DISPLACING CORRUPTION*

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December 2011

Abstract

This paper investigates how corruption adjusts to policy reforms that change opportunities for bribe extraction for different agents involved in bribery deals. We exploit an exogenous change in tariff schedules to identify changes in the incidence, the distribution, and in the type of bribes paid for clearing cargo through international borders. We find that changes in tariff rates are associated with a reduction in the incidence of tariff evasion: a 1% reduction in average tariff rates is associated with a 90% reduction in the probability of paying a bribe for the product that went from a high to a low tariff category. This reduction is however partially offset by significant substitution and income effects. Following the overall reduction in tariffs, customs officials move from colluding with shippers to accept bribes for tariff evasion to other more extortionary types of corruption. We also find suggestive income effects as shippers shift from paying bribes to customs officials to paying bribes to other border officials in charge of other phases of the clearing process. Our results therefore suggest that corruption was displaced from collusive agreements involving tariff evasion to more distortionary, coercive bribery deals. This can have important implications for the overall efficiency costs of corruption and should therefore be considered in the design of anti-corruption policies.

Keywords: Corruption; Tariffs; Transport; Ports; Trade Costs
JEL Classification Numbers: D21, D61, D73, K42, L91, O12, O55, R41.

*Very Preliminary– Please do not cite. Corresponding author: Sandra Sequeira at S.Sequeira@lse.ac.uk. I thank Alberto da Cruz, Cristovao Laice, Felix Simione, Diogo Wahnon and Guo Xu for superb assistance with the data collection. This project was funded by the World Bank, the International Finance Corporation (IFC) and the International Growth Center(IGC). Sandra Sequeira further acknowledges the generous support of STICERD's Young Research Award at LSE. All views expressed are those of the author and do not reflect the opinions of the World Bank, the IFC or of the IGC.

I Introduction

The relationship between tax policies and tax levels has been the subject of extensive discussions in both policy and academic circles. Higher taxes may increase incentives for evasion (Allingham and Sandmo 1972), or reduce the ability for private agents to pay bribes through an income effect (Cowell et al 2002). Disentangling these two effects persists as an important empirical challenge due to the difficulty in measuring tax evasion.

A particular type of tax evasion that has been easier to identify in recent years is the evasion of taxes on imported goods. Tariff evasion is of particular policy relevance since most governments throughout the developing world are still heavily reliant on tariff revenue.[1] Evidence is also mounting on how tariff evasion may differ across product types and firms, reward companies engaging in directly unproductive activities and rent seeking, which can distort firm survival and growth rates in non-optimal ways (Bagwhati 1964; Krueger 1974; Javorcik and Narciso 2008; Sequeira and Djankov 2011). Finally, corruption in customs can contribute to the deterioration of a country's business environment through institutional halo effects that set the tone for corrupt practices to become the norm in public service delivery. Tariff evasion has also been an often cited reason to justify a move towards uniform tariff rates in the trade liberalization debate. The argument is that simplified and uniform tariff schedules would reduce the incentive and the opportunity for tariff evasion through the misclassification of products from high to low tariff groupings (Panagaryia 1986).[2]

In this paper we investigate how tariff levels affect patterns of tariff evasion. We exploit an exogenous variation in tariff schedules triggered by the phasing in of a longstanding trade agreement, to observe how the incidence and distribution of bribe payments for tariff evasion change with the reduction in tariff levels. By observing the full process of clearing goods across international borders, we can further identify how changes in tariff levels affect bribe payments in other compulsory stages of the clearance process. This is a critical part of the analysis as it enables us to fully document the implications of policy reform in potentially displacing corruption to other stages of public service delivery of complementary public goods. We are therefore able to observe changes in bribe payments across tariff levels, across time, across products, and across stages of the clearing process.

[1] In Madagascar tariff revenue accounts for 62% of tax revenue, in Mozambique for 35% and in Bangladesh for 16%.

[2] Several countries have moved in this direction such as Chile in the 1970s, Mexico and Bolivia in the 1980s. The simplification of tariff rates is often an important goal in the trade liberalization agenda.

We find that the reduction in tariff levels is associated with a 90% drop in the probability of paying a bribe for tariff evasion and in the average amount of bribe paid immediately after the ta riff change. This result is however partially offset in subsequent years by important substitution and income effects. We find suggestive evidence of two types of substitution effects and two types of direct and indirect income effects. For products that experience the highest reduction in tariff levels, the amount of bribes paid conditional on still having to pay a bribe increased to compensate customs agents for the overall shortfall in bribe revenue. We also find evidence that customs officials moved from extracting bribes for tariff evasion prior to the tariff change, to extracting bribes for other reasons related to irregularities with the clearance documentation (real or fictitious) or to selling "speed" in the clearance queue.

Following the tariff change, more bribes begin to be paid to other public officials operating along the clearing chain, beyond customs. Finally, we observe that clearing agents, the shipping intermediaries who by law every firm has to resort to in order to clear their goods through borders, attempt to capture part of the bribes that were originally being paid to customs officials. Clearing agents possess full information on the patterns of bribe payments across each time period while firms are likely to be ill-informed about the actual distribution of bribes across the clearing process, and unaware of any changes in these patterns. Clearing agents can then exploit this asymmetry of information to take a share of the former bribes. This opportunity could emerge if firms budget certain funds for bribe payments (Anh 2011) and these budgets remain fixed throughout the period under analysis. This would generate what we label as an indirect income effect. Taken together, this last set of results suggests that the tariff reduction generated important direct and indirect income effects.

Our findings revealed that the tariff reform triggered a shift from collusive forms of corruption - tariff evasion -, which involved an element of rent-sharing between public officials and shippers, to more coercive types of bribe extraction, which also tend to be more distortionary. While the former could contribute to a reduction in overall trade costs, the latter is cost-increasing for importers.

Our results add to a growing literature documenting the elasticity of tariff evasion to tariff levels, which uses indirect methods of measuring tariff evasion. Bhagwati (1964) first suggested an indirect measure of tariff evasion by matching dyads of business partners and then comparing reported levels of exports from the sending country to reported levels of imports from the receiving country. Applying this methodology, Pritchett and Sethi (1994) detect only a weak association between tariff levels and collected duties in four Asian countries. Fisman and Wei (2004) match exports from China to imports from Hong Kong for a

cross section of 1,600 products, finding that a 1% increase in tariff levels was associated with an increase in tariff evasion of about 2-3%. Javorcik and Narciso (2007) repeat this exercise matching trade records between ten Eastern European countries and Germany, this time exploiting variation across both products and time. The authors find that a 1% increase in tariff levels is associated with a 1.7% increase in tariff evasion. Another example of this methodology can be found in Mishra et al (2007), which exploits variation in tariff levels triggered by India's trade liberalization reform in the 1990s. The authors find similar results as the previous literature, though the main effects are of considerable smaller magnitude. A 1% change in tariff rates is associated with a 0.12% increase in tariff evasion.

We identify three main advantages to our approach. First, we exploit three sources of variation to identify the overall effect of tariffs on corruption: variation across products, across time and across stages of the clearance process. Using all three sources of variation confers some significant advantages over past strategies that have relied solely in variation of tariff levels across products (Fisman and Wei, 2004), or across products and time (Javorcik and Narciso 2007), and have therefore been unable to identify the net effect of changes in tariffs on corruption. Furthermore, if tariff levels are systematically correlated with product characteristics or with variations in the quality of enforcement across time, we would be unable to isolate the causal relationship between tariff levels and corruption, from other product-level or enforcement related reasons. Another advantage of our analysis is the fact that we rely on directly observed bribe payments as opposed to the indirect measures of tariff evasion often used in the literature, which may be more prone to measurement error. Finally, because we observe the entire chain of public service delivery for the clearance of goods, we also provide the first set of evidence on potential substitution and income effects across opportunities for bribe payments along a chain of complementary stages in the provision of an important public service.

II The Shipping Process and Opportunities for Corruption

Each individual firm-level shipment goes through several different stages in order to clear through an international border. For analytical purposes, we define two broad categories of public officials who differ in their administrative authority and in their discretion to stop cargo and generate opportunities for bribe payments at different moments of the clearing process: customs officials and port operators.

Customs officials are in charge of validating clearance documentation and collecting all tariff payments

due. As a result, customs officials have greater discretionary power to extract bribes relative to regular port operators given their broader bureaucratic mandate and the fact that they can access full information on each shipment, and each shipper, at all times. First and foremost, customs officials possess discretionary power to allow a firm to engage in tariff evasion through three different channels: by misreporting physical quantities of imported products, by misrepresenting prices, or by misclassifying products from high to low tariff categories. Customs officials have an additional set of tools they can deploy to extract bribes, namely the threat of conducting a physical inspection of the shipment (which can delay clearance for up to 4 days), or citing irregularities (real or fictitious) with the documentation of the shipment. Associating the bribe with tariff evasion combines the desirable features of reducing both the informational costs of bribe-setting and the risk associated with the illicit transaction (Sequeira and Djankov 2011). From the perspective of the customs' official, whether the good falls under a high tariff category or not carries important information on the willingness-to-pay of a shipper. Customs officials assume that all firms would be better off by evading a tariff so the higher the tariff, the higher the bribe a firm would be willing to pay. All other bribe extraction tools are more costly and can potentially yield lower bribe revenue, as they rely on shipment characteristics that carry only coarse information on a firm's willingness-to-pay a bribe. Customs' officials would then be forced to engage in a costly and time-consuming exercise to elicit information on the time sensitivity of the firm's shipment or on the firm's ability to pay a bribe. For example, the size of the shipment is an imperfect indicator of willingness to pay a bribe: large shipments may signal a firm carrying higher than average inventories with a lower willingness to pay to expedite clearance, or a large firm with a higher ability to pay for a faster service. A lengthy process of discovering both commitment to an illicit transaction and the reservation costs of a shipper increases both the risk and the cost of bargaining for bribes (Sequeira and Djankov 2011).

A transaction based on tariff evasion has the additional benefit of lowering the risk of detection of the illicit transaction through a second channel: given that both parties are implicated in the illicit deal, neither side will have an incentive to deviate from it resulting in a more credible commitment (Schelling 1956). Tariff evasion is also less visible and easier to conceal from other customs officials and clearing agents when compared to an observable action such as jumping a queue or avoiding a physical inspection of a container.

Regular port operators on the other hand have a narrower mandate to move or protect cargo on the docks, and they lack access to the cargo's documentation specifying the value of the cargo, the client firm

and the origin/destination of the shipment, among others. Bribes can be paid to different types of port officials along different stages of the clearing process ranging from agents in charge of adjusting reefer temperatures for refrigerated cargo stationed at the port; port gate officials who determine the acceptance of late cargo arrivals; stevedores who auction off forklifts and equipment on the docks; port security who oversee high-value cargo vulnerable to theft; shipping planners who auction off priority slots in shipping vessels, and scanner agents who move cargo through non-intrusive scanning technology.

The third type of official involved in the clearing process is the clearing agent. In our setting, by law, no firm is allowed to interact directly with customs or port operators. Firms have instead to resort to private clearing agents who specialize in clearing cargo through the port or border post, mostly through *ad hoc*, shipment-based contracts. Clearing agents submit all the required documentation, monitor the clearance process and make all necessary bribe payments to customs officials and port operators, including bribes. These clearing agents are a common feature of the clearing process in several countries worldwide. While in countries like the US and other European countries resorting to clearing agents is optional several countries throughout the developing world have made them a mandatory fixture of the clearing process such as Mali, Burkina Fasu, Honduras, and Venezuela, among others.[3]

III The Setting

To identify the responsiveness of corruption to changes in tariff levels we exploit a staggered reduction in tariff rates that took place between 2007 and 2011 in Mozambique, in Southern Africa. Mozambique joined the Southern African Development Community (SADC) in 1992, committing to the SADC Tariff Trade Protocol that required the complete phasing out of tariff rates by 2015. Changes in tariff levels for different types of products took place in a total of 10 waves between 1985 and 2015, with the most significant changes taking place in 2001 and 2008. The agreed timeline for the reduction in tariff rates was similar to the reforms adopted by the remaining countries in SADC such as Malawi, Tanzania, Angola, Zambia and Zimbabwe, among others. The most significant reduction in tariff levels took place in 2008, though about 12% of the shipments in our sample experienced a second wave of reductions in 2011, for goods originating in neighboring South Africa. The highest tariff decline was registered for products that went from 20% to 0, but the drop in average nominal rates was of approximately 5 percentage points (see Figure 1).

[3]For more detailed information on the role of clearing agents see http://docsonline.wto.org/.

We exploit this rich variation in tariffs across time and across products to measure the impact of changes in tariff levels on corruption. We then measure corruption in 2007, 2008 and 2011, before and after the major change in tariff levels that took place in 2008 and the reduction in tariff levels for products originating in South Africa, which took place in 2011. We identify changes in the incidence, distribution and patterns of bribe payments during this period across different stages of the clearing process.

The validity of our results hinges on the assumption that the timing and rules of the tariff reductions are exogenous to the levels of corruption and tariff evasion prevalent in Mozambique at the time the changes took place. The SADC Trade Protocol was driven primarily by the need to harmonize Mozambican and South African tariff codes as quickly as possible, and previous work has provided compelling evidence that patterns of bribe payments at ports in South Africa differed significantly from corruption patterns in Mozambique (Sequeira and Djankov 2011). Given that the schedule for the tariff phase out was agreed to in the late 1980s, it is unlikely to be correlated with corruption patterns in 2008 and 2011.

IV Data

This paper relies on primary data obtained through a tracking study conducted at the port of Maputo and at border post with South Africa (representing the most developed transport corridor in Mozambique), which monitored a random sample of approximately 2,000 shipments.

We first conducted a listing of all official clearing agents in the region (approximately 117). Most (76%) were independent clearing agents working for several client firms, with 50% of them handling between 10 and 50 shipments per month. We selected 14 clearing agents out of this universe of 117, replacing just one refusal to participate with a clearing agent of similar size and experience. Four clearing agents were stationed at the border post while the remainder were working from the capital city of Maputo. Each clearing agent provided the listing of shipments they expected for a given week and were instructed to cover every third shipment. This sampling procedure was then verified by independent enumerators who received the listings from the clearing agents, prior to the arrival of the shipments. Each clearing agent would fill-in a questionnaire recording detailed information on the date, time of arrival and date of clearance of the shipments; and on a wide range of cargo characteristics such as its size, value and product type. They also noted the primary recipients of bribes, the bribe amounts requested and the reason for a bribe payment, ranging from the need to jump a long queue of trucks to get into the port, to evading tariffs or missing

important clearance documentation.

The questionnaire was designed in conjunction with the clearing agents participating in the study so as to ensure that we were capturing the most relevant features of the shipment and of the clearing process and, more importantly, to ensure that we accommodated any confidentiality concerns regarding how much information the clearing agents were willing to report. One such sensitive dimension related to information on the characteristics of client firms. To satisfy the clearing agents' participation constraint, we agreed to only collect information on the average size of the shipper and on the frequency of interactions between the clearing agents and the shipper as a proxy for the regularity of a firms' imports.

Throughout the data collection exercise, emphasis was placed on capturing all formal and informal costs of importing and exporting goods through the ports and border posts. The goal was to minimize the possibility of clearing agents strategically misreporting data on bribe payments. In this particular setting, there was limited stigma attached to the payment of bribes to port or border officials, since clearing agents saw the bribe as a necessary payment made at the request of their clients. Acting as mere intermediaries, clearing agents felt limited moral responsibility for their actions (Sequeira and Djankov 2011).

To cross-check the accuracy and reliability of the data collected we conducted an experiment by which clearing agents were randomly assigned to sequences of unmonitored and monitored data collection. To conduct the monitoring, we hired local observers to shadow clearing agents and verify the data reported by the clearing agent. The observers had experience in the shipping industry and were therefore familiar with all clearance procedures. To avoid any suspicion, the observers were also similar in age and appearance to any other clerk who normally assists clearing agents in their interactions with port officials. Tables 1 and 2 display the results from the experiment.

We find that monitoring a shipment with our observers was associated with a 14% lower probability of reporting a bribe and, conditional on reporting a bribe being paid, a significantly lower (by almost 200%) reported amount for the average bribe paid. These results are robust to the inclusion of a variety of controls including clearing agent and observer fixed effects, cargo and shipper-level characteristics, shipment level characteristics such as the day of the week the shipment arrived, the month of arrival, and the temperature on arrival.

The observed lower probability of reporting a bribe when monitored is consistent with an extensive literature in psychology showing that self-administered questionnaires increase the willingness of respondents to report sensitive behaviour in a variety of settings (Bradburn and Sudman 1979; Groves 1989;

Turner 1992; Waterton and Duffy 1984; Weinrott and Saylor 1991). Given that clearing agents knew from the onset that they would be monitored at some point, it is unlikely that they would try to strategically overreport information on bribe payments while they were not being monitored. The hypothesis supported by our observers and clearing agents was that the presence of the observer may have altered the type of interactions that took place between the clearing agent and the public officials, has the latter would be more reluctant to extract bribes. We therefore restrict our analysis to the data reported directly by the clearing agent, which enable us to measure expected bribes at each border (port and land border post) for different types of shippers and different types of shipments.

V Determinants of Bribe Payments

V.1 Tariff levels and Tariff Evasion

We investigate the responsiveness of corruption to changes in tariff levels through a standard differences in differences framework applied to the random sample of shipments tracked in 2007, 2008 and 2011.

We begin by placing as our dependent variable a dummy variable that equals 1 if a bribe was paid and 0 otherwise, for each shipment in our sample to capture the probability of a shipment having to pay a bribe. The first vector of independent variables includes our main difference-in-differences estimator and key controls:

$$\beta_1 Tariff\,Change\,Cat_i + \gamma_1 Tariff\,Change\,Cat08_i * year\,2008 +$$
$$\gamma_2 Tariff\,Change\,Cat11_i * year\,2011 + beta_2 BaselineTariff + X_i + v_i \quad (1)$$

In this base model, we consider a binary treatment variable equalling 1 if the product falls under a tariff category that changes in 2008 or 2011 and 0 otherwise. The coefficients of interest are γ_1 and γ_2, capturing the difference in the probability of paying a bribe for products that change tariff level, before and after the tariff change takes place, relative to products that do not experience any change in tariffs throughout the period under analysis. We also include in the base model the product's initial tariff level (in 2007), all double interactions and main effects, plus a vector of product, shipment and firm-level characteristics such as a dummy variable signalling if the shipper is a large firm (defined as having more than 100 employees); dummy variables defining the product as perishable, a consumer good or an agricultural product; temperature controls including the maximum temperature registered the day the

shipment arrived and the deviation between the temperature registered the day of arrival and the average monthly temperature; temperature controls interacted with the perishable dummy; product fixed effects at the level of the 4 digit harmonization code; and year dummies.

Tariff evasion can take place through the misrepresentation of import prices (underinvoicing) or through the misclassification of goods into lower tariff categories. A growing literature has tested the hypothesis that certain types of products without fixed prices may be more prone to corrupt practices due to the difficulty in assessing the tariff duties that are due. Honest customs officials find it more difficult to detect an invoice stating an incorrect price while corrupt customs officers have a plausible explanation for why they did not detect any underinvoicing. We follow the classification conventionally used in the trade literature to identify differentiated products as those that lack a reference price in the market (Rauch 1999). Examples of differentiated goods are clothes and cars, while non-differentiated goods could be oil or wheat. Several studies on tariff evasion have resorted to this classification in the past, with mixed results. Fisman and Wei (2004) failed to find a significant relationship between differentiated gods and tariff evasion whereas Javorvick and Narciso (2007) and Mishra et al (2007) find that the trade gap is more responsive to the tariff level for differentiated products. We test this hypothesis in our data by including a dummy variable in our specification that equals 1 if the product is differentiated and 0 otherwise. Standard errors are clustered at the level of the product's 4 digit harmonization code to allow for within product type correlation across time.

We then augment the base model to include the triple differences estimator, interacting the main treatment -the tariff change in 2008- with the year of the treatment and an indicator of the baseline tariff level of each product in our sample.

$$\begin{aligned}
&\beta_3 Tariff\,Change\,Cat_i + \gamma_3 Tariff\,Change\,Cat_i * year\,2008 + \\
&\delta Tariff\,Change\,Category_i * Baseline\,Tariff_i * year\,2008 + \\
&\gamma_4 Tariff\,Change\,Cat_i * year\,2011 + \gamma_5 Tariff\,Change\,Cat_i * Baseline\,Tariff_i * year\,2011 + \\
&\beta_4 BaselineTariff + X_i + v_i
\end{aligned} \tag{2}$$

Finally, we change our specification to replace the binary treatment variable with a continuous treatment variable that captures the percentage point decline in tariffs experienced by each product. The rest of the specification is unchanged.

V.2 Discussion of Results

Table 3 presents the simple differences in means in the probability of paying a bribe and in the amount of bribe paid in 2008 and 2011. Table 4 presents the first set of results on the determinants of the probability of paying a bribe. Column (1) represents a linear probability model, with the differences-in-differences estimator revealing that the tariff change in 2008 is associated with a 90% drop in the probability of paying a bribe. The result is robust to the inclusion of interactions between the treatment variable and the year dummies with the covariates of interest. The second tariff change, which affected a much smaller subset of shipments in our sample is nonetheless associated with a 53% reduction in the probability of paying a bribe. We find no support in the data that agricultural or consumer goods have a higher probability of paying a bribe. We find that pre-inspected goods at origin are 3% less likely of paying a bribe, though this result is unstable across specifications.

Columns (3) and (4) present the results for the triple differences estimation. In column (3) we find that the differences in differences estimate remains negative and significant, and the triple differences estimate reveals that products that went from the highest tariff level at baseline (in 2007) experienced a more significant drop (an additional 2 and 5% in 2008 and 2011, respectively) in the probability of paying a bribe relative to products with a low tariff at baseline, lending further evidence to the fact that tariff levels are an important predictor of the probability of bribe payments.

Table 5 presents the results for the determinants of bribe amounts paid. We find that the point estimates for the differences in differences and the triple differences estimators are less precise but still negative, suggesting that products that changed tariff levels in 2008 experienced a reduction in the amount of bribes paid. In columns (1) and (2) we also find that certain product and shipment characteristics are associated with higher bribes: differentiated products pay on average 31% higher bribes and cargo subject to pre-inspection at origin tend to pay on average 20% lower bribes. These results are not however robust to the inclusion of the interaction terms between the treatment variables, year dummies and important co-variates. In columns (3) and (4) we find that the differences in differences estimate is negative and significant at conventional levels and the triple differences estimate reveals that products with high tariffs at baseline experienced 11% lower bribes in 2008 and 39% lower bribes in 2011, relative to products that remain tariff-free throughout the period under analysis.

In Table 6 we replace our binary treatment dummy with a continuous treatment variable, capturing the percentage point reduction in tariff levels that occurred in 2008.[4] Column (1) reveals that products that registered a higher reduction in tariff rates are associated with a lower probability of paying a bribe than products that experienced no change in tariff levels. This effect is however small in magnitude (0.5%) and is not robust to the inclusion of the full set of interactions (column 2). In Columns (3) and (4) we show that products that registered a higher percentage point reduction in tariff levels are associated with lower bribes relative to products that did not experience a tariff reduction.

V.3 Substitution and Income Effects

We now look at the impact the tariff reduction may have had in displacing corruption into different types of products or different phases of the clearance process.

A closer look at tables 3 through 6 reveals that there are important substitution effects at play. In columns (3) and (4) in Tables 4, 5 and 6, we find that products with high baseline tariffs that remained in the high tariff category experience a statistically significant higher probability of paying a bribe in 2008.

The results displayed in table 3 reveal a similar pattern. While there is a significant downward trend in the probability of bribe payments for all product types (with a more pronounced drop for products that experienced a tariff change), the amount of bribes paid appears to follow a more ambiguous trend. If by 2008, products experiencing a reduction in tariffs saw a statistically significant reduction in the amount of bribe paid, by 2011 this result had dissipated. In fact, average bribe amounts are not significantly different for products experiencing the tariff change, before and after the change takes place. Similarly, products that remained in a low tariff category throughout the period under analysis are also affected by the general reduction in the probability of paying a bribe but the average amount and the variance of bribe payments appears to increase with the tariff change. This result is however not robust across specifications.

We then investigate the relationship between changes in tariff rates and changes in the pattern of bribe recipients and in the reasons for bribe payments. Figure 2 shows a clear substitution effect through which customs officials move from focusing primarily on tariff evasion prior to the tariff reduction, to extracting bribes through other means. The most frequently cited reason for a bribe payment went from tariff evasion in 2007 to selling "speed" in the clearance queue, irregularities with the clearance documentation (real or

[4]The tariff change in 2011 only affected a small subset of products with less significant tariff reductions so we restrict our analysis to changes that occurred in 2008

fictitious), or allowing the cargo to skip the scanning process. A second interesting unintended effect of the tariff change was that it allowed clearing agents to capture some of the surplus from the reduction in tariff rates. Between 2008-2011, we recorded the first set of cases in which the clearing agent would report to their clients that the cargo was retained in customs or at other stages of the clearing process, in order to justify the payment of a fictitious bribe. This "bribe" would be captured by the clearing agent himself. Figure 3 reveals this pattern as we can identify two trends triggered by the change in tariffs: a shift from extracting bribes for tariff evasion to other reasons for bribe extortion, and a second shift from payments to customs officials or other port operators to clearing agents. While our data do not allow us to completely understand how the clearing agents capture part of this surplus, one possible reason is that firms have limited knowledge of the exact nature and distribution of clearing costs, becoming accustomed to fixed "budgets for bribe" (Ahn 2009). This may have generated opportunities for clearing agents to appropriate part of the reduction in the bribes that occurred due to the tariff change, going undetected as long as it remained within the original budget.[5]

Figure 3 suggests an additional effect associated with the tariff reduction. We observe what appears to be an "income" effect driving a shift in the recipients of bribe payments from customs to other officials. Before the tariff change, the overwhelming majority (94%) of bribe payments were made to customs officials. After the tariff change, the percentage of payments made to customs officials declined to 68%, with an increase in payments appropriated by clearing agents to 13%, and of 19% to other border officials. Taken together, these results suggest that while the tariff reduction is associated with an overall decline in the probability of paying a bribe, this decline is partially offset by an increase in the average amount of bribe paid (conditional on a shipment having to pay a bribe), an increase in other forms of corruption both within customs and among other border officials, and finally an increase in the clearing agents' ability to appropriate part of the bribe reduction. This shows a clear shift between collusive forms of corruption in the form of tariff evasion into more coercive and extortionary forms of corruption (Sequeira and Djankov 2011). These results suggest that the tariff reform displaced corruption into new and more distortionary forms of corruption. These results confirm and add to preliminary results on patterns of displacement of corruption in ports found in Yang (2008). Our findings can have important implications for any evaluation of the real trade offs associated with policy reform and corruption and for the design of anti-corruption

[5]In on-going work, we have confirmed very low levels of firm-level awareness of the nature and distribution of actual clearance costs

policies.

VI Robustness Checks

A potential concern with our identification of patterns of bribe payments in years 2007, 2008 and 2011 is that the pattern of bribe payments observed is driven not by the tariff reduction but by the composition of shipments in our random sample of shipments. We test this directly in our data. Table 7 shows the p-values for a test of means for important product and shipment level characteristics. We observe that by and large, we fail to reject the hypothesis of the equality of means across time for important variables like the value and size of the shipment. The comparability of shipments across time reveals however another puzzling result: one may have expected that the change in tariff rates would have induced a change in the composition of imports. Assuming that we are indeed capturing a random sample of shipments in our tracking study, these changes should be reflected in our data. While we are unable to fully explain this result, one possible reason behind it is the poor enforcement of tariffs due to significant tariff evasion even prior to the tariff change. This may be at the root of the apparent low responsiveness of changes in imports to changes in tariff rates.

VII Conclusions

In this paper we investigate how corruption patterns adapt to important policy reforms that alter the extractive capacity of different types of agents involved in bribery deals. We exploit an exogenous variation in tariff levels that took place between 2007-2011 and an unusually rich and original dataset of bribe payments at different borders in a major transport corridor in Southern Africa to identify how bribe patterns vary across tariff levels, across products, across time and across different phases of the process of clearing goods through international borders.

While we find an important overall reduction in the probability of paying bribes after the tariff reduction takes place, we also find that these results are partially offset by two types of substitution effects and two types of direct and indirect income effects. For products that experience the highest drop in tariff levels, the amount of bribes paid conditional on still having to pay a bribe increases to compensate customs agents for the shortfall in bribe revenue. We also find evidence that customs officials move from extracting bribes for tariff evasion prior to the tariff change, to extracting bribes for other reasons such as irregularities with

clearance documentation (real or fictitious), or selling "speed" of clearance. After the tariff change, it is also the case that more bribes begin to be paid to other officials operating along the clearance chain. Secondly, we observe that clearing agents, who possess full information on the bribes requested in each period, try to capture part of the bribes that were previously paid to border officials. Given that firms are likely to be ill-informed about the actual distribution of bribes across the clearing process and are accustomed to working with specific budgets for bribes, clearing agents exploit this asymmetry of information to appropriate part of the former bribes. These represent important direct and indirect income effects driven by the tariff change.

Our results confirm previous findings in the literature on the positive relationship between tariff levels and tariff evasion, but suggest that any reduction in tariffs may not yield the expected reduction in corruption in the clearing process due to important substitution and income effects. We find evidence that the reduction in the probability of paying a bribe is partially offset by an increase in other types of corruption both within the same phase in the clearing process -customs- and across different phases of the clearing process. This also represents a shift from "collusive" forms of corruption in which the shipper and the border official share rents for tariff evasion -a trade cost-decreasing type of corruption-, to a more "coercive" and consequently more distortionary (in the short run) type of corruption. Our findings therefore suggest that corruption is hard to eliminate through policy changes that affect one dimension of the public service, as it can easily get displaced into other stages of the delivery process, or through the public officials' creation of new, even if less efficient, ways of extracting bribes. This has important implications for the design of anti-corruption policies.

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IX Figures

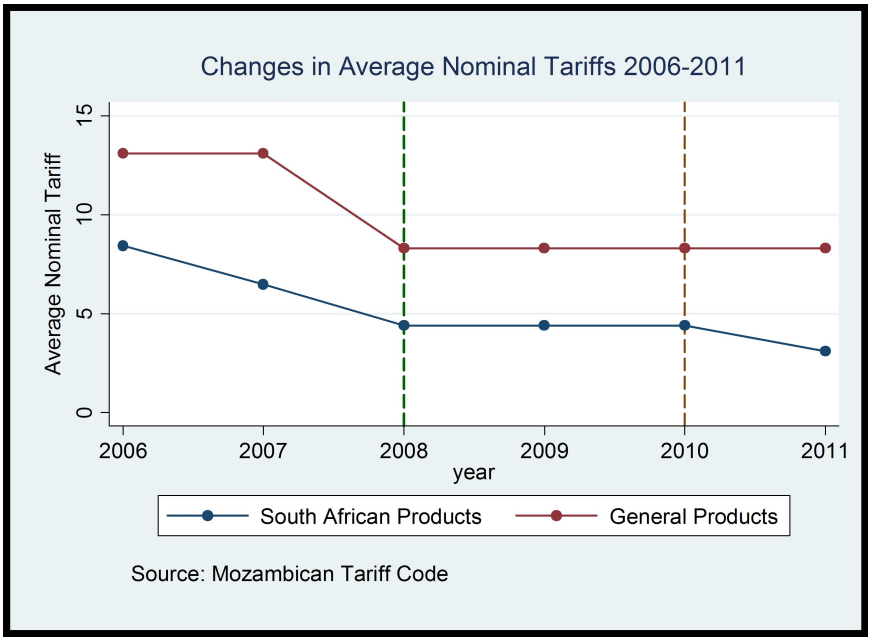

Figure 1: Changes in Nominal Tariffs in 2008 and 2011 for products originating in South Africa and in the Rest of the World.

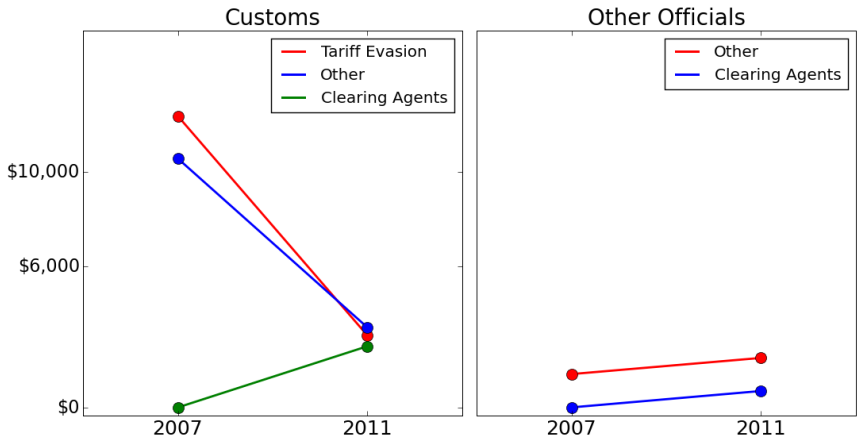

Figure 2: Changes in the frequency and average amount of bribe payments to different types of officials along the clearing process.

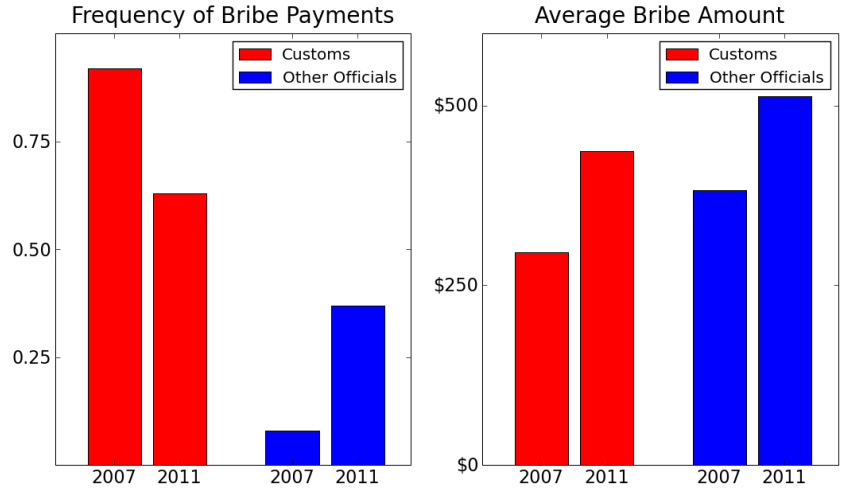

Figure 3: Changes in the reasons for bribe payments across different types of officials involved in the clearing process.

X Tables

Table 1: **Monitoring Experiment**

Differences in Means	**Monitored**	**Not Monitored**	**P-value**
Probability of Paying a Bribe	2%	9%	0
Amount of Bribe Paid (USD)	389	774	0.47

Table 2: **Monitoring Experiment**

	LPM Bribe Paid (1)	LPM Bribe Paid (2)	OLS Bribe Amount (3)	OLS Bribe Amount (4)
Monitored Shipment	-0.07**	-0.14***	-0.34**	-0.75*
	(0.03)	(0.024)	(0.15)	(0.11)
Controls				
Agricultural Product	No	Yes	No	Yes
Value of Shipment	No	Yes	No	Yes
Tonnage of Shipment	No	Yes	No	Yes
Differentiated Product	No	Yes	No	Yes
Temperature Controls	No	Yes	No	Yes
Temperature Controls *Perishable Product	No	Yes	No	Yes
Perishable	No	Yes	No	Yes
Tariff Level	No	Yes	No	Yes
Non Containerized Shipments	No	Yes	No	Yes
Large Client Firm	No	Yes	No	Yes
Consumer Products	No	Yes	No	Yes
Terminal	No	Yes	No	Yes
Clearing Agent	No	Yes	No	Yes
Pre-Inspected at origin	No	Yes	No	Yes
Month Arrival	No	Yes	No	Yes
Day of the week arrival	No	Yes	No	Yes
Observer Code	No	Yes	No	Yes
Observations	1,301	717	1,302	750
F Test	6	17.6	5.14	16.87
Adjusted R2	0.02	0.02	0.02	0.02

[a] Sources: Tracking Study.

[b] NOTES: In columns (1) and (2) the dependent variable equals 1 if a bribe was paid and 0 otherwise, while in columns (3) and (4) the dependent variable corresponds to the log of the amount of bribe paid +1. Temperature Controls include the deviation from average precipitation levels and average temperature levels on each shipment's day of arrival. Differentiated Product corresponds to products without a set international market price as conservatively defined in Rauch (1999). Pre-Inspected at origin corresponds to shipments subjected to Pre-Shipment Inspection. Observer Code corresponds to the code of our observer who shadowed the clearing agent throughout the period of the experiment.Standard errors clustered at the 4 digit harmonization code grouping of each product.

Table 3: **Simple Differences in Means**

Years	2007	2008	Difference	2007	2008 and 2011	Difference
Panel A:						
Probability of Paying Bribe (Pctg)						
All products	53	26	-27***	53	11	-42***
Tariff Change	55	28	-27***	55	11	-44***
No Tariff Change	43	21	-22***	43	9	-34***
Panel B:						
Bribe Amount Paid						
All products	300	176	-124***	300	306	6
	(26)	(12)	(29)	(26)	(63)	(68.4)
Tariff Change	293	179	-113***	293	366	73.33
	(27)	(14)	(30)	(27)	(95)	(98)
No Tariff Change	322	173	-149**	322	198	-124*
	(60)	(23)	(65)	(60)	(22)	(64)
Panel C:						
Probability of Paying a Bribe						
High Tariff to High Tariff	53	29	-24	52	11	-41***
High Tariff to Low Tariff	51	29	-22	50	12	-38***
Low Tariff to Low Tariff	49	19	-30	49	8	-41***
Panel D:						
Bribe Amount Paid						
High Tariff to High Tariff	405.8	172.9	-232.9	406	191.81	-214.02*
	(700.2)	(123)	(158)	(99.02)	(24.39)	(127.5)
High Tariff to Low Tariff	280	173.81	-105.75**	279.6	305.04	-25.46
	(287)	(113.26)	(41.35)	(24.006)	(69.92)	(62.76)
Low Tariff to Low Tariff	269	193.85	-75.15	269.34	449.5	180.2
	(418.7)	(111.4)	(106.02)	(51.54)	(240.12)	(182.08)

[a] Sources: Tracking Study. NOTES: Probability of Paying a Bribe in Panel A is displayed in percentages. We compare the probability of bribe payments and the amount of bribe paid for two types of period: comparing the immediate impact of tariff reductions in 2008 and then the overall effects comparing the baseline year of 2007 to the final year of 2011. Panels C and D display results broken down by the exposure of each product type to the direct reduction in tariff rates: products that remained in the high tariff category throughout the period under analysis, products that went from being in the high tariff category to the low tariff category in 2008 and products that remained in the low tariff categories throughout this period. Results significant at *** 1%, **5% and *1%.

Table 4: **Differences in Differences: Determinants of the Prob. of Paying a Bribe**

Dependent Variable	LPM DID Bribe Paid (1)	LPM DID Bribe Paid (2)	LPM 3DID Bribe Paid (3)	LPM 3DID Bribe Paid (4)
Baseline Tariff	-0.0001	-0.0015	0.0004	0.006
	(0.0006)	(0.0006)	(0.001)	(0.005)
Tariff Change Category in 2008	0.54*	0.33	0.98***	1.07***
	(0.3)	0.38)	(0.04)	(0.15)
Tariff Change Category in 2011	0.04*	0.039	-0.011	-0.025
	(0.02)	(0.26)	(0.06)	(0.05)
Tariff Change Category * Year 2008	-0.9**	-0.95*	-0.4***	-0.39
	(0.44)	(0.55)	(0.11)	(0.34)
Tariff Change Category * Year 2011	-0.51*	-0.54*	-1.02***	-1.02***
	(0.3)	(0.28)	(0.03)	(0.02)
Baseline Tariff * Tariff Change in 2008 * Year 2008			-0.024***	-0.03***
			(0.06)	(0.006)
Baseline Tariff * Tariff Change in 20011 * Year 2011			-0.05***	-0.054***
			(0.002)	(0.0022)
Tariff Change in 2008 * Baseline Tariff			0.0023**	0.022***
			(0.001)	(0.0012)
Tariff Change in 2011 * Baseline Tariff			0.053***	0.053***
			(0.004)	(0.002)
Baseline Tariff * Year 2008			0.02**	0.022***
			(0.006)	(0.005)
Baseline Tariff * Year 2011			-0.003**	-0.004**
			(0.002)	(0.002)
Differentiated Products	0.032	-0.04	0.023	0.04
	(0.019)	(0.077)	(0.019)	(0.03)
Pre-Inspected	-0.03***	-0.07	-0.024*	0.01
	(0.01)	(0.04)	(0.01)	(0.04)
Controls				
Year Dummies	Yes	Yes	Yes	Yes
Terminal	Yes	Yes	Yes	Yes
Clearing Agent	Yes	Yes	Yes	Yes
Temperature Controls	Yes	Yes	Yes	Yes
Precipitation Control	Yes	Yes	Yes	Yes
Pre-Inspected Shipment	Yes	Yes	Yes	Yes
Large Firm	Yes	Yes	Yes	Yes
Perishable Product	Yes	Yes	Yes	Yes
Consumer Product	Yes	Yes	Yes	Yes
Agricultural Product	Yes	Yes	Yes	Yes
Product 4 digit harmonization code	Yes	Yes	Yes	Yes
Tariff Change 2008 *Covariates	No	Yes	No	Yes
Tariff Change 2008 *Covariates*Year 2008	No	Yes	No	Yes
Observations	1,338	1,338	1,338	1,388

[a] Sources: Tracking Study. NOTES: Dependent Variable equals 1 if a bribe was paid and 0 otherwise. LPM stands for Linear Probability Model. Columns (1) and (2) represent the standard differences in differences framework and columns (3) and (4) represent the triple differences, interacting the treatment variables (tariff change) with the tariff level at baseline. Standard errors are correlated at the level of the 4 digit grouping of product harmonization codes. Results significant at *** 1%, **5% and *1%.

Table 5: **Differences in Differences: Determinants of the Amount of Bribe Paid**

Dependent Variable: Amount of Bribe Paid	OLS DID (1)	OLS DID (2)	OLS 3DID (3)	OLS 3DID (4)
Baseline Tariff	0.003	0.0031	0.02*	0.036
	(0.004)	(0.004)	(0.009)	(0.03)
Tariff Change Category in 2008	2.55	1.501	5.31***	5.9***
	(1.9)	(2.43)	(0.23)	(1.06)
Tariff Change Category in 2011	0.27*	0.235	-0.11	-0.17
	(0.15)	(0.17)	(0.32)	(0.24)
Tariff Change Category * Year 2008	-4.34*	-4.8	-1.97***	-2.62
	(2.6)	(3.2)	(0.62)	(1.97)
Tariff Change Category * Year 2011	-2.4	-2.55	-5.6***	-5.6***
	(1.89)	(1.8)	(0.15)	(0.14)
Baseline Tariff * Tariff Change in 2008 * Year 2008			-0.1	-0.11
			(0.07)	(0.07)
Baseline Tariff * Tariff Change in 2011 * Year 2011			-0.33***	-0.33***
			(0.06)	(0.06)
Tariff Change in 2008 * Baseline Tariff			0.01**	0.01*
			(0.006)	(0.007)
Tariff Change in 2011 * Baseline Tariff			0.33***	0.33***
			(0.066)	(0.066)
Baseline Tariff * Year 2008			0.06	0.06
			(0.07)	(0.009)
Baseline Tariff * Year 2011			-0.03***	-0.04***
			(0.009)	(0.009)
Differentiated Products	0.28**	-0.18	0.196	0.35*
	(0.12)	(0.48)	(0.11)	(0.21)
Pre-Inspected	-0.19***	-3.5	-0.127*	0.005
	(0.07)	(0.271)	(0.07)	(0.29)
Controls				
Terminal	Yes	Yes	Yes	Yes
Clearing Agent	Yes	Yes	Yes	Yes
Temperature Controls	Yes	Yes	Yes	Yes
Precipitation Control	Yes	Yes	Yes	Yes
Pre-Inspected Shipment	Yes	Yes	Yes	Yes
Large Firm	Yes	Yes	Yes	Yes
Perishable Product	Yes	Yes	Yes	Yes
Consumer Product	Yes	Yes	Yes	Yes
Agricultural Product	Yes	Yes	Yes	Yes
Product 4 digit harmonization code	Yes	Yes	Yes	Yes
Tariff Change 2008 *Covariates	No	Yes	No	Yes
Tariff Change 2008 *Covariates*Year 2008	No	Yes	No	Yes
Observations	1,332	1,332	1,332	1,332

Sources: Tracking Study. NOTES: Dependent Variables corresponds to the log of the amount of bribe paid. Tariff Change variable captures the percentage point reduction in tariff level experienced by each product. OLS stands for ordinary least squares. Results are robust to the use of other models such as negative binomial and the tobit model. Columns (1) and (2) represent the standard differences in differences framework and columns (3) and (4) represents the triple differences, interacting the treatment variables (tariff change) with the tariff level at baseline. Standard errors are correlated at the level of the 4 digit grouping of product harmonization codes. Results significant at *** 1%, **5% and *1%.

Table 6: **Determinants of Bribe Payments: Continuous Treatment**

Dependent Variable	OLS DID Bribe Paid (1)	OLS DID Bribe Paid (2)	OLS 3DID Bribe Amount (3)	OLS 3DID Bribe Amount (4)
Baseline Tariff	-0.0009	-0.001	-0.0004	0.02
	(0.0008)	(0.0008)	(0.005)	(0.013)
Tariff Change in 2008	0.00016***	0.006	0.008	0.009
	(0.0005)	(0.003)	(0.003)	(0.01)
Tariff Change * Year 2008	-0.005**	0.006	-0.033***	-0.32***
	(0.002)	(0.015)	(0.01)	(0.08)
Baseline Tariff * Tariff Change * Year 2008				-0.0001
				(0.0005)
Tariff Change * Baseline Tariff				0.17***
				(0.06)
Baseline Tariff * Year 2008				-0.024
				(0.01)
Baseline Tariff * Year 2011				0.17***
				(0.06)
Differentiated Products	0.04**	0.05**	0.33**	0.3**
	(0.02)	(0.03)	(0.13)	(0.13)
Pre-Inspected	-0.02*	-0.002*	-0.11	-0.67
	(0.012)	(0.001)	(0.074)	(0.07)
Controls				
Terminal	Yes	Yes	Yes	Yes
Clearing Agent	Yes	Yes	Yes	Yes
Temperature Controls	Yes	Yes	Yes	Yes
Precipitation Control	Yes	Yes	Yes	Yes
Pre-Inspected Shipment	Yes	Yes	Yes	Yes
Large Firm	Yes	Yes	Yes	Yes
Perishable Product	Yes	Yes	Yes	Yes
Consumer Product	Yes	Yes	Yes	Yes
Agricultural Product	Yes	Yes	Yes	Yes
Product 4 digit harmonization code	Yes	Yes	Yes	Yes
Tariff Change 2008 *Covariates	No	Yes	No	Yes
Tariff Change 2008 *Covariates*Year 2008	No	Yes	No	Yes
Observations	1,338	1,338	1,338	1,338

[a] Sources: Tracking Study. NOTES: In columns (1) and (2) dependent variable equals 1 if a bribe was paid and 0 otherwise. In columns (3) and (4) the dependent variable corresponds to the log of the amount of bribe paid. LPM stands for linear probability model and OLS stands for ordinary least squares. Results are robust to the use of other specifications such as logit and probit for regressions in columns (1) and (2), and the negative binomial and the tobit model in regressions (3) and (4). Columns (1) and (2) represent the standard differences in differences framework and columns (3) and (4) represents the triple differences, interacting the treatment variables (tariff change) with the tariff level at baseline. Standard errors are correlated at the level of the 4 digit grouping of product harmonization codes. Results significant at *** 1%, **5% and *1%.