

Trade, Corruption and Covid-19: evidence from small-scale traders in Kenya*

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Abstract

For a complete assessment of trade across African countries, informal cross-border trade must be taken into account. Using Covid-19 restrictions as a shock, I shed light on the role informal trade plays in the economy, the characteristics of the traders who engage in such trade, the costs/intermediaries they face and the effect on corruption. More specifically, I focus on understanding traders' choices of sourcing and selling markets, suppliers, types of goods, quantities, their choice of trade route used (formal versus informal trade routes) and shed light on switching costs. I also explore the relationship between formal and informal trade: beyond contributing to the literature that looks at the elasticity of informal trade with respect to tariffs, I look at the inter-dependencies between equilibrium costs incurred along formal and informal trade routes, including bribes. Collecting over 10 rounds of high frequency panel data, I show that over the course of a month, restrictions drove over 20 % of traders out of business, while a majority of cross-border traders switched to domestic supply chains. The remaining cross-border traders shifted to using informal border crossings and I estimate a resulting increase in the incidence of corruption, amount of bribes paid and harassment by officials and the police; reinforcing the existence of inter-dependencies between formal and informal trade and the need to consider both sectors when designing policy. I also show heterogeneity in resilience based on gender, industry and trader type.

Keywords: Trade, Agriculture, Corruption, Informality

JEL codes:

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1 Introduction

For a complete assessment of trade across African countries, informal cross-border trade - mainly conducted by individual and small and medium sized local enterprises, must be taken into account. Generally, there is little data and evidence on small scale traders who often contribute to informal trade, which is unrecorded in the official trade statistics, but thought to be large in magnitude¹. Informal trade doesn't specifically imply the goods traded are illegal - for example, many informal cross-border traders trade agricultural goods. Trade however qualifies as informal if traders do not use the official border crossing points and use other routes, to avoid paying taxes and/or avoid going through official procedures. A high proportion of ongoing informal trade is carried out by women small-scale traders who cross the border multiple times a week to source products.

Due to the lack of data and the complexity of the environment, there are many remaining unanswered questions regarding small-scale cross-border trade – both formal and informal – and only a few papers provide empirical insights on this sector (e.g., Titeca (2012)). This lack of empirical evidence is especially relevant when the sector is affected by a trade shock. In this paper, I use the restrictions imposed by Covid-19 as shock. Focusing on small-scale border traders as population is particularly informative in the context of the Covid-19 pandemic as they are directly affected by the crisis. Even though trucks transporting essential food items are allowed to cross the border (despite severe delays), government restrictions ban smaller-scale cross border traders from crossing the border. Then, beyond border closures, economies in developing countries use open air market places to facilitate exchange of goods between suppliers and customers, relying on face to face interactions and meeting spots. Closures of markets due to Covid-19 therefore increased matching costs between suppliers and customers. Moreover, economies in developing countries rely heavily on agriculture and food security remain a priority. Shocks to agriculture supply chains can drastically impact food prices in markets and employment in the area. Crucially, traders play an important role in food security in the region and affect food prices and food distribution - which are key in the midst of a pandemic. These issues are particularly salient in towns and counties that are located close to borders and rely on cross border trade.

¹Some estimates show informal trade to be multiple of formal trade. It is important to clarify key concepts such as informal trade, illegal trade and cross-border trade; as they are often used interchangeably in the literature. Cross-border trade refers to trade that operates across two countries and requires the crossing of a border. Informal trade can either be referred to "some trade that goes unrecorded because of evasion at customs, using practices such as under-invoicing, mis-classification or mis-declarations" or "some trade that occurs outside of official border crossing points, avoiding customs entirely". (Bensassi, 2018). When I refer to informal trade, I focus on the second definition

This paper sheds light on the effect of those restrictions on trade in developing countries - including the role of the informal sector, often ignored. Beyond estimating how small-scale traders are affected by trade restrictions, this paper provides evidence on the relationship between informal and formal trade. It contributes to the literature focusing on the elasticity of formal trade costs on the existence of informal trade, building on the theory that the presence of informal trade depends on the relative costs of trading informally and formally; tariffs and non-tariff barriers therefore explaining the existence of informal trade (Golub, 2015; Eberhard-Ruiz and Moradi, 2018; Little et al, 2010; Titeca et al, 2012; Mitaritonna et al, 2017). Exploring the relationship between formal and informal trade further, this paper highlights the inter-dependencies of equilibrium costs across formal and informal trade, using the closure of the official border as a shock. I therefore estimate the effects of the closure of the formal border on the costs incurred at the informal border crossings, including effects on corruption, bribes, harassment and violence.

This paper uses markets located close to the Kenya and Uganda border as context. I collect high frequency panel data on trade outcomes and supply chains for a sample of 1,100 traders, from February 2020 onwards. Traders in the sample include agriculture and shoes/clothing traders and include both small-scale traders who operate along domestic supply chains (referred as domestic traders) or who cross international borders to source products (referred as cross border traders). Cross border traders can cross the border formally (through the official border crossing) or informally (through informal routes). The panel data was collected via phone and includes over a month of pre-pandemic period, allowing me to rigorously estimate the effect of the pandemic and its restrictions. This paper takes advantage of the variation across markets, products and time to shed light on heterogeneity in traders' resilience to the pandemic. Matching product bans to traders' industries, border closure to traders' type (i.e., whether traders are domestic or cross border) and allowing for gender differences, I show that traders are differentially affected by the pandemic and the closure of the border.

I find that over the course of a month, the pandemic drove over 20 % of traders out of business and forced another 20 % of traders to relocate. This is a significant effect as trading is their main source of income and traders used to trade multiple times per week. Traders' sales and profits are also in decline in March, April and May compared to their baseline values in February 2020: their sales decreased by 37 %, while profits declined by 54 % during the same period. Traders are differentially affected by the pandemic and I explore heterogeneity in impacts based on traders' gender, types of supply chains, i.e., whether traders were domestic or cross border traders; and whether the industry the traders operate in was affected by a trade ban. Traders' decline in sales and profits

disproportionately affected women (80 % of small-scale border trading is carried out by women), despite the fact that women are more likely to stay in business. Then, traders operating in sectors affected by a product trade ban (e.g., shoes / clothing) are more likely to be out of business by May 2020. Traders switch goods within an industry (e.g., across agriculture goods) but not across industries- pointing to high switching costs. Beyond heterogeneity based on variation in the intensity of the shock, I show that differences in resilience rely on traders' ability to adapt to new supply chains. Cross-border traders, despite border closures disrupting their supply chains, are differentially less likely to be out of business due to the pandemic compared to domestic traders. Indeed, they are better at adapting and switch to domestic supply chains: 55 % of the traders in my sample were cross border traders and this dropped to 7 - 10% in April and May 2020. Switchers do not return to their initial suppliers once the border reopens.

A key factor underlying cross-border traders' resilience is that trade routes are not fixed and cross border traders who continue to use their usual international supply chains switch to informal border crossings, to avoid the closure of the official border. This paper estimates how informal and formal trade interact and how the equilibrium between formal and informal sectors is affected by the pandemic; e.g., how informal trade plays a role in enabling some cross border trade, despite the border restrictions; providing a way for both informal traders and formal traders to limit business closures and possibly limit price shocks, at least locally. I find that 29 % of traders in the markets operate along informal routes at baseline and are disproportionately less likely to go out of business compared to domestic traders but disproportionately more likely compared to formal traders, especially in the month following the restrictions. I find that traders rely increasingly on informal trade routes due to the closure of the official border crossing: informal border crossings were used by 1.8 times more traders compared to official border crossings at baseline and this ratio reaches 4 x between March and May 2020. Indeed, remaining cross-border traders are shifting towards using informal border crossings after the closure of official border crossings. Over 80% of cross border traders report using a crossing different to their usual border crossing in May. The estimated increased reliance on informal trade is a measure that can be compared to estimates of elasticities of trade informality to tariffs existing in the literature, which are limited in number despite a larger qualitative literature and policy interest. Those papers use variation across goods and countries to estimate how trade informality responds to variations in tariffs; whereas in this paper, I use the closure of the official border as a shock to tariffs.

Similarly, in addition to the relationship between costs at the formal border crossings and the probability of using informal routes, I find evidence of inter-dependencies

between equilibrium costs across formal and informal routes. Increases in tariffs do not only push traders towards using informal routes (as captured with the elasticity of trade informality to tariffs) but also affect the "costs" for using informal crossings. In this context, the costs for using informal crossings take the form of harassment and bribes collected by the police who strategically station themselves at informal crossings. I find evidence of an increase in the incidence of harassment from 3% to 30% between February and May 2020, a corresponding increase from 6% to 38% in the incidence of corruption and more than a doubling in the level of the bribes. From Early April to May 2020, traders report more than a doubling of the costs paid for bribes. With the closure of the official border crossing, traders lose one of their main outside option, increasing the police's bargaining power to request higher bribes, more often. In addition, the increase in the incidence of corruption could stem from a supply response, with police shifting from border crossings that are less used by traders to more demanded informal crossings. Indeed, traders who use borders that are relatively more popular (defined as 10% more likely to be used by traders) are 4 percentage point more likely to experience corruption and face a significantly higher bribe.

Focusing on public health policy measures, there is limited knowledge of the effect of trade and border restrictions on populations' wellbeing, making it difficult to get an accurate picture of the trade-off between adding restrictions and resulting economic impacts. A recent and fast growing literature is documenting the effect of restrictions on the spread of the Covid-19 virus whereas this paper addresses the second part of the trade-off; i.e., the effect of restrictions on economic outcomes. The lack of evidence is especially true in developing countries and low-income populations. Importantly, those trade-offs are not specific to the Covid-19 virus and lessons learnt from this pandemic will hopefully inform policy responses in future public health disasters.

My findings reinforce the need to consider both formal and informal sectors when designing trade policies. In most developed economies, there is a separation between goods and people, allowing the government to impose restrictions on people's mobility without affecting the mobility of goods across countries. Most borders in the world, including the Kenya-Uganda border, have been closed to people to limit the spread of the disease but remained open to trade vehicles throughout the pandemic, as an attempt to limit economic impacts and ensure food security. This paper highlights the fact that in many developing countries, the separation between goods and people is not as clear-cut. First, closing official border crossings to people therefore reduces cross-border movements but does not eliminate the outside option of going through informal routes. Second, closing the formal border to people but allowing trade vehicles as an attempt to

encourage movement of goods and minimize trade disruptions is not effective in areas where trade is conducted by small-scale foot traders who are no longer allowed to cross the border, despite being in the trade industry.

The data collection is still ongoing and I will be able to document further outcomes over time and locations as the crisis develops.

2 Background and Context

This project is located in markets around Busia, a town situated at the border between Kenya and Uganda. Busia is one of the main border crossings between the two countries. In 2018, Busia's border posts were replaced by a One Stop Border Post (OSBP), which is now regarded as one of the flagship OSBPs. Malaba, another but smaller official border crossing between Kenya and Uganda is situated 35 kilometers from Busia and is also used by traders who operate in the area. Busia, like many other border towns relies on commerce and this has shaped the town in many ways: Busia (and by extension most of the county) counts many markets that attract suppliers, traders and buyers from all over the country as well as from other neighboring countries; agriculture products and food found in markets come from diverse sources, as some traders source from domestic suppliers while others cross the border to reach foreign suppliers; the area's economy -including employment- is centered around trade and Busia's border crossing is considered as the main focal point in the town's urban planning and mobility infrastructure.

This paper focuses on small-scale traders who are found in markets in the areas surrounding Busia's border crossing. These small-scale traders either have domestic supply chains or are cross-border traders. Due to the proximity of the border crossing, a disproportionate number of traders are cross-border traders. Busia is not only one of the main official border crossing in East Africa, it also accounts for 74% of total informal agricultural trade flows between Kenya and Uganda. Informal cross border trade (ICBT)- trade activities which are unrecorded in official trade statistics- is pervasive in developing countries. Much of this trade is conducted by small-scale traders who cross the border multiple times a week to source or market agricultural and manufacturing goods. A phone survey carried out in 2017 by Sauti Africa show that 80 % of the traders are women and an average trader trades 1.8 type of goods sourced from 1.7 markets and sold on 2.2 markets. Traders in my sample who are cross border traders can therefore trade through Busia / Malaba's OSBP's, the two formal border crossings between Kenya and Uganda; or instead trade through informal routes. In Busia, people refer to the border as "porous": there are ways to cross the border informally without having to go through the formal

checkpoints. Those routes, that are located on either side of the official checkpoints, are called informal routes (or “panya” routes in Swahili): the most known ones in Busia are Sofia and Marachi (referred to as *main* informal border crossings in this paper). Although official border posts are manned by Kenya/Uganda Revenue Authority officials, the informal routes are manned by the police who are known to extract bribes in exchange for silence. The informal “panya” routes are known to be less safe.

Following up on cross-border traders, they often face challenging conditions and high barriers to trade such as the lack of reliable, accessible and accurate trade and market information, the prevalence of corruption among security and border officials at the border, frequent harassment and other personal safety risks. Small-scale traders face disproportionately higher trade barriers and trade costs. In their 2017 final report, Uganda Women Entrepreneurs Association (UWEAL) and TradeMark East Africa (TMEA) surveyed women cross-border traders across Uganda to identify key Non-Tariff Barriers (NTB) to trade. The four most frequently occurring NTBs were customs clearance issues (67 % of respondents), payment of bribes (57 %), immigration document requirements (30 %) and road blocks (17 %). They also identify Uganda, Tanzania and Kenya as the countries that present most NTBs. The results from their study are clear: 65% of respondents are able to clear their goods through customs in less than two hours but that the speed of clearance is bribe-driven. 41 % of respondents pay a bribe every time they cross the border. Through survey evidence, they identify information asymmetry as being the main cause for which women cross border traders face unofficial charges and harassment in their attempts to conduct trade. Many women cross border traders are not aware of the tariffs they should be paying, their rights or trade procedures. Clearing agents and border officials exploit this information gap to extract money for their personal gain. A survey carried out between November 2016 and January 2017 in Busia shows that over 75% of the traders they survey have encountered incidents of corruption at the border. Moreover, 80 % of the respondents report that corruption at the border happens daily or weekly.

High trade barriers and trade costs faced by cross border traders - both at the official and informal border crossings - are exacerbated by the fact cross border trading involves many types of actors as well as intermediaries. Amongst others, legal actors include the Kenya Revenue Authority officials, the Uganda Revenue Authority, the municipal tax collectors and the police. Revenue authorities are assigned to official border posts across the country for a specific amount of time. Anecdotally, revenue officials prefer some border posts than others as there is variation in terms of how much bribes they can extract across different border posts. Within a border post, their shifts follow a schedule. Mu-

municipal collectors collect municipal level taxes. They are usually seen on either side of the border, located strategically to ensure they can stop everyone who imports goods. They also locate themselves on market places to levy sales related taxes. Taxes depend on the type and value of the goods. Contrary to the Revenue Authority officials, they are also found at informal border crossings. The police's mandate is to maintain order. Current evidence shows that the police seems to be often responsible for the perpetration of corrupt incidents and harassment at the border. Their mandate is not to collect taxes, although it seems like many are collecting bribes from traders both along formal and informal borders and at road blocks. Respondents report that the police (69 % of the survey respondent) and revenue authority agents (24% of the survey respondents) are responsible for corruption at the border and 58% report the police as responsible for harassment at the border ². Similarly, intermediaries used in trade can be numerous. The main ones are brokers, transporters and clearing agents. Payments to intermediaries are usually set through bargaining. There are also different types of transporters. Most relevant to this project are transporters who help transport the goods across the border, usually via bike; as no motor vehicles are allowed to cross the border with shipments. Transporters are also sometimes used to avoid paying taxes on a large shipment: for example, instead of paying taxes on the entirety of a truck, traders divide their shipment between multiple transporters to be under the 2000 USD cut-off, allowing them to go through simplified procedures (this will be described in more details below). Clearing agents help traders clear their goods and get the correct approvals and documents before crossing the border. There are established clearing agents companies who usually deal with large traders, for whom it is difficult to clear goods themselves. These large traders often clear their goods in advance, before the trucks arrive at the border. There are also individual clearing agents (or at least people who call themselves clearing agents) who patrol the border and offer services to smaller traders. Through the Simplified Trade Regime and Simplified Certificate of origin, clearing goods should be an easy and quick task for traders with small consignments - as traders in my sample - and should not require clearing agents. In practice, it seems like clearing agents take advantage of traders' lack of information about trade procedures to make a business. The Simplified Trade Regime and Simplified Certificate of origin stem from regional integration efforts that acknowledge the role of ICBT as a contributor to socio-economic development such as a source of employment supporting job creation both in traders' home countries and in the countries where they source their goods from; supplementary source of family income to under-employed people, thus helping to bridge the income gap that is characteristic of many African households.

²See TMEA report

Therefore, to facilitate ICBT, member states from the East African Community (EAC) and the Common Market for East and Southern Africa (COMESA) have adopted Simplified Trade Regimes for small-scale cross-border traders. The aim is to make it easier to conduct small-scale cross-border trade activities by putting in place instruments and mechanisms tailored to the trading requirements of small-scale traders that are operating in border areas, where informal trade is rampant. One of these is the East African Community Certificate of Origin, a trade facilitation document which is used for clearance of goods that have been grown or produced in the EAC partner states and whose value is less than USD 2000. The simplified procedures were introduced in 2007 in an effort to reduce smuggling. In the EAC, 370 products currently qualify for clearance through the simplified certificate of origin. The ease of use of the simplified certificate of origin has allowed cross-border traders to clear their consignments quickly and with less hassle. In line with this definition, I consider "small-scale traders" to be traders who trade goods valued at less than USD 2000 (per trip).

2.1 Key dates and events related to Covid-19

- 12 March 2020: First case of Covid19 reported in Kenya
- Mid March onwards: Market closures: some reopen, some closed indefinitely
- 23 March 2020: Borders between Uganda and Kenya closed to people including informal crossings
- 25 March 2020: 7pm - 5am curfew
- End March 2020: Ban on importing 2nd hand clothes
- 31 March 2020: Uganda total lock down
- 6 April 2020: Kenya partial lockdown in main cities
- June - July 2020: Decrease in restrictions (border remains officially closed)
- 16 Aug 2020: Ban on second hand clothing lifted
- End Sept 2020: Announcement of border opening
- October 2020: Border opens

3 Sample and Data Collection

In January 2020, a census of traders who either trade agriculture goods or shoes and clothing was conducted in Kenyan markets located within 40 kms radius to the Kenya-Uganda border in Busia. 1,650 traders were censused in 30 markets, all located on the Kenya side of the border. In February 2020, I carried out a round of baseline data collection for 1,100 randomly selected traders. 20% are men and 80% are women and all are small and medium traders who transport their goods by foot, bike and motorbikes. About 55% are cross border traders and 45% are domestic traders. 37% mainly cross the official border while 63% prefer using the non-official border crossings. 80% trade mostly in agriculture products while 20% in shoes and clothing. I should note that this sampling strategy captures a representative sample of traders located in Kenyan markets - therefore mostly Kenyans who either trade domestically in Kenya or cross-border traders who buy goods in Uganda and sell them in Kenya. This is a different sample that would have been selected if I had sampled traders crossing at the border itself -a sample strategy often used by governments as an attempt to estimate informal trade. Table 1 presents the main socio-economic characteristics of the traders in the sample.

Since April 2020, a high frequency phone survey was carried out at two weeks' intervals to capture how Covid-19 and the associated restrictions affect traders' trade and border experiences. The phone surveys are scheduled at 2 weeks interval and are currently still ongoing. Each phone survey round asks traders about their experiences "in the past 2 weeks". I also have data on traders' trading activities for March 2020, through a retroactive survey carried out in April (concurrently with the April surveys). The current version of this summary paper includes the rounds collected up to now, i.e., a panel dataset that follows traders across 13 periods:

- February 2020 [Baseline]
- Month of March 2020 (retroactive) [March]
- First 2 weeks of April 2020 [Early April]
- Last 2 weeks of April 2020 [Late April]
- First 2 weeks of May 2020 [Early May]
- First 2 weeks of May 2020 [Late May]
- Last 2 weeks of June and whole of July [June-July]

- First 2 weeks of August 2020 [Early Aug]
- "Last 2 weeks of August" [Late August]
- "First 2 weeks of Sept" [Early September]
- "Last 2 weeks of Sept" [Late September]
- "First 2 weeks of Oct" [Early Oct]
- "November" [Nov]

Figure 1 shows the attrition across the high frequency rounds, post baseline. Phone surveys collect outcomes on traders' businesses including the health of their business, the type of goods they trade, their supply chain. I also collect data on what trade route they choose as well as reports of corruption and harassment. In addition to collecting outcomes on traders' businesses, the phone surveys have also served as a way to collect details about shocks such as market closures, product bans as well as market prices ³.

4 Results

I look at 5 types of outcomes ⁴ and document changes across time:

1. Traders' business: sales, profits, credit, ability to stay in business
2. Adaptation and resilience
3. Supply chain: suppliers and customers
4. Trade routes (domestic versus international) and the interdependencies between formal and informal trade routes
5. Corruption and harassment

4.1 Traders' business

Traders' businesses are significantly impacted by Covid-19 and its restrictions and the impacts seem long-lasting. When asked if they traded in the past two weeks, over 20 % of traders report not trading throughout April and remain out of business in May 2020

³Effects on market prices is the focus of another paper

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(Figure 3). This is a large effect as small-scale traders reported trading multiple times per week prior to the onset of Covid-19.⁵ Moreover, trading is the main source of income for 95 % of traders in the sample (at baseline), emphasizing the potential for large negative consequences for traders' businesses and households. This negative effect on trading is not purely seasonal: 67 - 77 % of traders who stopped trading blame the pandemic and/or the government restrictions associated with it. Seasonality would only explain 1-5% of the traders going out of business (Table A1). Traders are also forced to relocate their business due to Covid-19 and in rare occasions relocate their own household. 20 % of traders are forced to relocate in April and May 2020 (First panel of Table 4).

At the onset of the pandemic (in March and April), traders who were forced to relocate were given another spot within their own market (29%) - to ensure social distancing regulations - but the majority of the relocations were to areas outside their home market: 34% of the traders who had to relocate were placed in a different market and 21% to locations outside markets/along the road. At the end of May, more relocations occur, mostly within traders' home market (44 %) but also to other markets and locations (36 %). Throughout the pandemic, traders also opt to sell from their own homes and/or directly to the clients' homes (Table A3). Relocations within the same market or to other markets have consequences on traders' sales: 58 % of traders report having had a better spot before the relocation (Table A6). This is likely due to the fact that despite variation in quality of the spots in the market, market spots are assigned on a first come first serve basis and therefore favor long standing traders.

Lastly, sales and profits are also in decline for traders in March and April compared to their baseline values in February. Table A5 shows that on average traders had sales of USD 360 for 2 weeks at baseline and their sales decreased by 37%, while profits declined by 54% during the same period. The decrease in sales and profits aren't only decreases on the extensive margin, i.e., traders going out of business bringing the average sales and profits down. Conditioning the sample on traders still in business, remaining traders also experience a decrease in sales and profits in March, April and May compared to February, before the onset of Covid-19 (Panel 2 of Table A5). This analysis does not control for seasonality, which could explain some of the decrease - but not all of it - and would certainly not explain the gender gap observed across time (see next section).

⁵Both during baseline in February 2020 and previous data collection rounds in the previous 2019 season.

4.2 Resilience, Heterogeneity and Traders' ability to adapt

Traders are affected by the crisis differently, as evidenced by the variation in changes in traders' sales, profits and ability to remain in business. Variation in business outcomes across traders is a function of (a) the intensity of the shock experienced by traders and (b) traders' own resilience. I explore heterogeneity in outcomes based on three main characteristics: (i) industry, (ii) trader type i.e., whether traders were domestic or cross border traders, and (iii) gender. All three characteristics are correlated with traders' resilience (b). Both product traded and trader type are correlated with variations in the intensity of the shock experienced (a): the former as I observe variation in trade bans across products; and the latter using variations in supply chain disruptions when cross-border traders are affected by the border closure, compared to domestic traders who can rely on existing supply chains.

First, I explore whether traders who trade agriculture goods are differently impacted compared to those who engage in the shoes and clothing industry. The hypothesis is that the shoes and clothing industry is more likely to be affected by the pandemic than traders who trade in agriculture goods as agriculture goods remain necessity goods to feed households in the area and shoes and clothing face a trade ban by the government. Second, given the border was closed to small-scale border traders (most of whom do not cross the border using trucks), cross-border traders should be disproportionately more affected by supply chain disruptions than domestic traders. This does not imply domestic traders will not be affected as a result of increased competition for domestic suppliers and/or increased cost of goods. Third, gender is an important dimension as small-scale border trading is mostly carried out by women traders, whereas men constitute a larger proportion of the larger traders who use trucks to trade goods internationally. 80% of the traders in my sample are women. Even within the population of small-scale traders, men are more likely to have larger businesses compared to women: Table 3 shows that at baseline, women's sales and profits are on average 10-12% lower than men's (although not statistically significantly different).

Focusing first on the role of industry, I find a reduction in the proportion of traders who trade shoes and clothing from Baseline to the end of May as well as a reduction in the proportion of traders who engage in cross-border trade (Table 2). This could either be due to cross border traders and shoes/clothing traders going out of business or due to traders adapting and switching to other goods and/or to domestic supply chains. Evidence shows that traders in one industry (namely shoes and clothing) do not switch to other industries and are thus most likely to go out of business throughout the pandemic compared to the industry that did not suffer a trade ban (Table A8, Columns 1 and 2).

Traders diversify and switch goods within industry (namely within agriculture) but not across industries - pointing to high switching costs. Trade bans on specific products have significant consequences on traders operating in the industry and in this context, led to an increase in the probability of going out of business by 15-35 percentage points compared to agriculture traders (Column 3). This effect is in addition to the increased likelihood of being out of business due to the pandemic and its other restrictions (which also led to a 20 percentage point increase in the likelihood of being out of business), showing that trade bans on specific products have effects beyond border closures. In addition, this effect is not driven by disruptions in supply chains due to traders losing their source their goods on the other side of a closed border crossing, as I control for whether traders are cross border traders.

Moving on to trader types, evidence shows that cross-border traders adapt and are 5 percentage points less likely to be out of business compared to domestic traders throughout the pandemic (Column 1), despite closures of borders creating a direct shock to their supply chains. Indeed, cross-border traders switch suppliers and become domestic traders. Contrary to switching industry, finding new supply chains seems like a more elastic process. In addition, traders who self-select in cross-border traders are likely to be significantly different to traders who choose domestic supply chains and differ in ability, networks, etc. This isn't only a level effect as cross-border traders' businesses are differentially less likely to suffer throughout the pandemic, especially when the crisis is well under way (in May).

Focusing on gender, I find that the pandemic affected women traders significantly more than men: women traders (i) suffered a larger decline in sales and profits, (ii) do not show sign of recovery at 3 months and (iii) are less likely to have outside options, forcing them to stay in their trading business (Table 3). The decline in sales and profits disproportionately affected women throughout the crisis: men experience a 7 % decrease in sales in March and early April, after the onset of Covid-19, compared to February, whereas women traders experience a 40 % decrease between February and March/Early April 2020. As everyone remains in business in March, the decrease in sales and profits is distributed throughout the population rather than dictated by traders out of business. Despite doing relatively worse in March and throughout the crisis, women are more likely to stay in business especially at the beginning of the pandemic (in the month of April). They are less likely to have other revenue generating activities to rely on : 23% of women report engaging in other revenue generating activities before the pandemic compared to 28 % of men traders and the profits generated by those other revenue generating activities are twice as high for men (Table A2 Columns 5-6). In addition to be less likely to have outside

options, women traders who do have other revenue generating activities to switch to, are less likely to rely on those other activities during the pandemic (10% of women report engaging in other revenue generating after March 2020 compared to 17% of men), and those who do generate less than 25% of profits compared to men traders. Besides, higher sales and profits in April compared to women, men recover at the end of April and May; at the expense of women traders who continue to experience a fall in business: 50% decrease in sales in May compared to February and 60% loss of profit. As women traders are less likely to stop trading compared to men, the largest changes when I condition the sample to traders still in business (Columns 4-6), are outcomes for men traders. Remaining men traders enjoy larger sales and profits - the result of a combination of self selection (larger and more able men traders remain in business) and possible reduction in the competitive landscape. Conditioning the sample to traders in business increases the gender gap, both in levels and in changes.

However, gender is correlated with trader type and industry. Men are proportionately less likely to be cross-border traders compared to women (43% compared to 56%) and are proportionately more likely to be in the clothes and shoes industry compared to women (37% compared to 17%). Interestingly, segments in which men traders self-select; i.e., domestic traders and shoes and clothing traders, were assessed as differentially more affected by the crisis. Table ?? disentangles whether the gender gaps observed stem solely from gender self-selection in industries and types of traders (domestic versus cross border). I show that for the probability of staying in business, gender does not play a significant role and that the gender gaps observed across the survey rounds (Column 1) can be explained by the fact men are less likely to be cross border traders or less likely to trade in agriculture products, both categories which experience a lower intensity shock (Column 2). However, trader type (cross border versus domestic) and industry cannot explain the gender gaps found in sales and profits. Gender gaps in sales and profits are both in terms of levels for each time period (i.e., men traders have significantly higher sales and profits than women traders, across all time periods) and in terms of changes across time periods (i.e., men traders are differentially less impacted than women in each time period). Columns 3 to 6 show that despite controlling for trader type and industry, gender continues to explain variation in sales and profits, pointing to the fact that the heterogeneity in gender observed cannot be explained by self-selection in categories more likely to be affected by the crisis. The results are stronger when I condition the sample on traders who are still in business (Columns 7-10).

4.3 Effect on supply chain

Even though traders (especially cross border traders) have to find new suppliers as they cannot source their goods from across the border anymore, they keep the same number of suppliers, emphasizing that for traders who remain in business, search costs for new domestic supply chain are not a binding constraint. However, due to Covid-19 and its restrictions, traders have fewer clients (Table 4). There's also been a push throughout the pandemic to limit cash transaction as a way to limit disease transmission. I explore whether this has affected the way traders make business and whether they rely more on mobile money. Table 4 shows that the number of traders who use mobile money for business purposes increases from 18 % to around 30% in April, although precautions fade in May. However, the increase seems to be mostly on the extensive margin, not on the intensive margin and fading over time. Indeed, around 10 % of sales and 45-55 % of purchases (in terms of value) are made through mobile money and that seems to remain fairly constant even throughout the pandemic ⁶.

4.4 Trade routes and the role of trade informality

The role of closing borders to people is to limit the spread of the disease. However, most borders in the world, including Busia border, remained open to trade vehicles throughout the pandemic, as an attempt to limit economic impacts and ensure food security. However, in developing country contexts, the analysis of this strategy needs to incorporate all different angles and address complexities and subtleties of the environment. First, a significant amount of trade between Sub-Saharan countries are carried out through smaller scale traders operating through informal border crossings. These traders contribute to employment and food security in the region. Closing official border crossings therefore reduces cross-border trade but does not eliminate the outside option of going through informal routes. Typical informal routes were said to be closed and monitored by the police and/or the army but it is harder to enforce closures in informal settings, especially as law enforcement agents operating at the informal routes are known to take advantage of traders and request bribes against passage. Second, closing the formal border but allowing trade vehicles as an attempt to minimize trade disruptions is not effective in areas where trade is conducted by small-scale foot traders who are no longer allowed to cross the border, despite being in the trade industry.

⁶The shift in using mobile money is truly an increase in adoption in mobile money for business purposes, not a result from mobile money users remaining in business while non mobile money users drop out of the sample

In this section, I explore whether border closures led to changes in traders' routes. First, as alluded in previous sections, cross border traders switch to becoming domestic traders after the borders are closed. Indeed, 55 % of traders in my sample were cross-border traders at baseline, whereas only 7% remain in April and 10% in late May (Figure 5). This is the result of cross-border traders adapting to the restrictions, changing their supply chains and switching to domestic suppliers. Table A7 describe how the proportion of traders evolves over time and the reliance on informal routes compared to formal routes for traders who continue to cross the border. Formal and informal cross border traders switch to either being out of business (16-24%) or domestic traders (68-73%). In addition, formal crossings are only used 2 % of the time, while informal crossings (both main informal crossings and other informal crossings) account for 4 % of the crossings, compared to 17% and 30% respectively at baseline. Conditional on still crossing the border, the reliance on informal borders increase over time, reaching a factor of 4x by late April and Early May (6). Border crossings are closed, forcing traders who continue to trade internationally to have to rely on informal crossings. Indeed, 32-45% of the traders report choosing a different border crossing in April compared to their usual border crossing and my data suggest that 80% actually use a different border to their baseline border crossing in April (Figure 8). They confirm this is due to their usual border crossing being closed and due to Covid-19 and the associated government restrictions (Figures A6). This increased reliance on informal trade highlights the importance of the informal sector as well as the role it may have played in reducing food price variations and preserving food security during the pandemic.

Who are the traders who continue to cross the border and how can they cross the border? Different types of traders are likely to be systematically different from each other, both on observables and unobservables. Table A9 shows the correlations between trader types and likelihood of being out of business (Column 1) or crossing the border (Columns 2-5). The rest of the analysis focuses on differential effects of the pandemic rather than level effects between formal and informal traders.

Figure A4 shows the evolution of each type of traders across the pandemic. Types of traders are defined based on the type of border crossings they used at baseline. Traders are classified into using domestic routes, formal / official border crossings, main (well-known) informal border crossings, other informal border crossings and both formal and informal crossings. Figure A4 shows for each trader type and across time, the proportion of traders who go out of business, trade domestically or trade cross-border - and if they trade cross-border, whether they cross their usual border or switch to a different one. Evidence shows that domestic traders were the most affected by the pandemic and were the

most likely to stop trading between April and late May, despite being the only ones who did not experience a direct disruption to their supply chains. The resilience observed with cross-border traders stems from formal traders who as soon as the formal border closed in mid March, were more likely than informal traders to rapidly switch to become domestic traders. In addition, half of the formal traders who continued to cross the border switched to using informal routes. Informal traders, on the other hand, were more likely to continue using their less enforced informal routes and were less likely to switch to becoming domestic traders in March. Following an earlier adaptation, formal traders are more likely to remain in business in April compared to informal traders, who are significantly more likely to stop trading or forced to adapt to domestic trade routes and new informal border crossings - an adaptation pattern similar to formal traders adaptation in March, lagged by a month. In May, formal and informal traders are equally likely to be out of business but formal traders prefer domestic routes whereas informal traders are differentially more likely to keep crossing the border by finding new informal routes. Informality can indeed be seen as a spectrum: when formal borders experience high costs or constraints at the formal border (here border closure), they opt to use well-known informal routes whereas traders who were already using those main informal crossing switch to more informal routes, while being more likely to continue to cross the border. Traders who were already using both formal and informal border crossings at baseline are more likely to rely on adaptation strategy involving new border crossings compared to other trader types (not shown). Table A10 shows similar results through regressing whether traders crossed the border and switched border crossing on initial trader types with interactions with time dummies.

Turning now to which border crossings traders switch to, Figure 11 shows the distribution of border crossings used by trader types and illustrates that formal traders switch specifically to informal crossings, especially in March and that informal traders switch to other less known informal routes. Not surprisingly, traders who at baseline were using other informal crossings are both more likely to have suffered from the pandemic and went out of business in April and more likely to recover in May. Table A11 shows similar results, for the sample of traders who were cross - border traders at baseline.

Lastly, there are some gender heterogeneity in switches in and out of informality. For formal traders, women are differentially more likely to switch to informality (especially in March) while men are more likely to continue using formal routes. For informal traders, women are differentially less likely to switch to other less known informal routes compared to men informal traders (Figure A5). In addition, the increased risk for men to go out of business throughout the pandemic stems from informal traders.

4.5 Corruption, Harassment and Violence

Corruption and harassment have been longstanding issues for traders who want to cross the border - both at the formal and informal crossings. Significant effort has been invested by governments to reduce corruption and harassment at the formal border crossings by increasing transparency and educating traders of their rights. However, both formal and informal traders report the existence of corruption and having to pay bribes in order to cross the border (especially for informal routes). Corruption incidence increases from 6% to 38 % during the pandemic and harassment incidences increase from 3 to 30 % throughout the period (Table 5). I also find evidence of an increase in costs associated with bribes to the police and other agents between Early April and Late May (Table A13). When asked to rate corruption and harassment compared to what it was two weeks prior, an overwhelming majority (80-90 %) report they are worse (Figure 10).

There seems to be an equilibrium between costs and bribes extracted across informal and formal routes. With restrictions relaxing slowly in Late May and some traders progressively returning to using the formal border, both corruption and harassment seem to progressively decrease back to 24 % and 15 %, in line with the idea of inter-dependence between the formal and informal routes. I can use the shock incurred during the pandemic to shed light on this elasticity. During the pandemic, the formal border crossing was officially closed, giving the police stationed at informal border crossings increased bargaining power to extort higher bribes from cross-border traders, who have lost one of their outside option of crossing through the formal way. Table 8 shows the relationship between costs at the formal border and costs incurred at the informal border, measured in terms of corruption and harassment incidences (Columns 1-2) and bribes paid (Column 3-4). The closure of the formal border in March - considered as infinite costs - differentially increased corruption and harassment (both on the extensive and intensive margin) for traders using informal routes, whether it is the main informal routes and other less known informal routes; especially right after the closure of the border in Early April. Indeed, traders were 55-62 percentage points more likely to pay bribes and 50 percentage points more likely to be harassed while crossing informal borders right after the closure of the border compared to February while formal crossings were comparatively less prone to corruption and harassment. Similarly, traders who crossed informal border crossings report doubling the amount paid to the police throughout the pandemic (Column 3-4). The increase in corruption incidence is consistent with the idea that corruption is a function of whether traders have outside options to cross the borders as well as the existence of a police level supply response: the police may shift towards border crossings that are more often used by traders, which during the pandemic are informal border crossings. Both

mechanisms seem to be at play. Indeed, the effect observed on the equilibrium bribe level is evidence that corruption is a function of the outside option while Table A21 shows that corruption incidences (Columns 1-5) and bribes level (Columns 11-15) are indeed functions of border crossings' relative popularity. Indeed, choosing a border crossing that is used by 10 % more traders, increases the probability of facing corruption by 2.8-3.9 percentage points and increases the level of the bribe faced by 66 Kshs - a large effect given the average bribe in March was around 140 Khs.

Moreover, even though corruption seems to be an issue that is more linked to crossing the border; harassment doesn't seem to be limited to traders who continue to cross the border (a relatively small and selected sample). Indeed, table A14 shows that 26 % of traders report facing harassment by the end of April, irrespective of being cross-border traders or domestic traders and the police is main actor responsible. Looking into the contexts underlying the incidence of harassment by the authorities, a majority of traders report facing harassment while authorities are attempting to enforcing regulations, e.g., closures of markets, borders or banned products (Table A15) and 15-20% of traders report that harassment is also used purely to take advantage of traders and/or because of frustrations for not keeping the population safe.

More generally and beyond the harassment perpetuated by officials, the pandemic increase opportunities for violence. Table A15 shows that 21% of traders report witnessing violence in Early May and 10 % in Late May. For those who did witness violence, 60-77 % is violence between officials and individuals, while 21% between citizens themselves. By the end of the month of May, violence between citizens increase to 31 % of total violence cases.

5 How do traders perceive the crisis?

5.1 Insights in the role of Supply and Demand shocks

In this section, I offer some insights into the respective roles played by supply and demand shocks in traders' outcomes. 6-13% of traders report improved business between April and May, while 88-90 % of traders report having issues with their businesses in the past 2 weeks.

Table 7 highlights traders' reports on main issues that have affected their business in the past 2 weeks. For April, traders report increasingly that low demand for their goods is a main issue for their business (41-48 %). They also highlight travel restrictions for their customers (27-37 %) as significant negative factors for their business, on the demand side.

On the supply side, they blame the increased costs of goods (34-45 %), of transport (25-33 %), closed border (17 -29 %) and supply chain issues such as having to change suppliers (14 - 25 %) or suppliers going out of business (10 -15 %) as main reasons for low business. Market access constraint also play a large role in affecting traders' negatively in April 2020: 36-41% of traders highlight that own movement restrictions as a significant issue to their business and 22-44% point to market closures. In terms of prevalence, both supply and demand constraints seem to be at play in affecting traders' businesses during the pandemic. However, supply constraints seem to be progressively less of an issue in May, contrary to the demand constraints. Indeed, 14-17% of traders report high costs of goods, transport, closed borders as issues and 3-9% highlight supply chain issues (compared to 10 - 25% in April). This is both due to the easing up of some restrictions such as market closures (down to 7-9 % rather than 60% in March) and movement restrictions (down to 18% from 41% in April) as well as traders and suppliers adapting across time. However, on the demand side, despite better travel options for their customers in May (19% complaints compared to 37% in April), traders still face low demand for their goods. 61 % of traders in May highlight this as one of the main issues and twice the number of traders report having to make sales at credit. Low demand may come both from an inward shift in the demand curve, due to lower customers' incomes ⁷ or could also be a result of an equilibrium shift along the demand curve as traders sell their goods at a higher price, passing through the higher costs incurred in April ⁸.

For the 6-13% of traders who gain from the crisis and report improved business activities, this seems to come from increased demand for their goods, specifically in April (71-80% of those who report positive gains), being able to sell their goods at a higher price across April and May (25-35%) while purchasing goods at a low price, specifically in May (25-28%).

Table A16 gives an overview of potential mechanisms in greater details and emphasizes the role played by demand shocks on traders' businesses: 72% of traders report that having fewer customers significantly contributes to the decline in their business and 29% report that customers buy less quantity.

5.2 Beliefs about the future

When asked to rate the welfare of their business at the time of the survey in April, 61 % report that their business is bad or very bad. However, their beliefs about future welfare

⁷Future work tests for differential effects on shoes/clothing versus agriculture products as food remains a necessity

⁸Future work looks at price variation across time

seems to improve: 54 % report they think their business will be average to good 2 weeks after the survey and 48 % report it will be good or very good 3 months after the survey (Table A17). This trend of beliefs seems consistent across rounds, i.e., traders beliefs about the next two weeks in April remain the same as their beliefs for the next two weeks in May. However, their beliefs about the next 2 weeks in April do not match their current beliefs two weeks after - and traders do not seem to update their priors when they discover the reality 2 weeks later.

The effect seen on traders' business have spillover effects on their household wellbeing. Indeed, over 80 % of the traders report their household wellbeing is average, bad or very bad (Table A18). Traders also report that adults in their household had to skip meals on average during 2 days out of the 14 last days due to limited food and money availability in April 2020. Similarly, children had to skip meals on average during 1.6 days (Table A19). There seems to be a slight improvement in May, although it seems the burden has switched to being on the children instead of adults.

5.3 Trade-off between economics and population safety

Lastly, even though restrictions are imposed and many traders seem to respect those, this isn't the case for all traders who still cross the border. This isn't surprising when those traders have limited savings and small buffer and need to feed their household. There is an intrinsic trade-off between wanting to respect the regulations for the safety of the population versus the necessity to keep their business afloat and have sufficient means to feed their families. In terms of opinion, 3-4% of traders report that the restrictions in place aren't sufficient, 78-88% report that they are critical for the safety of the population, 7-16 % that they are useful but too restrictive and 1-3 % that they are not useful at all.

Turning to actually implementing the guidelines, 73-74 % of traders report following all restrictions, 21-25% most restrictions and 1-4 % only a few restrictions. However, when I ask them how they view others' behaviors, they report only 43-45% of the population follow all restrictions, 39-41% most restrictions, 14-15 % only a few restrictions and 1 -2% don't follow restrictions at all.

Lastly, to get at this idea of tradeoff between population health and own economic wellbeing, traders are asked to rate the importance of the population's health and safety towards Covid-19 compared to their own business and economic welfare. 63% of traders affirm the safety and health of the population is the most important during Covid-19, 31 % that population health is important but not at the detriment of their own business survival and welfare and 4% report not caring at all about the population's safety during

Covid-19. Trends are fairly constant across the month of May (Table A20).

6 Conclusion

This paper provides evidence of the effects of trade restrictions imposed by governments to reduce the spread of Covid-19 on populations' economic well-being. Border closure, product bans and market closures significantly affect traders who rely on markets and movement of goods for their business. Through high frequency data collection that started before the pandemic, I can document changes over time for small-scale traders located in markets around the Kenya-Uganda border. I find that 20 % of traders go out of business in the first month and another 20% are forced to relocate. Traders' sales and profits are also in decline compared to their baseline values in February 2020. Traders show adaptation despite being a population directly affected by the measures and I find heterogeneity in resilience based on gender, industry and type of supply chain. First, the decline in sales and profits disproportionately affected women, despite the fact that women are more likely to stay in business. Second, traders adapt and switch goods within a sector (e.g., agriculture goods) but not across sectors; implying that traders operating in sectors experiencing trade bans are more likely to be out of business by May 2020. However, it seems that cross-border traders who experience a complete disruption of their supply chains through border closures are better at adapting and switching to domestic suppliers.

My findings shed light on the effect of trade restrictions on businesses in developing countries and highlights the importance of considering the effect restrictions in the formal sector have on informal sectors. Informal sectors both constitute a significant part of the economy and are increasingly relied upon when restrictions are imposed. In addition, restrictions imposed in the formal sector affect equilibrium prices in the informal sectors; leading to increased corruption incidence, harassment and violence.

Tables

Table 1: Traders' socio-economic characteristics - Baseline : February 2020

	mean
Age	40.81
Men	0.19
Kenyan	0.94
Trade is main income	0.95
Has other source of income	0.40
N goods sold in past 3 months	2.51
Only cross border trader	0.20
Cross border and domestic trader	0.34
Domestic trader	0.45
Observations	1165

Table 2: Sample composition over time

	Baseline mean	March mean	Early April mean	Late April mean	Early May mean	Late May mean	June-July mean	Early Aug mean	Late Aug mean	Early Sept mean	Late Sept mean	Early Oct mean	Nov mean
Shoes Clothing-cross border	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Shoes Clothing-domestic	0.17	0.03	0.09	0.11	0.11	0.13	0.16	0.16	0.16	0.15	0.15	0.16	0.18
Ag-cross border	0.51	0.25	0.06	0.07	0.08	0.09	0.08	0.08	0.11	0.12	0.12	0.15	0.14
Ag-domestic	0.28	0.54	0.62	0.61	0.63	0.62	0.63	0.66	0.61	0.60	0.58	0.55	0.59
Not trading	0.00	0.00	0.24	0.22	0.19	0.16	0.12	0.09	0.11	0.12	0.14	0.13	0.09
Observations	1166	991	1002	972	932	937	892	904	898	912	873	892	814

Table 3: Gender Heterogeneity

<i>Industry and Trader Type</i>	Full sample			In business sample		
	Women	Men	P-value of Diff	Women	Men	P-value of Diff
Init. Cross border (CB)	0.56	0.43	0.000***			
Init. Clothes/Shoes	0.18	0.37	0.000***			
<i>Traded</i>						
Traded in March	1.00	1.00	.			
Traded in Early April	0.78	0.69	0.009***			
Traded in Late April	0.80	0.73	0.051*			
Traded in Early May	0.82	0.79	0.383			
Traded in Late May	0.85	0.82	0.419			
Traded in June-July	0.89	0.87	0.492			
Traded in Early Aug	0.91	0.89	0.464			
Traded in Late Aug	0.89	0.91	0.334			
Traded in Early Sept	0.88	0.88	0.925			
Traded in Late Sept	0.85	0.91	0.035**			
Traded in Early Oct	0.87	0.90	0.226			
Traded in Nov	0.92	0.89	0.255			
<i>Sales</i>						
Sales Baseline	35877.59	47943.07	0.097*	35877.59	47943.07	0.097*
Sales March	21728.89	37949.11	0.004***	21728.89	37949.11	0.004***
Sales Early April	21462.52	38990.61	0.005***	27599.51	56913.71	0.000***
Sales Late April	18895.07	45859.66	0.000***	23730.78	62831.34	0.000***
Sales Early May	17886.30	50101.76	0.000***	21838.91	63410.04	0.000***
Sales Late May	19453.25	49986.12	0.000***	22987.51	60967.92	0.000***
Sales June-July	17188.25	31676.21	0.000***	19426.72	36567.39	0.000***
Sales Early Aug	23454.66	41298.97	0.002***	25817.51	46386.52	0.001***
Sales Late Aug	22302.11	25799.10	0.495	25174.35	28247.19	0.586
Sales Early Sept	20930.01	31553.96	0.007***	23851.95	35836.29	0.007***
Sales Late Sept	19171.13	30865.03	0.002***	22648.25	33815.37	0.009***
Sales Early Oct	18497.30	26768.85	0.015**	21367.57	29699.74	0.027**
Sales Nov	28116.19	45259.07	0.019**	30598.36	50916.46	0.012**
<i>Profits</i>						
Profits Baseline	8230.22	11587.19	0.110	8230.22	11587.19	0.110
Profits March	3976.59	6859.79	0.000***	3976.59	6859.79	0.000***
Profits Early April	4070.86	5446.95	0.180	5242.28	7930.76	0.051*
Profits Late April	3239.30	7017.50	0.000***	4069.63	9614.53	0.000***
Profits Early May	3234.19	7914.94	0.000***	3950.04	10033.90	0.000***
Profits Late May	3918.82	10439.34	0.000***	4636.27	12750.34	0.000***
Profits June-July	3041.86	7173.29	0.000***	3439.86	8297.46	0.000***
Profits Early Aug	4449.47	9454.51	0.001***	4898.38	10627.70	0.000***
Profits Late Aug	4418.55	6215.25	0.140	4992.83	6805.01	0.178
Profits Early Sept	3911.54	6346.35	0.001***	4460.95	7207.64	0.001***
Profits Late Sept	4219.37	7165.72	0.042**	4988.42	7850.68	0.080*
Profits Early Oct	3817.65	5764.11	0.048**	4415.66	6395.22	0.073*
Profits Nov	6183.03	10704.04	0.022**	6728.89	12042.04	0.014**

Note: * p<0.1, ** p<0.05, *** p<0.01.

Revenues and profits are in KShs

Traded is defined as whether the trader bought or sold goods in the past 2 weeks

For columns 1-3: Traders who were not trading were considered to have 0 profit and revenues

Table 4: Effect on the value chain and Mobile money

	March mean	Early April mean	Late April mean	Early May mean	Late May mean	Late June-July mean	Early Aug mean	Late Aug mean	Early Sept mean	Late Sept mean	Ealy Oct mean	Nov mean
Relocations												
Relocated business	.	0.11	0.09	0.05	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.02
Relocated hh	.	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Supply Chain												
Num of suppliers/locations	1.17	1.10	1.15	1.21	1.19	1.30	.	.	.	.	.	.
Num of clients/locations	1.73	1.19	1.20	1.32	1.35	1.49	.	.	.	.	.	.
Num of clients	142.13	100.93	89.18	82.44	82.23	81.67	85.03	79.19	64.98	59.58	71.48	103.01
New clients	0.78	0.78	0.84	0.89	0.91	0.88	0.83	0.86	0.87	0.90	0.92	0.87
Old and regular clients	0.88	0.81	0.86	0.83	0.85	0.88	0.90	0.90	0.90	0.94	0.93	0.93
Old and occasional clients	0.41	0.52	0.60	0.51	0.54	0.70	0.57	0.62	0.65	0.71	0.75	0.81
Mobile Money												
Used mobile money for business	0.18	0.31	0.28	0.22	0.23	0.27	0.19	0.20	0.18	0.21	0.18	0.28
Percent sales in mobile money	11.90	9.84	11.77	8.26	8.46	9.05	10.06	9.81	8.30	12.12	11.03	8.49
Percent purchases in mobile money	54.92	45.34	50.76	42.72	57.63	46.20	45.41	42.11	47.12	46.88	45.16	48.70
Observations	907	996	972	932	937	892	904	898	911	873	891	771

Table 5: Issues while crossing the border

	February mean	March mean	Early April mean	Late April mean	Early May mean	Late May mean	Late June-July mean	Early Aug mean	Late Aug mean	Early Sept mean	Late Sept mean	Ealy Oct mean	Nov mean
Corruption	0.06	0.11	0.36	0.29	0.38	0.24	0.38	0.41	0.56	0.52	0.45	0.50	0.58
Harrassment	0.03	0.13	0.25	0.28	0.30	0.15	0.22	0.12	0.18	0.09	0.12	0.11	0.25
Long waiting times	0.01	0.05	0.04	0.11	0.07	0.10	0.14	0.03	0.11	0.11	0.04	0.06	0.24
Confiscation	0.04	0.01	0.04	0.03	0.07	0.06	0.06	0.00	0.05	0.01	0.04	0.02	0.00
Other	0.01	0.11	0.00	0.31	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
Observations	594	230	56	65	71	86	79	74	104	114	112	141	118

Table 6: Intermediaries

	March mean	Early April mean	Late April mean	Early May mean	Late May mean	Early Aug mean	Late Aug mean	Early Sept mean	Late Sept mean
<i>Who did you interact with</i>									
Police	0.17	0.35	0.37	0.41	0.38	0.53	0.60	0.70	0.70
KRA	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02
URA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal agents- Kenya	0.50	0.06	0.09	0.01	0.07	0.09	0.14	0.15	0.15
Municipal agents - Uganda	0.57	0.12	0.09	0.00	0.08	0.12	0.15	0.12	0.12
Port Health/Public Health	0.00	0.00	0.02	0.00	0.01	0.00	0.01	0.01	0.01
KEPHIS	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.01
KEBs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fishery	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
I don't know as I used a broker	0.00	0.06	0.09	0.20	0.10	0.05	0.03	0.02	0.02
I don't know as I used a transporter	0.30	0.59	0.42	0.35	0.45	0.32	0.29	0.21	0.21
I don't know as I used a clearing agent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I don't know as I used another intermediary	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.02	0.02
None	0.03	0.00	0.06	0.04	0.01	0.04	0.04	0.04	0.04
<i>Who did you negotiate with</i>									
Police	0.00	0.75	1.00	1.00	0.64	1.00	0.83	1.00	1.00
KRA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal agents- Kenya	0.88	0.25	0.00	0.00	0.21	0.00	0.50	0.25	0.25
Municipal agents - Uganda	0.88	0.25	0.00	0.00	0.29	0.00	0.33	0.12	0.12
Port Health/Public Health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KEPHIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KEBs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forestry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fishery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I don't know as I used a broker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I don't know as I used a transporter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I don't know as I used a clearing agent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I don't know as I used another intermediary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
None	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	30	17	65	71	86	74	104	114	114

Table 7: Main factors impacting traders' business

	March mean	Early April mean	Late April mean	Early May mean	Late May mean
<i>ISSUES past 2 weeks</i>					
Issues with business in past 2 weeks	0.88	0.88	0.90	0.88	0.88
<i>Demand</i>					
Demand for my goods is very low	0.38	0.41	0.48	0.52	0.61
Traveling/Movement restrictions for my customers	0.33	0.37	0.27	0.19	0.19
Demand for my goods is too high and my stock cannot keep up	0.09	0.10	0.03	0.03	0.01
I have to make sales at credit	0.01	0.03	0.03	0.07	0.06
<i>Supply</i>					
Cost of goods very high	0.41	0.45	0.34	0.17	0.14
Transport is more expensive	0.31	0.33	0.25	0.16	0.14
The border crossing I usually use is closed	0.29	0.29	0.17	0.14	0.14
I had to change my suppliers	0.21	0.25	0.14	0.09	0.06
My suppliers are not selling goods anymore	0.15	0.15	0.10	0.05	0.03
Suppliers are selling goods but do not have enough stock for me	0.05	0.06	0.02	0.01	0.01
Trade ban on my product	0.08	0.06	0.05	0.04	0.02
Spoiled goods	.	.	0.10	0.12	0.14
<i>Market Access</i>					
Traveling/Movement restrictions for me	0.40	0.41	0.36	0.26	0.18
Market closures	0.60	0.44	0.22	0.09	0.07
Crossing the border with my goods is more difficult	0.11	0.11	0.08	0.07	0.09
<i>Other</i>					
Harrassment	.	.	0.26	0.19	0.09
Me or my household member was sick	0.00	0.00	0.15	0.14	0.13
Other, specify	0.01	0.01	0.09	0.08	0.07
<i>BENEFITS past 2 weeks</i>					
Improved business in past 2 weeks	0.09	0.13	0.07	0.06	0.06
<i>Types of benefits</i>					
Increased demand	0.79	0.71	0.79	0.74	0.60
Sell at higher price	0.29	0.25	0.35	0.26	0.25
Buy lower price	0.00	0.08	0.15	0.28	0.25
Cheaper transport	0.00	0.04	0.06	0.04	0.10
Cross border cheaper	0.00	0.00	0.01	0.02	0.02
Diversify	0.07	0.21	0.18	0.26	0.17
Other benefit	0.21	0.12	0.12	0.20	0.27
Observations	991	1002	972	932	937

Table 8: Dependency between formal and informal sectors

	(1) Corruption incidence	(2) Harassment incidence	(3) Bribes police
Current Informal (all)	0.049** [0.023]	0.030* [0.017]	146.100 [91.781]
Current Informal x March	0.094*** [0.034]	0.115*** [0.042]	
Current Informal x Early April	0.570*** [0.092]	0.272** [0.120]	67.293 [168.231]
Current Informal x Late April	-0.219 [0.187]	-0.059 [0.172]	144.847 [187.570]
Current Informal x Early May	0.482*** [0.091]	0.350*** [0.085]	168.147 [172.809]
Current Informal x Late May	0.109 [0.113]	0.103 [0.081]	72.881 [181.980]
Current Informal x June-July	0.486*** [0.080]	0.320*** [0.072]	223.215 [224.375]
Current Informal x Early Aug	0.418*** [0.075]	0.092 [0.056]	178.954 [150.270]
Current Informal x Late Aug	0.329** [0.143]	0.017 [0.122]	227.612 [159.291]
Current Informal x Early Sept	0.038 [0.150]	0.084** [0.039]	-27.254 [150.743]
Current Informal x Late Sept	0.409*** [0.097]	-0.106 [0.127]	231.391 [199.964]
Current Informal x Early Oct	0.356*** [0.119]	0.114*** [0.043]	-99.036 [140.242]
Current Informal x Nov	0.547*** [0.084]	0.314*** [0.070]	-92.717 [118.159]
Dep Var Control	Baseline - Off. CB	Baseline - Off. CB	March- Off. CB
Dep Var Control Mean	0.051	0.036	12.500
R-Squared	.346	.149	.142
Round FE	X	X	X
Market FE	X	X	X
Covariates	X	X	X
Observations	1601	1601	1015

Note: Standard errors robust (reported in brackets).

Covariates include traders' gender and nationality'

* p<0.1, ** p<0.05, *** p<0.01.

Figures

Figure 1: Attrition across rounds

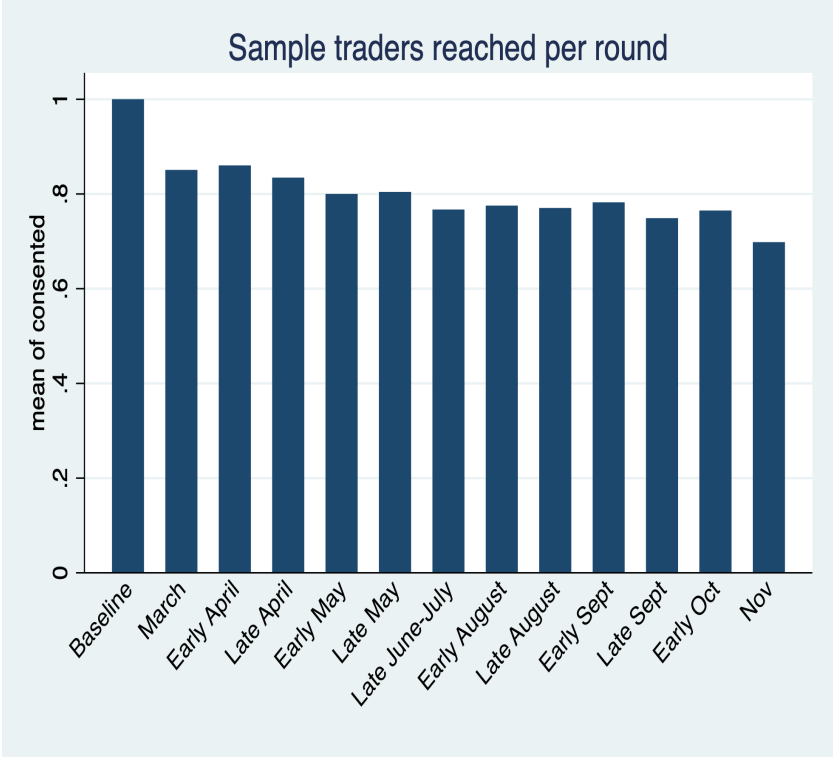


Figure 2: Trade across time



Figure 3: Determinants of being Out of business by industry and trader type

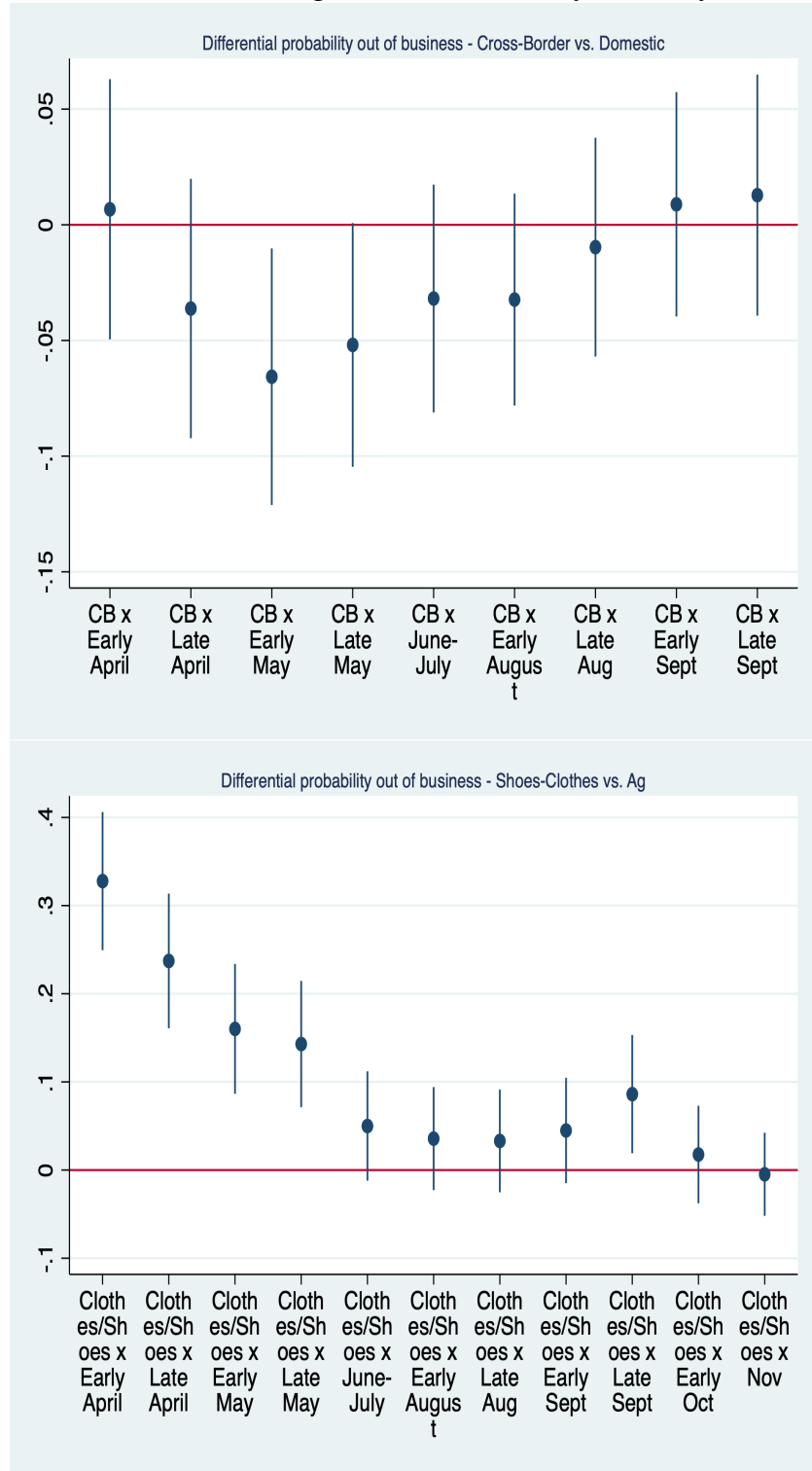


Figure 4: Sample Composition

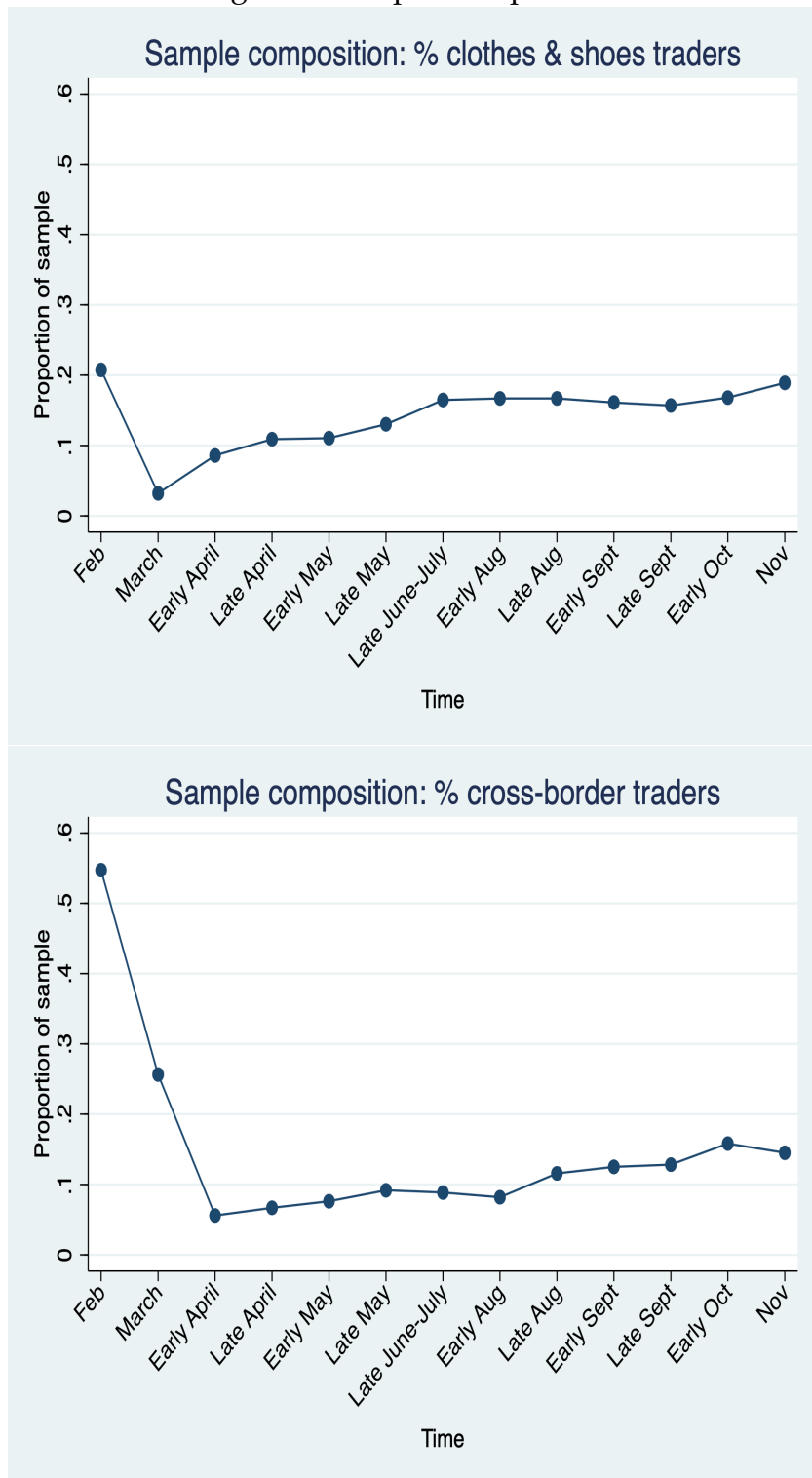


Figure 5: Switch from cross border trading to domestic trading

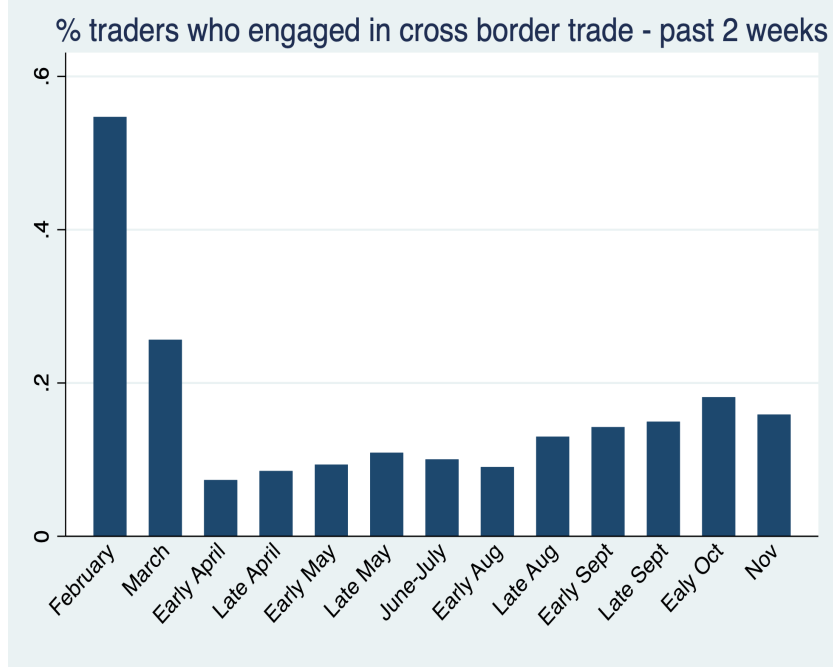


Figure 6: Border crossing used

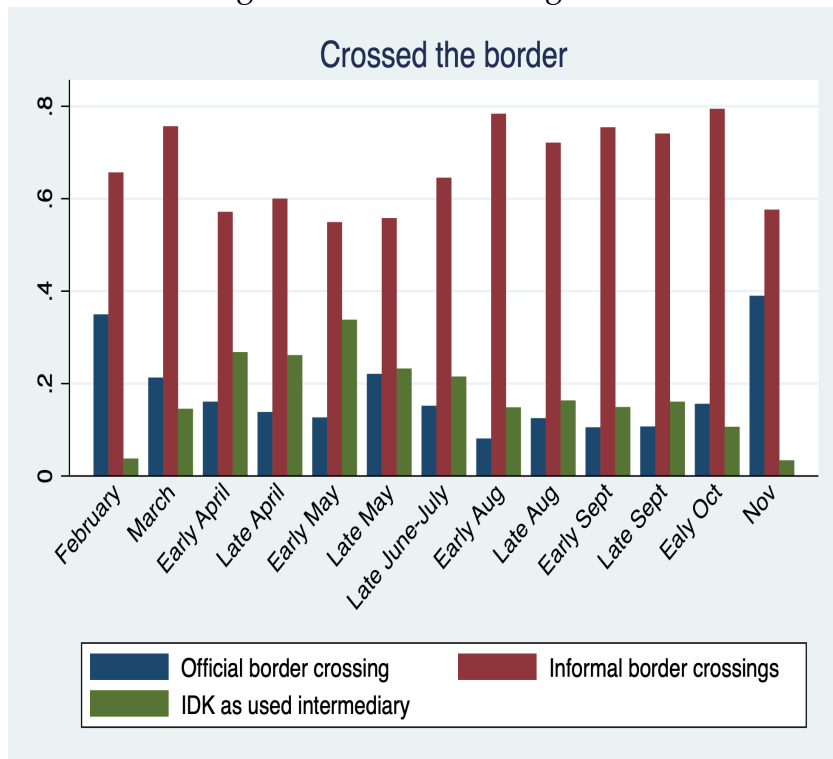


Figure 7: Choice of border crossing: heterogeneity by trader type

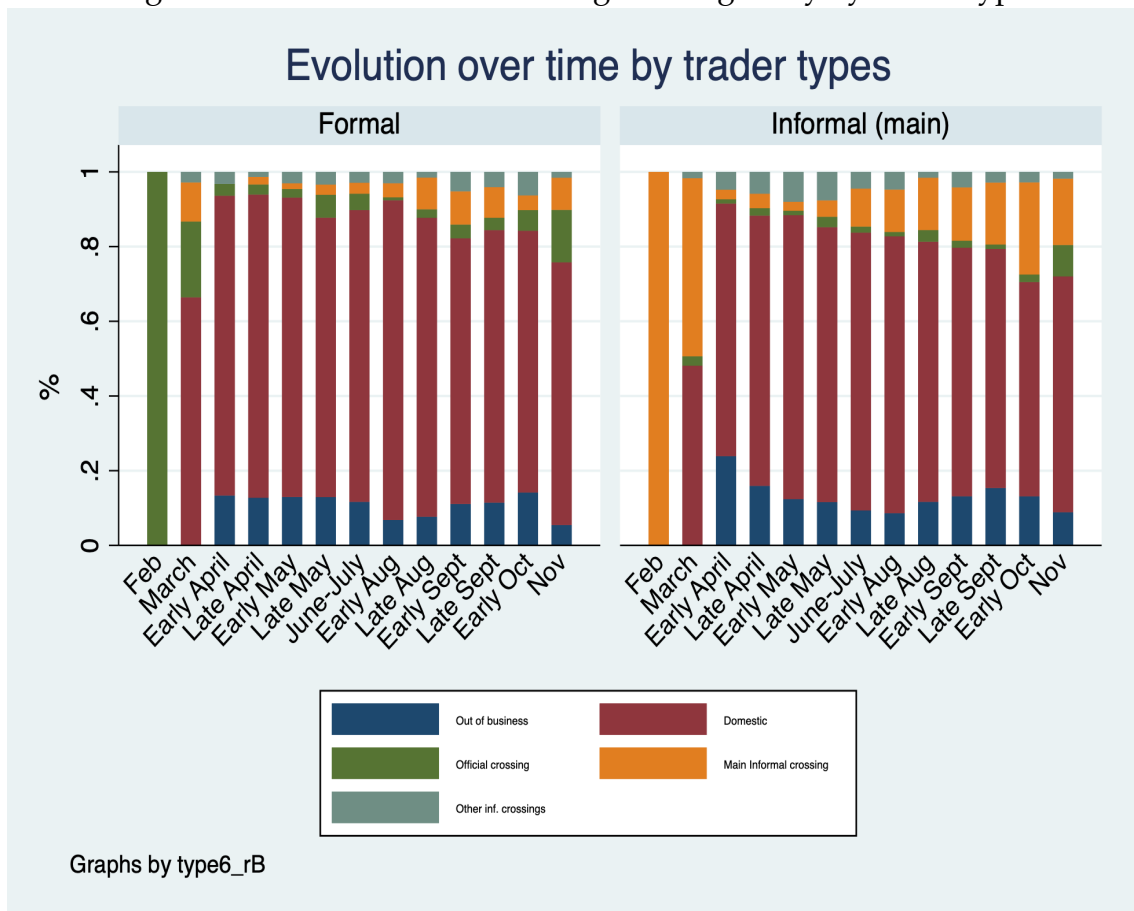


Figure 8: Traders report changing border crossings

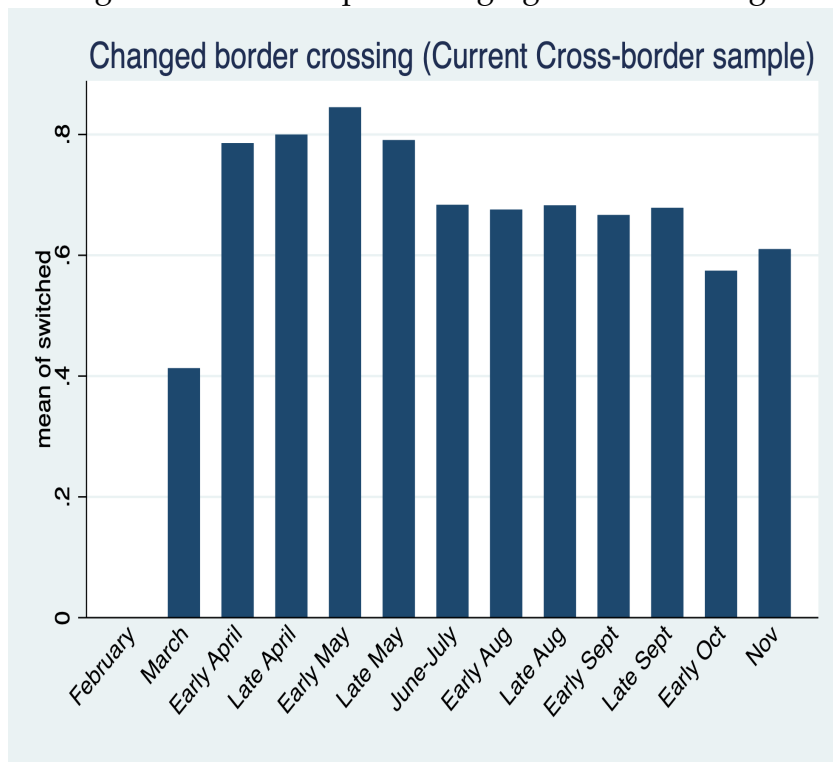


Figure 9: Rating of corruption and harassment over time

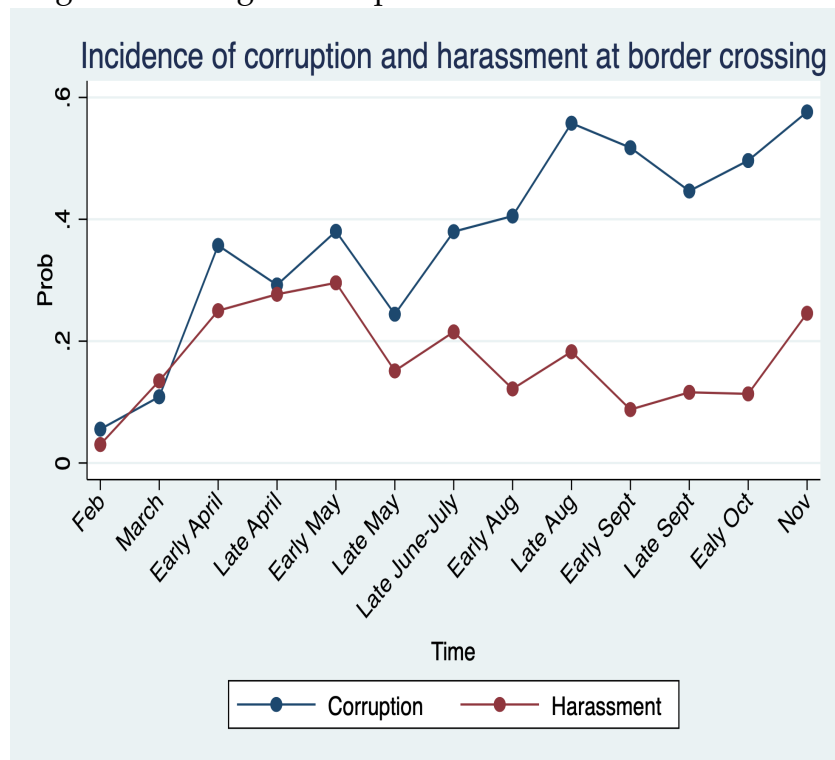


Figure 10: Rating of corruption and harassment over time

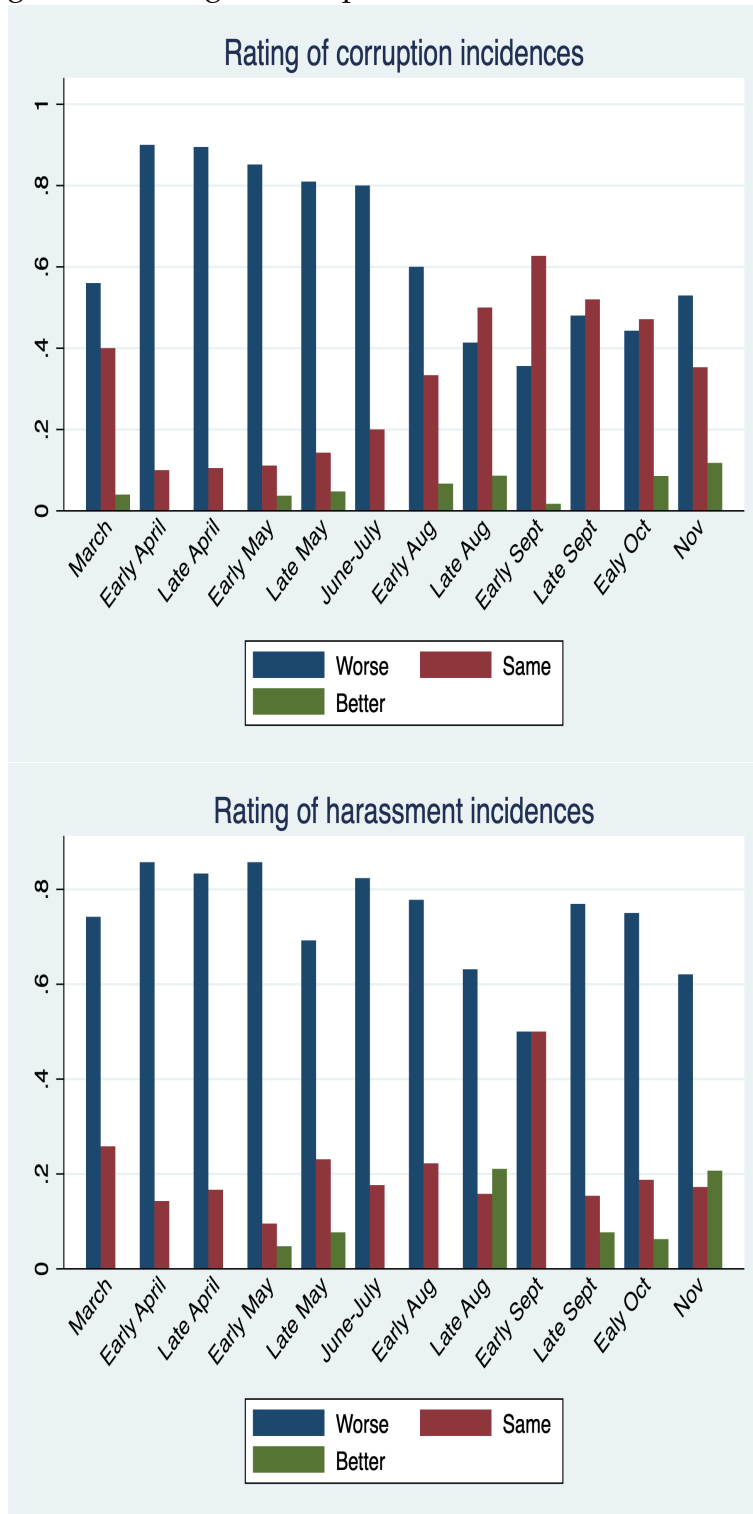


Figure 11: Profitability per gender

