limited Liability Company 4. Publically owned 5. Cooperative 6. Other	523	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$
Country industry control variables, Z_{cj}			
Z_{cj}	Country * industry fixed effects	515	$Y^1_{cjf}, Y^2_{cjf}, Y^3_{cjf}, Y^4_{cjf}$

Appendix C. Empirical methodology

When estimating the probability that a firm is engaged in IVCs (Y=1) or not (Y=0), the dependent variable can only take 2 values:

$$Y = \begin{cases} 0 \; if \; firm \; is \; not \; in \; IVC \\ 1 \; if \; firm \; is \; in \; IVC \end{cases}$$

Let π_f be the probability that firm f is indeed engaged in an IVC. In estimating the effect of various firm specific characteristics, captured by the vector x_f', on the probability that the firm exports, one could use a simple linear probability model as in:

$$\pi_f = f\left(x_f'\beta\right)$$

However, the probability that a firm is in a value chain π_f is bounded between 0 and 1, while the linear predictor $x_f'\beta$ can take any real value. We must therefore apply a restriction so that the predicted values from $x_f'\beta$ on π_f will range between 0 and 1 as well.

The simple answer to this is to apply the logit transformation to remove the restrictions on π_f. Firstly, the ceiling restriction can be removed by using the odds rather than probability of success as in:

$$odds_f = \frac{\pi_f}{1 - \pi_f}$$

Note that while the probability has a ceiling restriction of 1, the corresponding odds ratio would be infinity. Secondly, we take the log of these odds, which has the effect of removing the floor restriction:

$$logit(odds) = \log\left(\frac{\pi_f}{1 - \pi_f}\right)$$

Note that while the probability has a floor restriction of 0, the corresponding log odds would be negative infinity. Then finally, when wanting to estimate the effect of various firm specific variables $x_f'\beta$ on the probability of a firm being an exporter π_f, we exponentiate the previous equation and rearrange it so that:

$$\pi_f = \frac{\exp\{x_f'\beta\}}{1 + \exp\{x_f'\beta\}}$$

Which is what we use in equation (2).

Appendix D. Empirical results

Table 6 Firm determinants of IVC trade at the extensive margin

VARIABLES	(1) Importing raw materials	(2) Exporting goods	(3) Importing + Exporting
VA_share	1.030***	1.032***	1.042***
	(4.403)	(6.738)	(5.778)
Effect of firm size. Compared to a small firm:			
Medium sized	1.626	3.835**	2.562
	(0.665)	(2.454)	(1.612)
Large sized	2.262	15.29***	7.152***
	(0.964)	(10.04)	(5.204)
Effect of foreign ownership. Compared to 0% foreign ownership:			
1-50 % foreign owned	0.933	1.733	2.349
	(-0.0767)	(0.503)	(0.889)
51 – 100 % foreign owned	2.460	2.301*	2.996
	(0.912)	(1.818)	(1.357)
Effect of Relevance of investment. Compared to firm "not needing investment"			
Would welcome direct investment	0.473	0.759	0.715
	(-1.192)	(-1.124)	(-0.585)
Actively looking for investor	0.824	0.398	1.292
	(-0.263)	(-1.200)	(0.246)
Sales per person	1.000	1.000**	1.000
	(-0.628)	(1.972)	(1.379)
Firm located in EPZ	1.375	8.204***	16.72***
	(0.944)	(2.777)	(3.317)
Effect of firm age; compared to <1 year			
Between 1-5 years	15.05*	1.424	0.510
	(1.835)	(0.278)	(-1.202)
Between 6-10 years	6.451	4.071	0.823
	(1.147)	(1.038)	(-0.511)
Between 11-20 years	5.329	1.847	0.613
	(1.319)	(0.484)	(-0.650)
More than 20 years	10.52	2.060	1.159
	(1.361)	(0.548)	(0.339)
Effect of type of ownership, compared to sole proprietorship:			
General partnership	0.803	1.013	1.337
	(-0.236)	(0.0107)	(0.232)
Limited partnership	1.057	0.691	0.239
	(0.0693)	(-0.796)	(-0.910)
Limited liability company	0.799	1.195	1.448
	(-0.403)	(0.187)	(0.733)
Public limited	0.142***	1.025	1.216
	(-6.125)	(0.0458)	(0.242)
Publically owned	0.501	9.800**	3.498
	(-1.456)	(2.313)	(1.562)
Not for profit		1.378	
		(1.466)	
Cooperative	2.287	0.269	1.903
	(0.741)	(-1.154)	(1.299)
Other ownership type	0.340**	0.882	0.817
	(-2.307)	(-0.400)	(-1.393)
Constant	0.0832*	0.0332**	0.0411**
	(-1.946)	(-2.122)	(-2.442)
Observations	385	387	368

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All estimations use country*industry fixed effects. Values represent Odds ratios

Table 7 Firm determinants of IVC trade at the intensive margin

VARIABLES	(1) Importing raw materials	(2) Exporting goods
VA_share	0.998	0.983**
	(-0.166)	(-2.408)
Effect of firm size. Compared to a small firm:		
Medium sized	0.151	2.050
	(-1.298)	(1.114)
Large sized	0.924	7.690***
	(-0.0566)	(3.057)
Effect of foreign ownership. Compared to 0% foreign ownership:		
1-50 % foreign owned	0.294	1.581
	(-1.325)	(0.718)
51 – 100 % foreign owned	2.048	1.854
	(1.237)	(1.264)
Effect of Relevance of investment. Compared to firm "not needing investment"		
Would welcome direct investment	0.750	2.053*
	(-0.576)	(1.684)
Actively looking for investor	4.843*	0.620
	(1.870)	(-0.644)
Sales per person	1.000	1.000
	(0.681)	(0.529)
Firm located in EPZ	4.298**	0.924
	(2.245)	(-0.168)
Effect of firm age; compared to <1 year		
Between 1-5 years	0.783	2.574
	(-0.260)	(0.874)
Between 6-10 years	1.401	2.168
	(0.421)	(0.727)
Between 11-20 years	2.633	1.653
	(1.007)	(0.487)
More than 20 years	4.047	0.454
	(1.392)	(-0.765)
Effect of type of ownership, compared to sole proprietorship:		
General partnership	1.715	0.418
	(0.396)	(-1.282)
Limited partnership	1.164	1.565
	(0.114)	(0.628)
Limited liability company	2.217	0.417
	(1.075)	(-1.513)
Public limited	0.149	28.81***
	(-1.371)	(3.424)
Publically owned	0.257	0.626
	(-0.982)	(-0.236)
Not for profit	5.66e-07***	0.143
	(-11.22)	(-1.583)
Cooperative	3.050	0.348
	(1.239)	(-1.613)
Other ownership type	1.108	1.892
	(0.0907)	(1.004)
Constant	0.480	0.807
	(-0.358)	(-0.151)
Observations	131	129

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All estimations use country*industry fixed effects. Values represent odds ratios

Table 8 Firm determinants of engaging with South-North, rather than South-South value chains, at the extensive margin

VARIABLES	(1) Exporting to North vs. South
VA_share	0.961***
	(-3.288)
Standard compliance	6.825***
	(5.118)
Effect of firm size. Compared to a small firm:	
Medium sized	3.331*
	(1.826)
Large sized	1.015
	(0.0284)
Effect of foreign ownership. Compared to 0% foreign ownership:	
1-50 % foreign owned	1.021
	(0.0148)
51 – 100 % foreign owned	0.782
	(-0.669)
Effect of Relevance of investment. Compared to firm "not needing investment"	
Would welcome direct investment	0.530***
	(-2.852)
Actively looking for investor	2.728***
	(4.639)
Wages (USD)	1.004***
	(2.585)
Effect of firm age; compared to <1 year	
Between 1-5 years	1.024
	(0.0496)
Between 6-10 years	1.684
	(1.363)
Between 11-20 years	2.598*
	(1.645)
More than 20 years	-
Effect of type of ownership, compared to sole proprietorship:	
General partnership	-
Limited partnership	0.776
	(-0.311)
Limited liability company	2.758***
	(2.945)
Public limited	9.859***
	(7.893)
Publicly owned	5.299**
	(2.570)
Not for profit	8.375***
	(3.594)
Cooperative	2.217***
	(3.533)
Other ownership type	-
Constant	2.075
	(1.014)
Observations	103

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All estimations use country*industry fixed effects. Values represent odds ratios

Table 9 Firm determinants of engaging with South-North, rather than South-South value chains, at the intensive margin

VARIABLES	(1) Share of export sales to North	(2) Share of export sales to South	(3) Share of total sales to North	(4) Share of total sales to South
VA_share	0.954***	1.047***	0.970***	1.028***
	(-3.285)	(3.267)	(-3.393)	(2.849)
Standard compliance	3.047**	0.342**	3.556***	0.510
	(2.345)	(-2.272)	(2.923)	(-1.580)
Effect of firm size. Compared to a small firm:				
Medium sized	1.480	0.625	1.266	1.417
	(0.619)	(-0.736)	(0.375)	(0.524)
Large sized	0.912	1.036	1.225	2.157
	(-0.121)	(0.0464)	(0.305)	(1.103)
Effect of foreign ownership. Compared to 0% foreign ownership:				
1-50 % foreign owned	0.560	1.797	2.321	0.736
	(-0.402)	(0.405)	(0.546)	(-0.266)
51 – 100 % foreign owned	0.488	2.000	1.395	0.519
	(-0.777)	(0.757)	(0.537)	(-0.946)
Effect of Relevance of investment. Compared to firm "not needing investment"				
Would welcome direct investment	0.543	1.777	0.543	2.712**
	(-1.073)	(1.019)	(-1.248)	(2.300)
Actively looking for investor	0.351	2.762	0.204**	1.813
	(-1.607)	(1.572)	(-2.166)	(0.833)
Wages (USD)	1.003**	0.997***	1.003**	1.001
	(2.420)	(-2.587)	(2.365)	(0.624)
Effect of firm age; compared to <1 year				
Between 1-5 years	4.60e-07***	2.219e+06***	2.21e-07***	64,247***
	(-8.343)	(6.898)	(-11.45)	(7.763)
Between 6-10 years	1.28e-06***	809,233***	3.19e-07***	26,145***
	(-5.900)	(5.922)	(-11.47)	(7.527)
Between 11-20 years	2.26e-06***	438,514	3.49e-07***	17,484***
	(-8.189)		(-17.14)	(6.951)
More than 20 years	8.83e-07***	1.162e+06***	2.34e-07***	12,001***
	(-21.84)	(4.721)	(-11.71)	(6.412)
Effect of type of ownership, compared to sole proprietorship:				
General partnership	0.875	1.032	0.278*	0.339
	(-0.108)	(0.0252)	(-1.884)	(-0.901)
Limited partnership	0.282	3.404	1.244	1.883
	(-1.137)	(1.081)	(0.199)	(0.625)
Limited liability company	2.409	0.402	0.318	3.178
	(0.776)	(-0.804)	(-1.086)	(1.039)
Public limited	3.545*	0.279**	4.913***	0.221**
	(1.936)	(-1.974)	(2.901)	(-2.560)
Publicly owned	1.788	0.543	1.358	0.157
	(0.624)	(-0.664)	(0.314)	(-1.155)
Not for profit	10.81	0.0867	3.527	0.858
	(1.267)	(-1.306)	(0.941)	(-0.0940)
Cooperative	0.808	1.175	1.294	0.797

	(-0.368)	(0.279)	(0.530)	(-0.490)
Constant	1.096e+07***	1.05e-07***	1.588e+07***	3.08e-07***
	(7.663)	(-10.34)	(8.555)	(-7.371)
Observations	101	101	101	101

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1
All estimations use country*industry fixed effects. Values represent odds ratios

Appendix E. An application to regional trade

As part of ITC's flagship publication on "The region: a door to global trade", we also looked at the geographic diversification of the various chains that East African firms engage in. Macro level data has shown that Africa's engagement in regional value chains is limited, and that they rather skip the region and connect to global value chains instead (Brenton & Isik, 2012; UNDP, 2011). Our data corroborates that finding. Following the literature (Rugman & Verbeke, 2004), we classify firms into 6 different types of geographic diversification:

1. Domestic firms, i.e. firms that do not export
2. Home regional firms
   a. These are firms that sell the majority (i.e. >50%) of their exports to countries located within the home region
3. Foreign region
   a. These are firms that sell the majority (i.e. >50%) of their exports to countries located in 1 other region than the home region.
4. Multiregional (Home and Foreign region)
   a. These are firms that export to two regions, of which 1 is the home region
5. Multiregional (Foreign and Foreign)
   a. These are firms that export to two regions, both of which are outside of the home region
6. Global
   a. These are firms that export to 3 or more regions of the world

Classifying firms as such, Table 10 provides a summary of the geographic diversification of the firms in our sample:

Table 10

IVC diversification	Freq.	Percent	Cum.
Non-exporter	312	63.67	63.67
Home region (H)	22	4.49	68.16
Foreign region (F)	76	15.51	83.67
Multiregional (H+F)	14	2.86	86.53
Multiregional (F+F)	53	10.82	97.35
Global	13	2.65	100
Total	490	100	

Here, we see that only 22 out of 490 firms, or 4.5% export the majority of their international sales to the home region. However, Figure 10 shows that those firms extract, on average, the highest shares of value added.

Figure 10 Regional firms extract the most value added
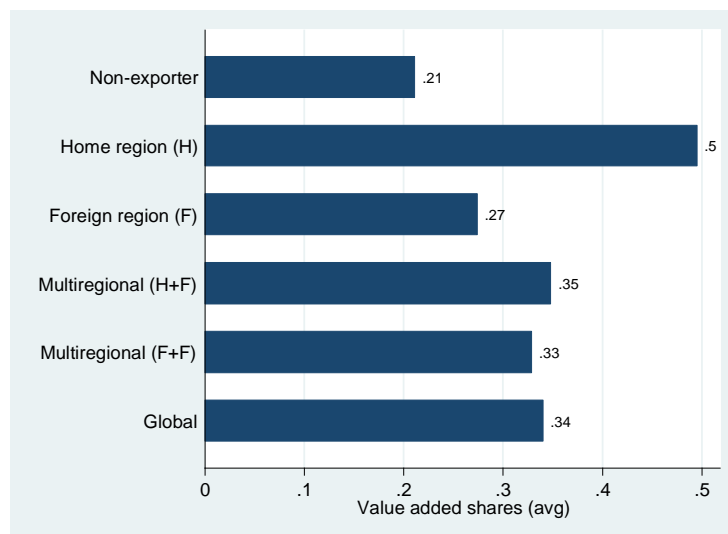
We use an innovative way to show the information on firms' geographic diversification of exports and corresponding value-added shares extracted from these value chains. To that extent, Figure 11 provides a detailed mapping of firms' IVC engagement based on those two critical dimensions. Bubbles represent firms and greater bubbles representing a larger number of firms. The horizontal axis shows the value-added shares that those firms extract while the vertical axis shows their geographic diversification.

Figure 11 A detailed mapping of East African firms' engagement in internationally diversified value chains
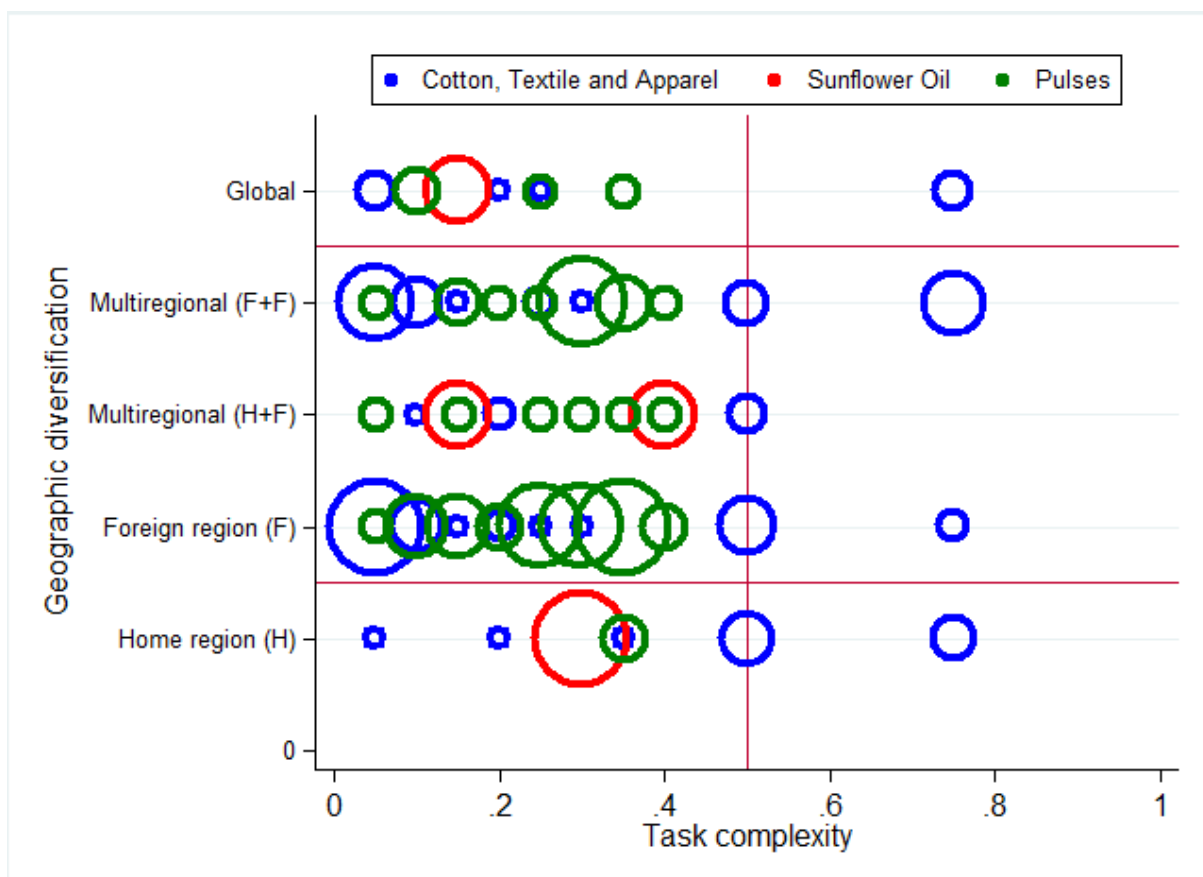
Figure 11 shows various things. Firstly, we see that these firms are predominantly engaged in relatively low complex tasks, which represent low value added. Only a very small portion of firms in the cotton, textile and apparel sector manage to extract value added shares of 0.75. These firms are typically producers of traditional clothing, which are also engaged in the design of these clothing and thus classified as original design manufacturers.

Secondly, we get a confirmation that only a very limited number of firms are engaged in home-regional value chains and that the majority of firms export to countries located in one foreign region. This finding is in line with the literature that Africa tends to skip the home region in favour of regions located outside of Africa.

The low engagement of these firms in regional trade is a pity since previous literature (UNDP, 2011) has shown that all of Africa would be experience significant increases in welfare by increased regional integration. In addition, the region provides many opportunities to firms wishing to internationalize. The home region can serve as a stepping stone to internationalization, since it shares many commonalities with the domestic market, e.g. in the form of policies, institutions, language, culture, common history etc. Therefore, engaging with the home region typically entails lower fixed internationalization costs (Bamber, Fernandez-Stark, Gereffi, & Guinn, 2013; Rugman, 2003).

As one example, we can look at the availability of export market information. Figure 12 shows that both the access and quality of export market information is better for regional firms than any other type of firm.

Figure 12 Information on regional markets is of higher quality than for global markets
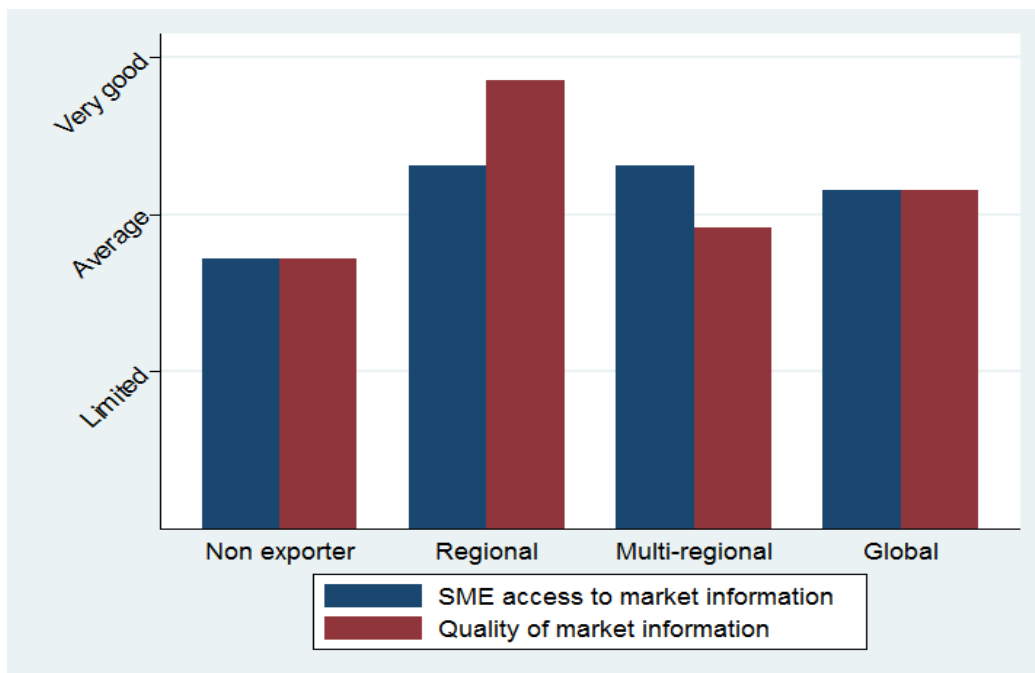
Similarly, it is well known from the literature that regional value chains tend to be easier to enter due to lower entry barriers in the form of standards and certification (Diaz Rios & Jaffee, 2008; Kaplinsky & Farooki, 2011; Kaplinsky et al., 2011; Staritz & Morris, 2013). We can test whether this is also true for our sample of firms by looking at the percentage of firms that are aware of, understand, and comply with international quality standards. As shown in Figure 13, firms that are more diversified geographically score higher on all these points. This suggests that firms which engage with regional value chains face lower requirements in terms of their awareness, understanding and compliance with international quality standards. For example, only 25 % of firms that are engaged in regional trade (need

to) comply with international quality standards, compared to 67 % of firms that are engaged in globally diversified value chains.

Figure 13 Global markets require more international quality standards than regional markets
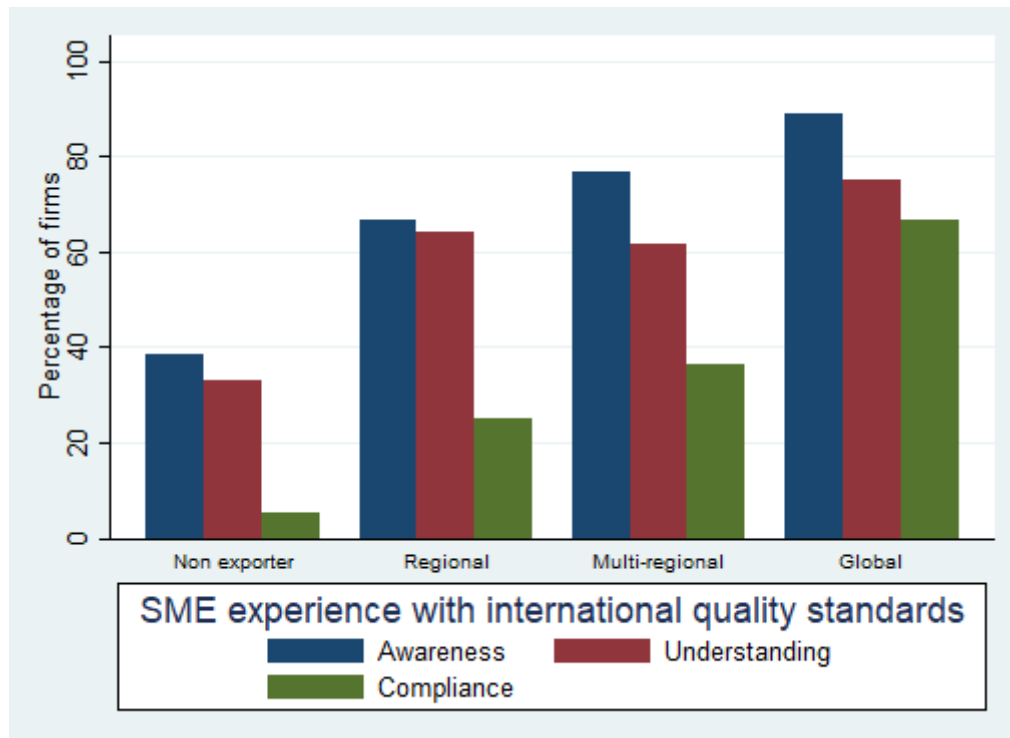
All in all, these results suggest that despite East African firms' minor engagement in regional trade, the region might provide unexploited opportunities to increase the benefits of internationalization. Future research, ideally with a larger sample of firms that are engaged specifically in African regional trade, could look more into the entry barriers as well as performance implications of regional versus global value chains.

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