

# Political Connections and Tariff Evasion

## Evidence from Tunisia

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## Abstract

Are politically connected firms more likely to evade taxes? This paper presents evidence suggesting firms owned by President Ben Ali and his family were more prone to evade import tariffs. During Ben Ali's reign, evasion gaps, defined as the difference between the value of exports to Tunisia reported by partner countries and the value of imports reported at Tunisian customs, were correlated with the import share of connected firms. This association was

especially strong for goods subject to high tariffs, and driven by underreporting of unit prices, which diminished after the revolution. Consistent with these product-level patterns, unit prices reported by connected firms were lower than those reported by other firms, and declined faster with tariffs than those of other firms. Moreover, privatization to the Ben Ali family was associated with a reduction in reported unit prices, whereas privatization per se was not.

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**Evidence from Tunisia**

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Are politically connected entrepreneurs more likely to evade tariffs? At issue are not only inequity and fiscal losses, but also inefficiency, since tariff evasion endows perpetrators with a cost advantage over those who are compliant that is not based on performance. The question is especially relevant for developing countries, as they tend to be disproportionately reliant on revenues collected by customs to finance public expenditures (Jean and Mitaritonna 2010),<sup>1</sup> are characterized by a greater prevalence of problematic state-business relationships (Faccio, 2006), and often have weaker tax collection capacity (Slemrod and Yithzaki, 1999).

Using a unique data set in which importing firms owned by former president Ben Ali and his family confiscated in the aftermath of the Jasmin Revolution are identified, this paper examines whether politically connected enterprises were more likely to evade tariffs during Ben Ali's tenure. Their behavior is compared with that of public firms and other private sector firms, which can be categorized into two types, notably "onshore" firms, and so-called "offshore" firms, which are exempted from having to pay tariffs provided they export at least 70% of their output (or sell it to other offshore firms) and consequently have less incentive to evade tariffs.

More specifically, politically connected enterprises are identified in firm-product-source country customs data spanning the universe of import transactions. These are merged with UNCTAD data on HS6 exports to Tunisia by country and year to compute evasion gaps (Fisman and Wei, 2004), defined as the discrepancy between exports to Tunisia reported by partner countries minus imports of the same product from that source country reported in Tunisia. Such evasion gaps are a useful proxy for the amount of imports that are underreported (or misreported) and thus not taxed

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<sup>1</sup> Estimates by Cantens et al. (2012) suggest that in low income countries such as Cameroon customs revenues account for between 30% to 60% of state revenues, and that the importance of customs revenues as a source income declines when countries get richer.

(appropriately) and hence have become a standard indicator of tariff evasion (Fisman et al., 2008; Jean and Maritonna, 2010). If connected firms are more prone to evade tariffs, evasion gaps should increase with the share of imports accounted for by connected firms. In addition, the correlation between the import share of connected firms and evasion gaps should strengthen with the tariff rate, since evasion is more lucrative when taxes are high. Moreover, gaps can be expected to decrease in product-source lines in which connected firms were operating after they lose such connections as a result of being confiscated.

The data also enable us to examine whether the elasticities of connected firms' reported import values, quantities and prices, with respect to tariffs are different from those of non-connected firms, which is our second test for tariff evasion. If Ben Ali firms are more likely to evade tariffs, one would expect their reported imports to decrease disproportionately faster with tariff increases than those of other firms. Comparing the responsiveness of reported unit prices and import quantities across different groups of firms helps assess to what extent evasion occurs through underreporting of prices and mis- or underreporting of quantities. In addition, a difference-in-difference strategy comparing the import declarations of firms privatized to the Ben Ali family with those of firms privatized to non Ben Ali family members is deployed to identify the impact of becoming connected on reported unit prices.

Tunisia, a small open economy at the forefront of the Arab Spring, provides an interesting case study of which firms are most likely to engage in tariff evasion for several reasons. To start, the Ben Ali family had extensive business interests and is documented to have (ab)used its political power for personal gain (Rijkers et al., 2014). Second, Tunisia has been one of the most successful exporters in Northern Africa and is rather reliant on imports, which amount to roughly half of its GDP, with customs revenues accounting for 9% of fiscal revenues. Third and related, its export success is to a

large extent due to tax regulations that stipulate that the so-called offshore firms do not have to pay import duties. As alluded to above, this minimizes their incentives to engage in tariff evasion, rendering such firms a useful comparison group against which to benchmark the behavior of other firms. Fourth, Tunisian customs authorities are considered among the most corrupted of all government institutions by Tunisian citizens and companies (ATCP, 2015, ITCEQ, 2012). While the Tunisian customs code is consistent with best practices defined by the World Customs Organization,<sup>2</sup> its implementation is discretionary (World Bank 2014).<sup>3</sup> The combination of a bewildering complexity of import regimes allowing for suspension of import duties and very weak administrative controls, including a severely defunct IT system, render effective enforcement challenging. Last but not least, Tunisia has great administrative data and authorities willing to share those, enabling us to unambiguously identify politically connected firms as those who were confiscated in the aftermath of the Jasmin Revolution.

By providing evidence suggesting that politically connected firms are more likely to evade tariffs, this paper contributes to and combines different strands of literature. To start, a large literature, pioneered by Bhagwati (1964, 1967) and popularized by Fisman and Wei (2004), has used

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<sup>2</sup> A new customs code compliant with “best practices” was adopted in 2009 just months before the Jasmin revolution.

<sup>3</sup> Like many other countries, Tunisian’ customs maintain a three-track system whereby customs declarations allocated to the ‘green corridor’ are allowed to pass through customs without any inspection, customs declarations allocated to the ‘yellow’ corridor face document inspections and customs declarations in the ‘red’ corridor are subject to physical inspections. Customs officers, however, were reluctant to disclose both which firms were allocated to these various corridors and the criteria used to make such allocations. In all cases, containers have to go through a scanner due to a 100% scanning policy, which means that there is a minimal control for any container. Document checks are carried out systematically. Therefore, any firm is subject to controls and therefore subject to discretion from customs officers.

discrepancies between trade flows reported by trading partners to show how tariff evasion varies with product characteristics, tariff rates (Javorcik and Narcisko, 2008, Fisman and Wei, 2009), enforcement (Mishra et al., 2008), customs organization and country characteristics, such as level of corruption or bureaucracy efficiency (Jean and Mitaritonna, 2010, Carrère and Grigoriou 2015). However, there is still no research that the authors are aware of that examines which type of entrepreneurs are most likely to evade import taxation.<sup>4</sup>

Second, by unveiling an additional mechanism by which firms may benefit from political connections, the paper helps explain why political connections tend to be valued highly (Fisman, 2001, Faccio, 2006, Faccio et al., 2006, Mitten and Johnson, 2003). Though quantifying the costs associated with tariff evasion is challenging, a highly conservative back-of-the-envelope calculation presented in section 5.2 suggests that between 2002 and 2009, underreporting of unit prices alone enabled Ben Ali-owned firms to evade 1.2 billion USD worth of import taxes *more* than other private firms would have; this estimate does not consider other types of tax fraud, such as smuggling or underreporting of quantities. Our findings also resonate with earlier studies on trade-related corruption by Mobarraq and Purbasari (2008) and Khandelwal et al. (2013), which demonstrated that politically connected firms were prone to firm-specific preferential treatment in being granted exclusive and inefficient import licenses.

Third, by showing evidence suggestive of abuse of power by the ruling elite, our results also contribute to the literature on state-business relationships in the Middle East and Northern Africa

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<sup>4</sup>In answering this question, we also contribute to the nascent literature on which firms are most likely to evade taxes (see e.g. Slemrod, 2007, and Slemrod and Yithzaki, 2002, for overviews of the literature).

(Acemoglu et al., 2014, Diwan et al., 2014) and (indirectly) the economics of the Arab Spring (Campante and Chor, 2012, Malik and Awadallah, 2013).

The remainder of this paper is organized as follows. The next section briefly reviews related literature and discusses why firms might differ in their propensity to evade tariffs. Testing strategies are presented in section two. Data and descriptive statistics are presented in section three. Product-level regressions are presented in section four, while firm-level regressions are presented in section five. Section six concludes.

## **1 Why Do Firms Differ in Their Propensity to Evade Tariffs?**

Models of tax compliance predict tax evasion, the circumvention of taxes through illegal practices, to increase with the tax rate, the probability of detection, and to decrease with penalties for evasion, risk aversion, and opportunities to avoid taxes (through legal means) (see Alm 1999, Andreoni et al., 1998, Slemrod, 2007, and Slemrod and Yithzaki, 2002, for reviews of the literature). These factors are likely to vary across different types of firms.

Starting with punishment, detection and risk-aversion, connected firms faced both a lower risk of being caught and lower penalties conditional on being caught and might have been less risk averse as connected entrepreneurs were on average wealthier than non-connected ones. Customs officials who had been working in the risk management unit during the Ben Ali era told us that fraudulent behavior by Ben Ali firms was less likely to be reported in part because of career concerns and fear of retaliation from the family. Ben Ali entrepreneurs also appear to have been very well informed of customs risk management practices and control criteria. According to customs officials we



interviewed, they “continuously adapted their tactics in response to newly introduced [anti-corruption] measures”.

Connected firms may also have enjoyed greater opportunities for tax avoidance (through legal means); anecdotal evidence suggests connected firms may have had privileged access to duty exempted import regimes.<sup>5</sup> Tax exemptions to promote exports were also very important for offshore firms; since they do not have to pay import tariffs for goods used to manufacture exports (or sold to other offshore firms), their incentives to evade are limited.

State-owned firms might have had weaker incentives to evade tariffs because they have softer budget constraints, may not be purely profit-oriented, and because the compensation of public sector firms does not co-vary with firm profits to the same extent as is the case in private sector firms (Brockmeyer et al., 2015).<sup>6</sup> Moreover, financial reporting is typically weak in Tunisian SOEs and over-invoicing imports is often used to reduce possible taxable profits which can in turn help generate extra funding for the SOE (Banque Mondiale, 2014). At the same time, the relative inefficiency of SOEs may incentivize evasion to stay cost-competitive. In sum, managers of public sector firms face mixed incentives.

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<sup>5</sup>For example, the customs regime “vente à quai”, was predominantly used by ENNAKL, a firm owned by Ben Ali’s son-in-law Sakhr El Matri that allowed firms to import goods destined for sale on the domestic market without having to pay import taxes. Unfortunately, analyzing the (ab)use of such duty suspension regimes is beyond the scope of this paper due to data limitations. Note, however, that if connected firms used duty exempted import regimes more intensively, detecting evasion would be more difficult.

<sup>6</sup> Evidence from the U.S. suggests private firms have higher proposed tax deficiency ratios than public firms (see Slemrod, 2007 and the references therein).

Since connected entrepreneurs arguably have some sway over policy making, one may wonder why they do not simply exempt themselves from having to pay tariffs at all, or use their political clout to remove (or at least lower) tariffs. In practice, Ben Ali firms did not on average face lower tariffs as is demonstrated in section 3. One possible explanation is that they benefitted to some extent from tariffs, as these reduce foreign competition (Grossman and Helpman, 1992, Goldberg and Maggi, 1997, Gawande and Bandyopadhyay, 2012). This explanation is consistent with evidence suggesting that sectors in which connected firms were active were more likely to be subjected to new restrictions on foreign investment (Rijkers et al., 2014), which enhanced the market power of connected firms. Moreover, evasion is all the more advantageous when competitors are forced to pay higher taxes. Reducing tariffs would not only help connected firms, but also their competitors. Another possible explanation is that the scope for influencing tariff setting may have been limited by Tunisia's WTO membership and international trade agreements, which predated the aggressive expansion of the Ben Ali business empire after the turn of the millennium.

In short, connected entrepreneurs may be more likely to evade tariffs because they face a lower risk of being caught, lower penalties conditional on being caught, and because they might be less risk averse. At the same time, they might also be more successful at lobbying for tax breaks, which would diminish their incentives to evade tariffs. Offshore firms are able to avoid taxes, and thus have limited incentives for evasion, while public sector firms face mixed incentives.

## **2 Econometric Strategy**

Two complementary strategies are deployed to test whether connected firms are more likely to evade taxes. The first, product-level, approach relates trade evasion gaps to the relative importance of Ben Ali owned importers and examines how such gaps changed in the aftermath of the Jasmin Revolution.

The second, firm-level, approach assesses whether the value, quantity and price of connected firms' imports decline more rapidly with tariffs than those of non-connected firms. A difference-in-difference strategy comparing privatizations to the Ben Ali family with other privatizations is deployed to isolate the impact of becoming connected on reported unit prices.

### ***2.1 Do Evasion Gaps Increase with the Presence of Connected Firms?***

If imports into Tunisia are reported correctly, then they must be close to reported exports to Tunisia. Since exports are typically reported as Free on Board<sup>7</sup> (FOB), i.e. excluding transport and insurance costs, while recorded imports are often calculated in terms of Cost Insurance Freight<sup>8</sup> (CIF), small discrepancies reflecting transportation and insurance costs are expected.<sup>9</sup> Yet, it is not clear why such discrepancies should be systematically correlated with tariffs once product and destination characteristics are controlled for and tax compliance is perfect. By contrast, a correlation between tariffs and trade gaps, defined here as the difference between exports to Tunisia reported by source countries and imports reported into Tunisia at the HS6-country-year level, is suggestive of tariff evasion. If Ben Ali firms are more likely to evade tariffs than other firms, then the evasion gap should be higher when Ben Ali firms are present, especially for products subject to high tariffs. To assess

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<sup>7</sup> The seller loads the goods on board the ship nominated by the buyer. The seller must clear the goods for export.

<sup>8</sup> The seller must pay the costs and freight including insurance to bring the goods to the port of destination.

<sup>9</sup> Such discrepancies are typically negative (meaning reported imports in Tunisia are higher than exports reported by partners) and can be amplified by classification errors and/or exchange rate fluctuations. Additional discrepancies may arise because different countries use different accounting systems.

whether trade gaps vary with the prevalence of Ben Ali importers in a particular product-source line, we estimate the following specification:

$$\begin{aligned}
Trade\ Gap_{pst} &= \log(E_{pst}) - \log(I_{pst}) & (1) \\
&= \beta_T \text{Log}(\text{Tariff}_{pst} + 1) + \beta_{BA} \text{Ben Ali}_{pst} + \beta_O \text{Offshore}_{pst} + \beta_P \text{Public}_{pst} \\
&+ \beta_{TBA} \text{Ben Ali}_{pst} * \text{Log}(\text{Tariff}_{pst} + 1) + \beta_{TP} \text{Public}_{pst} * \text{Log}(\text{Tariff}_{pst} + 1) \\
&+ \beta_{TO} \text{Offshore}_{pst} * \text{Log}(\text{Tariff}_{pst} + 1) + \beta_N \log(\text{NTB}_{pt} + 1) + u_{ps} + \tau_t + \varepsilon_{pst}
\end{aligned}$$

Where  $E_{pst}$  stands for exports to Tunisia of product  $p$  reported by partner country  $s$  at time  $t$  and  $I_{pst}$  stands for imports of product  $p$  from country  $s$  reported by Tunisian customs at time  $t$ ,  $u_{ps}$  is a vector of source-country-product dummies,  $\tau_t$ , a vector of time dummies, and  $\text{Ben Ali}_{pst}$  is a proxy for the share of imports of product  $p$  from country  $s$  in year  $t$  imported by politically connected firms. Similarly,  $\text{Public}_{pst}$  is a proxy for the import share of public enterprises, and  $\text{Offshore}_{pst}$  a proxy for the import share of offshore firms. Note that, implicitly, the omitted category here is onshore private firms. If Ben Ali firms are more prone to tariff evasion especially for products that are subject to high tariffs then  $\beta_{TBA} > 0$ . Similarly, one might hypothesize public enterprises and offshore firms to be less likely to evade tariffs in which case;  $\beta_{TO} < 0$ , and  $\beta_{TP} < 0$ . To examine whether potential evasion is due to under-reporting of prices or mis- and/or under-reporting of quantities, the same regression is estimated using evasion quantity gaps and evasion unit price gaps as dependent variables.

We consider four different proxies for the import shares of different types of firms, notably the aggregate share of the value of all reported imports in a given HS6-country-year cell, the aggregate share of the total reported quantity imported in that cell, and the share of all firms that report importing product  $p$  from country  $s$  at time  $t$ . Neither of these proxies is ideal; the latter implicitly

assumes homogeneity across importers within a HS6-country pair. The first two measures arguably better account for the relative size of different types of firms, yet they may themselves be affected by differential underreporting and/or misclassification. Indeed a crucial problem with this identification strategy is that underreporting or even non-reporting of imports can be very difficult to detect. In the extreme case in which Ben Ali firms imported goods but simply did not report them at all, they would not appear in the data altogether. To remedy this problem, we also use as a proxy the *predicted* import share of the different types of firms, constructed using a combination of tax and firm-census data and an input-output table, that does not rely on reported imports, but rather on production data (see the Appendix for details on how this proxy was constructed).

One potential limitation of this strategy is that evasion gaps may be misattributed to the Ben Ali family when in fact their competitors are the ones who are evading tariffs. To address this limitation, we not only resort to firm-level analysis, but also exploit the fact that the Jasmin Revolution was associated with a loss of connections for the confiscated firms. While we do not have firm-level or tariff data post 2009, we fix the relative importance of the different categories of firms at their 2009 levels and estimate a difference-in-difference variant of equation (1), notably;

$$\begin{aligned}
Trade\ Gap_{pst} = & \beta_T Log(Tariff_{pst} + 1) + \beta_{PT} Post_t Log(Tariff_{ps09} + 1) + \beta_{BA} Ben\ Ali_{pst} + \beta_{PBA} Post_t Ben\ Ali_{ps09} \quad (2) \\
& + \beta_O Offshore_{pst} + \beta_{PO} Post_t Offshore_{ps09} + \beta_P Public_{pst} + Post_t \beta_P Public_{ps09} \\
& + \beta_{TBA} Ben\ Ali_{pst} Log(Tariff_{pst} + 1) + \beta_{PTBA} Post_t Ben\ Ali_{ps09} Log(Tariff_{ps09} + 1) \\
& + \beta_{TP} Public_{pst} Log(Tariff_{pst} + 1) + \beta_{PTP} Post_t Public_{ps09} Log(Tariff_{ps09} + 1) \\
& + \beta_{TO} Offshore_{ps09} Log(Tariff_{pst} + 1) + \beta_{PTO} Post_t Offshore_{ps09} Log(Tariff_{ps09} + 1) \\
& + \beta_N \log(NTB_{pt} + 1) + \beta_{PN} Post_t \log(NTB_{p10} + 1) + u_{ps} + \tau_t + \varepsilon_{pst}
\end{aligned}$$

Since the last year for which NTB data are available is 2010, we use the 2010 value also for 2011, 2012 and 2013. If connected firms were more likely to engage in tariff evasion, we would expect this effect to diminish after the Jasmin Revolution, especially in product lines subject to high tariffs, where evasion is expected to be greatest. That is, we would expect  $\beta_{PTBA} < 0$ .

## ***2.2 Do connected firms report lower import values, quantities and prices (when tariffs are higher)?***

If Ben Ali firms are more likely to evade tariffs than non-connected firms, their reported imports can be expected to decline more strongly with tariffs than those of non-connected firms. As a complementary testing strategy, we therefore examine whether Ben Ali firms' imports are differentially responsive to tariffs by estimating a simple import demand function at the product-source country level:

$$\begin{aligned} \ln I_{ijpst} = & \beta_Y \log Y_{it} + \beta_L \log L_{it} + \beta_A \log age_{it} + \beta_{BA} Ben\ Ali_i + \beta_O Offshore_i + \beta_P Public_i + & (3) \\ & \beta_T \log(Tariff_{pst} + 1) + \beta_{TBA} Ben\ Ali_{pst} * \log(Tariff_{pst} + 1) + \beta_{TP} Public_{pst} * \\ & \log(Tariff_{pst} + 1) + \beta_{TO} Offshore_{pst} * \log(Tariff_{pst} + 1) + \beta_N \log(NTB_{pt} + 1) + \alpha_j + \\ & u_{ps} + \tau_t + \varepsilon_{pst} \end{aligned}$$

Where  $I_{ijpst}$  are imports by firm  $i$  operating in sector  $j$  of product  $p$  from country  $s$  at time  $t$ ,  $Y_{it}$  is the log of firm  $i$ 's output in year  $t$ ,  $L_{it}$  is the amount of workers employed by firm  $i$  at time  $t$ , and  $\alpha_j$  is a vector of 5-digit activity dummies (Ben Ali importers are active in 70 distinct 5-digit sectors)  $u_{ps}$  is a vector of product-source dummies. Controlling for output, employment, firm age, and detailed activity helps control for size heterogeneity and differences in technology across different types of importers. In addition, inclusion of product-source dummies mitigates potential bias associated with sorting into importing particular products from particular countries. Section 5.1 also presents specifications in

which industry-product-source-year dummies are included (in which case tariffs and non-tariff measures obviously drop out) to control for industry-product-source specific shocks. Of focal interest is the coefficient  $\beta_{TBA}$ ; if Ben Ali firms are more likely to underreport or misclassify imports, we would expect a negative coefficient. These regressions are estimated using import values, quantities and prices as dependent variables.

The identifying assumption underpinning this strategy is that once their output, labor usage, age and sector are accounted for, there is no reason why Ben Ali firms would import less of goods that are subject to higher tariffs than other firms importing the same product from the same source country in the same year would other than their proclivity to evade taxes.<sup>10</sup> This assumption might be flawed, for instance, if Ben Ali firms are better negotiators and more successful at bargaining for lower prices for products subject to high tariffs. Alternatively, if it were easier for Ben Ali firms to substitute away from using high-tariff imports (perhaps because they are more likely to obtain import licenses) than for other firms, then we might misinterpret a negative coefficient  $\beta_T$  as evidence for tariff evasion. The strategy obviously also does not detect pure smuggling, though it helps detect difference due to misclassification and underinvoicing of imports conditional on reporting.

Another potential limitation is that political connections may be endogenous; the Ben Ali family may have bought or set up firms that were particularly cost efficient and/or had a comparative advantage in navigating the complex Tunisian bureaucracy. To examine this issue, we exploit the fact that five of the connected firms were privatized into the Ben Ali family, rendering it feasible to compare their pre- and post-privatization customs declarations for the same firm by source-country.

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<sup>10</sup> If for some other reason than tariff evasion Ben Ali firms import relatively more goods subject to high-tariffs, the coefficient estimates on the tariff will be spuriously attributed to evasion.

By comparing the evolution of the unit prices of these firms with those of firms privatized to non Ben Ali family members, we attempt to isolate the impact of becoming connected from the impact of changing public to private ownership. Formally, the following difference-in-difference strategy is adopted;

$$\log P_{ipst} = \beta_{Priv} PostPrivatization_{it} + \beta_{BAPriv} PostBen AliPrivatization_{it} + u_{ips} + \varepsilon_{ipst} \quad (4)$$

Where  $P_{ipst}$  is the unit prices reported by firm  $I$  importing product  $p$  from source country  $s$  at time  $t$ ,  $u_{ips}$  is a firm-product-source country fixed effect, and  $PostPrivatization_{it}$  and  $PostBen AliPrivatization_{it}$  are dummy variables that take the value 1 after a firms has been privatized, and privatized to the Ben Ali family respectively, and zero otherwise. Identification is thus based on comparing the unit prices of the same product imported from the same source country by the same firm before and after becoming privately owned. If Ben Ali firms are more likely to underreport, then one would expect  $\beta_{BAPriv} < 0$ . The sample of competitors is confined to firms operating in the same 5-digit industries as (to be) privatized firms that report importing the same products from the same origin in the same years as (to be) privatized firms in at least two different calendar years.

### 3 Data and Descriptive Statistics

#### 3.1 Data

In the aftermath of the Tunisian revolution, assets of the Ben Ali clan were confiscated. The confiscation process, which is still ongoing, affects 114 individuals, including Ben Ali himself, his relatives and his in-laws, and concerns the period from 1987 until the outbreak of the revolution.



We obtained from the Tunisian authorities a list of 662 firms that were owned by the Ben Ali clan and confiscated in the aftermath of the revolution (before December 2014), and were able to identify 206 of these firms as importers by merging the business register, the Repertoire National des Entreprises (RNE), with annual firm-HS6 product-origin data on import transactions for the period 2000-2009 from Tunisian customs. The RNE contains information on the age, sector, and employment of all registered non-agricultural firms operating in Tunisia, including for firms not employing any salaried workers, i.e. the self-employed (see Rijkers et al., 2014). Moreover, it has information on firms' tax status, and whether or not firms are publicly or privately owned. These data are complemented with information on output declared to the Tunisian tax authorities from the Tunisian Ministry of Finance.

We thus do not identify all Ben Ali owned importers, yet do identify the vast majority and, moreover, our sample of connected firms is most likely skewed towards the largest and economically most relevant firms since these are easier to identify (and hence also easier to confiscate).

In order to calculate evasion gaps and assess how they relate to tariffs, the Tunisian HS6-product-origin import data are merged with bilateral tariff data by product from WITS, which is available for 2002-2009 though missing for 2007 and 2009 for which we use instead tariff data from 2006 and 2008 respectively; data on non-tariff measures by product available for the period from 2000 to 2010, and information on imports and exports to Tunisia by HS6 product and year from COMTRADE for the period from 2002 to 2013. To ensure our results reflect systematic mismatches, rather than erratically reported incidental transactions, the sample is confined to (i) products which account for more than 0.01 percentage points of cumulative total exports to Tunisia reported by partner or more than 0.01 percentage points of cumulative imports reported in Tunisia over this

period.<sup>11</sup> In addition, (ii) we only focus on the top 15 source countries in terms of total import value reported in Tunisia or total export value declared in source countries<sup>12</sup> and (iii) HS6-source country-year combinations for which both reported imports in Tunisia and reported exports by partner countries are positive.<sup>13</sup> The resulting sample comprises 1,386 products and 16 countries,<sup>14</sup> which cover 69.75% of all exports to and 61.03% of all imports declared in Tunisia. We also add product-level information on non-tariff measures from the World Bank (Malouche et al., 2013).

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<sup>11</sup>This reduces the sample from 5449 to 1493 products which together account for 91.05% of exports to Tunisia declared by partners and for 92.05% of imports declared in Tunisia.

<sup>12</sup> These countries account for 84.26% of import value declared in Tunisia over the period and for 78.92% of all exports to Tunisia reported by partners. Focusing only on products which account for more than 0.01 percentage points of cumulative imports reported in Tunisia or 0.01 percentage point of cumulative exports to Tunisia reduces these numbers to respectively 76.97% and 73.32%,

<sup>13</sup>Such source-product combinations account for 81.44% of all exports to Tunisia reported by partners and 73.65% of imports reported in Tunisia. We also examined whether the likelihood of imports being “orphaned”, i.e. existing in Tunisian customs declarations without having a corresponding matching declaration in the alleged source country, was related to the importance of Ben Ali firms but could not reject the null hypothesis that this was not the case. Results are omitted to conserve space but available upon request.

<sup>14</sup> The countries are Algeria, Argentina, China, France, Germany, Italy, Japan, Libya, the Netherlands, the Russian Federation, Spain, Turkey, the United States of America, Ukraine, and the United Kingdom. Note that we have 16 rather than 15 countries because we are including countries that in either the top 15 source countries either based on imports declared in Tunisia or based on exports to Tunisia reported partner countries. While the ranking of different source countries using these different criteria usually line up well, there are a few exceptions where this is not the case. Notably, Argentina is ranked as the 15th largest source country based on Tunisian import data, but the 16th largest source country based on export data reported by partners. By contrast, Japan is considered the 15th largest source country based on import data reported in Tunisia, but the 21st largest importer based on data reported by partners.

### *3.2 Descriptive Statistics*

Table 1 presents descriptive statistics for different types of firms. The 206 connected importing firms are on average larger and more diversified than other private firms; while they comprise only 0.7% of all importing firms they account for 2.3% of all imports over the period considered. Even more striking, 124 public firms (0.44% of all firms in our sample) together account for more than a quarter of all import value over the period. By contrast, private “onshore” importers, which represent nearly three-quarters of all importing firms, tend to be the smallest and the least diversified, accounting for 38% of reported exports. “Offshore” importers which specialize in exports are comparatively large. Note also that connected firms do not, on average, face lower tariffs or fewer non-tariff measures.

Table 2 presents descriptive statistics on average evasion gaps at the source-country-year level for the entire sample and by dominant importer type, by tariff level. It discriminates between respectively Ben Ali, offshore, onshore, and public sector dominated products depending on which type of firms is the dominant importer based on aggregate import value; i.e. goods for which Ben Ali (public/onshore/offshore) firms account for more than 50% of the value of all reported imports from a given country in a given year are classified as Ben Ali (public/onshore/offshore) dominated. Goods for which there is not a single dominant importer are classified into a residual “mixed” category.

Average log evasion gaps in terms of import value are very small. The value of imports recorded in Tunisia is on average 0.1 percentage points higher than the export value reported in partner countries. Average evasion gaps for goods subject to high tariffs, i.e. subject to a tariff rate of at least 36 percentage points, are positive and approximately 9.9 percentage points. By contrast, gaps for goods subject to low tariffs are minus 10.4 percentage points. Thus, goods subject to higher tariffs

seem more prone to tax evasion, and such evasion is likely taking place through misclassification of goods.

More striking are the differences across dominant importers. Log evasion gaps for goods for products for which onshore firms are the dominant importer are -0.04 on average, but 0.09 for goods subject to high tariffs. Log evasion gaps for goods for which offshore firms are the dominant importer are around 0.07 and do not seem to vary much with tariffs. By contrast, log gaps for Ben Ali dominated products are on average approximately 0.36 and a striking 0.80 for goods subject to high tariffs. Gaps are consistently negative for goods for which public firms are the most prominent importers, which is consistent with over-invoicing of imports. Thus, *prima facie*, the results are suggestive of evasion of tariffs by politically connected firms, as well as over-reporting of imports by public firms.

Average log evasion gaps in terms of quantities and prices, presented in panels B and C respectively, are also small on average, notably 0.02. Quantity gaps are on average somewhat higher for goods subject to high tariffs (0.08) and negative for goods subject to low tariffs (-0.11) which hints at misclassification. The difference in average evasion price gaps between goods subject to low and high tariffs is very small. The standard deviation of price gaps is much lower than that of quantity gaps.

Evasion strategies seem to vary by firm type; while all firm types appear to misclassify goods to some extent (as is evidenced by the fact that across the different dominant importer types evasion gaps are consistently higher for goods subject to high tariffs than for goods subject to low tariffs),

price under-reporting is most egregious in Ben Ali dominated product lines subject to high tariffs, for which gaps are as high as 0.47.<sup>15</sup>

Can we detect differences between firms importing the same product from the same country in the same year that are operating in the same 5-digit industry? Table 3 present information on average firm-level import values, quantities and unit prices, normalized by the product-source-industry-year average (which is normalized to be equal to 1), and documents descriptive statistics consistent with the product-level patterns; the declared value of Ben Ali firms' imports exceeds that of the average firm by 18%, and their declared import quantities are 21% higher than the average. Yet, their reported unit prices are on average 4.8% lower than those reported by a representative firm. For goods subject to low tariffs, Ben Ali firms' import prices are on a par with those of other firms, whereas for goods subject to high tariffs, their reported prices are 8.1% lower than the average. Onshore firms on average report lower import values and quantities, but their reported prices are very close to average prices. Public firms pay unit prices which are on average 7.4% higher than other firms that simultaneously import the same HS6 product from the same country.

To sum up, exploratory descriptive statistics are indicative of considerable tariff evasion. They also suggest that connected firms are more likely to evade tariffs than other firms, and that they were more likely to use undervaluation of prices as an evasion strategy than other firms. By contrast, under-reporting and/or misclassification of import quantities seems to have been an evasion strategy that all

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<sup>15</sup> Quantity gaps are also high for these product lines, yet the highest average quantity gaps are observed for goods for which public firms are the dominant importers which are subject to high tariffs. By contrast, price gaps for goods predominantly imported by public firms are on average negative (irrespective of the tariff); the over-reporting of import values for products predominantly imported by SOEs is thus driven by over-reporting of prices, rather than over-reporting of quantities (and all the more remarkable given the existence of non-trivial average quantity gaps for such products!).

types of firms engaged in to some extent. The next sections test these hypotheses more rigorously by estimating the models discussed in section 2.

## 4 Results: Evasion Gaps

### *4.1 Baseline Results*

Table 4 examines the determinants of log evasion gaps, using two different models; a simplistic model (presented in columns 1-3) in which the evasion gap is modeled to be a function of the tariff rate, and the share of imports accounted for by, respectively, Ben Ali firms, offshore firms, and public enterprises, with onshore firms being the reference group. The second, and preferred, model (referred to as the “interacted” model, presented in columns 4-6) adds interaction terms between the tariff and the value share of Ben Ali importers, offshore importers, and public importers. The coefficient on the tariff can thus (loosely)<sup>16</sup> be interpreted as providing a crude approximation to the evasion elasticity of onshore firms. Standard errors are clustered at the product level. Progressively more elaborate sets of dummies are added when moving from the left side of the table to the right; columns 1 and 4 include country-year effects, columns 2 and 5 add product fixed effects, while columns 3 and 6 control for both country-year and country-product fixed effects.

The results presented in column 1 are consistent with substantial tariff evasion; the tariff rate is a strongly significant predictor of the evasion gap, and the estimated evasion elasticity is 0.058. Once product and country-product dummies are included (columns 2 and 3) the coefficient on the tariffs drops and loses statistical significance, which is presumably at least in part due to the fact that tariffs

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<sup>16</sup> The approximation is crude because the value shares used to proxy the importance of different types of firms are themselves endogenous to evasion.

do not vary dramatically across countries and over time and that out of necessity we had to assume that they were equal to tariffs in the preceding years for two years for which tariff data were missing altogether (see the Appendix). Our ability to nonetheless identify significant interactions between the tariff rate and the import shares accounted for by different firms (columns 4-6) is due to variability in these import shares (rather than the tariffs themselves) over time.

Turning to the main result, evasion gaps are strongly positively correlated with the share of import value accounted for Ben Ali firms in the simple specification, even when product fixed effects are included (column 2). Moreover, the interaction between the Ben Ali proxy and the tariff measure is consistently positive and significant in the preferred interactive specifications (columns 5-6), consistent with the hypothesis that connected firms are more likely to evade tariffs.

By contrast, offshore firms seem less likely to engage in tariff evasion; once product and product-source dummies are conditioned on the coefficient on offshore importers is negative and statistically significant in the simple specification and the interaction between the tariff and the import share of offshore firms is significantly negative in the interacted specification. Evasion gaps are also significantly negatively correlated with the share of imports accounted for by public firms in the simple specification without interaction terms, pointing towards possible overinvoicing of imports by such firms.

To assess whether the documented evasions gaps are due to (i) underreporting of misclassification of import quantities or (ii) underreporting of prices, Table 5 presents estimates of the same regressions using as dependent variable log evasion gaps in weights (columns 1-4) and unit prices (columns 5-8). It replicates both the models that only condition on country-year dummies (presented in columns 1, 3, 5 and 7), as well as the models that condition on country-year as well as country-product dummies (presented in columns 2, 4, 6 and 8).

The results presented in column 1 demonstrate that quantity gaps significantly increase with tariffs, with a 10% increase in tariffs being associated with an increase in evasion gaps of approximately 0.56 percentage points. Once product-country dummies are introduced (column 2), the coefficient on the tariff drops and becomes statistically insignificant. Different types of firms do not appear to differ substantially in their propensity to underreport quantities, however, as the coefficients on the import shares of Ben Ali, offshore and public firms, and their interactions with the tariff level are not statistically significant. Thus, the hypothesis that different types of firms misreport quantities to the same extent is not rejected.

By contrast, unit price discrepancies are not significantly correlated with the tariff rate, but vary strongly with the import shares of different types of importers. They are strongly and significantly increasing with the share of Ben Ali firms in the simple specification. Moreover, the interaction between the share of imports accounted for by Ben Ali firms and the tariff is consistently statistically significant in our preferred specification, which is consistent with such firms being more likely to underreport prices. For offshore firms, the opposite pattern is observed; gaps are negatively correlated with the share of imports claimed by offshore firms in the simple specification, and with the interaction between the offshore share and the tariff in the interacted specification. Put differently, such firms appear less likely to engage in price underreporting. Note also that unit price gaps are strongly decreasing with the share of imports claimed by public firms.

In sum, the results are consistent with the hypothesis that politically connected firms are more likely to evade tariffs than other firms, and suggest that underreporting of unit prices is the main driver of the association between evasion value gaps and Ben Ali presence. By contrast, such underreporting is significantly less prevalent where offshore firms account for a larger share of import value, especially when tariffs are high. Public firms seem to over-report imports. The results also suggest that



misreporting of import quantities was an important evasion mechanism overall, even though the null hypothesis that such misreporting did not vary across firms is not rejected (perhaps in part because the variance in quantity gaps is larger than the variance in unit price gaps).

#### ***4.2 Robustness Tests***

Robustness checks using alternative proxies for the import share of Ben Ali firms and alternative samples are presented in Table 6. Table 7 presents specifications that allow for a more flexible functional form. Starting with the former, column 1 in Table 6 presents results using the aggregate quantity share of imports by firm type, while column 2 presents results using the share of all importing firms of a particular type, presented in column 2. These alternative proxies for the import share of different types of firms yield qualitatively very similar results; evasion gaps are consistently increasing with the interaction between the tariff and the share of Ben Ali firms, though this effect is no longer statistically significant if the share of firms is used (see column 2).<sup>17</sup> In addition, coefficient estimates obtained using these two proxies are fairly similar to results obtained using the value share of imports.

Columns 3 and 4 present results using *predicted* import shares; these predicted import shares are not based on recorded imports but instead on domestic production data and thus help pick up gaps due to smuggling and non-reporting. Column 3 replicates the simple specification and unveils a strong and statistically significant association between predicted imports by Ben Ali firms and evasion gaps.

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<sup>17</sup> If we not control for country-product dummies we do retrieve a significant effect; results are available upon request but not presented to conserve space

In the interacted specification presented in column 4 the Ben Ali terms are not significant, but have the expected sign; gaps are increasing with Ben Ali presence.

Second, one may be concerned that our results are driven by limiting the sample to Tunisia's main trade partners and products, which account for a non-trivial share of imports. Column 5 presents results for all product and all countries, without controlling for country-product dummies.<sup>18</sup> The interaction between the share of imports accounted for by Ben Ali firms and the tariff is again significantly positive. In short, sample selection bias does not drive the results.

Third, to ensure the results are not driven by the (lack of) quality of customs records of and/or corruption in partner countries the sample is restricted to imports from Germany, the Netherlands, and Belgium, relatively non-corrupt Northern European countries with high statistical capacity in column 6. A very similar qualitative pattern of results obtains; evasion gaps are increasing with the interaction between the tariff and the Ben Ali share.

Fourth, to assess the possibility that outliers are driving the results, column 8 replicates our main specification excluding the top and bottom 10% highest evasion gaps by dominant importer. While the estimated coefficient estimate on the interaction between the Ben Ali share and the tariffs drops considerably, it remains statistically significant at the 10% level. Thus, the results do not appear driven by outliers.

Fifth, Table 7 presents specifications that allow for a more flexible functional form using as dependent variable respectively the log value gap (columns 1 and 2), the log quantity gap (columns 3 and 4) and the log price gap (columns 5 and 6). Instead of using a continuous tariff measure, we discretize tariffs into three categories – notably up until 20, equal to or greater than 20 but smaller

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<sup>18</sup> Models including country-product dummies would not converge given limited computing capacity at the INS.

then 40, and equal to or greater than 40 - and include dummies for each tranche. These dummies are then interacted with the relative importance of different groups of firms. We estimate models both with and without these interaction terms.

Starting with the simple specifications, evasion gaps in terms of values and quantities are positive and significantly higher for goods subject to the highest tariffs (i.e. where the tariff is at least 40) than for goods subject to low tariffs which constitute the reference category. Gaps for goods subject to tariffs falling into the medium band are not significantly higher than those for goods falling in the lowest band. For price gaps, no significant differences in evasion gaps across tariff categories are detected. Value and unit price gaps are significantly increasing with the presence of Ben Ali firms, and significantly decreasing with the presence of publicly owned firms. Unit price gaps also decrease with the share of imports accounted for by offshore firms. Thus, the relationship between the tariff rate and evasion is non-linear, with evasion being concentrated in goods subject to the highest tariffs.

Interacting the tariff band dummies with the shares of imports accounted for by different firms unveils that evasion is particularly high for products subject to high tariffs in which Ben Ali importers are important. For value and price gaps, Ben Ali presence is significantly correlated with evasion gaps for goods subject to tariffs of at least 40%, but not for goods subject to lower tariffs. For quantity gaps, the share of imports accounted for by Ben Ali firms is not significantly correlated with evasion gaps in any tariff bracket.<sup>19</sup>

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<sup>19</sup>These results are qualitatively robust to including product and country-product dummies. We also experimented with more refined tariff categories but the qualitative pattern of results, with evasion being highest for goods subject to the highest tariffs, does not change – which is why we opt to present a relatively parsimonious model instead.

### ***4.3 The Evolution of Evasion Gaps after the Revolution***

What happened to evasion gaps after the Jasmin Revolution which involved the ousting of President Ben Ali? Table 8 presents descriptive statistics on the evolution of mean evasion gaps before and after the revolution, distinguishing between products dominated by Ben Ali firms and other products. Note that the sample is confined to products which were imported from the same source country both before and after the Jasmin Revolution. Table 8 documents the change in average evasion gaps after the revolution, showing that they decreased, though not significantly, by approximately 16.2% on average in product lines where Ben Ali firms had been dominant (column 1). By contrast, they *increased* significantly, by 5.7% on average, in other product lines (column 2). Thus, the difference in average evasion gaps between previously Ben Ali dominated product lines and other product line reduced substantially by 21.9% (column 3) and this change was statistically significant at the 10% level.

The increase in value gaps in non Ben Ali dominated product lines has been driven by a significant increase in quantity gaps, which is consistent with a rise in informal trade with Libya and Algeria documented by Ayadi et al. (2013). Price gaps declined significantly on average. They declined most rapidly in previously Ben Ali dominated product lines subject to high tariffs.

Table 9 presents regressions in which we replicate our preferred specifications, but now interact all variables with a post-revolution indicator which takes the value 1 for 2011, 2012, and 2013 and zero otherwise. Due to data limitations, we impute all explanatory variables for this period using the latest available data, which for the firm-level proxies and the tariff is 2009, while it is 2010 for the non-tariff measures. The results presented in columns 1-3 show that after the revolution, price gaps decreased significantly faster the greater the share of imports accounted for by Ben Ali firms during his reign. By contrast, evasion gaps increased more quickly in product lines in which public firms and offshore firms had been important importers.

The interacted specifications, presented in columns 4-6, show that unit price gaps diminished especially rapidly with the presence of Ben Ali firms for products subject to higher tariffs. By contrast, quantity gaps appear to have increased for such products.

To summarize, after the Revolution evasion gaps diminished, though not significantly, in product lines where Ben Ali firms had been dominant, whereas they increased significantly in other product lines. This led to a significant reduction (albeit at the 10% level) in the difference in average evasion gaps between previously Ben Ali dominated product lines and other product lines. This reduction was driven by a significant reduction in price gaps in product lines subject to high tariff where Ben Ali firms had been dominant.

## **5 Firm-Level Results**

### ***5.1 Differential Elasticities with Respect to Tariffs***

One drawback of testing for differential tariff evasion using evasion gaps is that such gaps are only observed at the product level, whereas the focus of this paper is on assessing the evasion propensities of different groups of firms. We therefore turn to the complementary firm-level testing strategy discussed in section 2 and assess whether, and, if so, how reported import values, quantities and prices, of the various types of firms vary differentially with tariffs.

The firm-source-product level regressions mimic the product-level regressions, but the explanatory variables are modified to account for firm-level differences; the explanatory variables are the log of the tariff, firm-type dummies, as well as interactions between various firm-type dummies

and the log of the tariff, as well as log of the number of non-tariff barriers. Onshore firms are the reference category. Dependent variables are respectively, the log of total import value (columns 1 and 4), the log of import quantity (columns 2 and 6), and the log of import price (columns 3 and 6) measured at the firm-product-country-year level. The specifications presented in columns 1-3 control for country-year, product and sector dummies, while those presented in columns 4-6 include product-country-sector-year dummies which sets a high bar for identification but precludes separate identification of the impact of tariffs and non-tariff measures as these do not vary within product-source-years.

Table 10 presents the results, which accord with conventional economic wisdom. Import values reported by onshore firms (the reference category) decline significantly with tariffs (column 1), mostly because their reported import quantities tend to decrease as tariffs rise (column 2), although the latter association is not statistically significant. By contrast, their reported unit prices do not appear to vary with tariffs; the coefficient on the tariff in the unit price regression presented in column 3 is very close to zero. The import demands of offshore firms are significantly less elastic with respect to tariffs, presumably because they are exempted from having to pay them. Other explanatory variables also have the expected sign; firms that produce higher levels of output import significantly more both in terms of reported value and quantities, but don't pay significantly higher or lower unit prices.

Of focal interest, import values reported by Ben Ali firms don't appear more elastic with respect to tariffs than those of imports of onshore and offshore firms, but their reported import prices decline significantly as tariffs rise. By contrast, their reported quantities are significantly less elastic with respect to tariffs than those of onshore firms. These results are robust to controlling for source-product-year-industry fixed effects (columns 4-6).

Overall, these firm-level results are consistent with tariff evasion through under-reporting of unit prices by connected firms.

How costly was tariff evasion by connected firms? Accurately quantifying the costs of tariff evasion is challenging, but one admittedly crude yet conservative method to answer this question is to assume that unit price differentials between connected firms and the median import price reported by other private sector firms importing the same product from the same country at the same time are due to evasion. By multiplying that price differential by the quantity imported by connected firms and the tariff rate one can arrive at an estimate of the *additional* tax loss associated with being connected (private firms on average evade; this measure allows us to assess how much more connected firms evaded than other firms). Doing this, and summing over all import transactions by connected firms in our database for which tariff data exists and for which there is at least one counterpart declaration by a private firms suggests that in 2009 alone, connected firms evaded approximately 217 million US dollars' worth of taxes *more* than other firms would have. Over the period 2002-2009, they cumulatively evaded 1.2 billion US dollars' worth of taxes more than other private firms would have. These estimates are very conservative. If instead of using median prices reported by other firms, we use the average price reported by other firms, the number rises to 2.6 billion USD. Also, this price discrepancy can only be calculated when tariff data are available and when at least one private sector firm is importing the product at the same time as Ben Ali firms; such observations account for less than half the value of all import transactions reported by connected firms between 2000 and 2009. Most importantly, this method only considers underreporting of prices, not other types of tax fraud; if Ben Ali firms were able to grant themselves exemptions, then they would not need to underreport, in which case they are likely to report higher prices than non-

connected firms. It also does not consider underreporting of quantities, including smuggling – i.e. goods that are simply not declared to Tunisian customs do not feature in this calculation.

### ***5.2 Do Firms Report Lower Prices after Becoming Connected?***

The observation that import and unit prices reported by connected firms decline more rapidly than those of non-connected firms could be an artefact of selection; e.g. Ben Ali entrepreneurs buying firms that were more cost-effective or more likely to engage in evasion to start with. To assess whether this explains the patterns documented above, we use a difference-in-difference strategy comparing the evolution of unit prices of firms privatized to the Ben Ali family with other privatizations. Note that power is limited due to the relatively small number of privatizations (25) for which we observe imports of the same product from the same source country both pre- and post-privatization.

The results are presented in Table 11, with dummy variables indicating whether a firm was (i) privatized (in year  $t$ ) and (ii) privatized to the Ben Ali family (in year  $t$ ) as key explanatory variables. The dependent variable is the log unit price. All specifications include firm-source country-product fixed effects. Identification is thus based on comparing the evolution of prices reported by the same firm for the same product net of time varying source country-product specific shocks. Column 1 presents estimates in which standard errors are clustered at the firm-product level, while in columns 2 and 3 standard errors are clustered at the firm-level. Column excludes one firm which was privatized to the Ben Ali clan and known to have made extensive use of duty suspension regimes and thus had limited incentives to evade tariff by underreporting prices.

The results presented in columns 1 and 2 demonstrate that privatizations to the Ben Ali family are associated with a decline in unit prices of approximately 18%, whereas privatizations per se are



not. The price decrease associated with becoming connected is significant at the 5% level when standard errors are clustered at the firm-product level (column 1), but insignificant when standard errors are clustered at the firm-level (column 2). Once we exclude one of the privatized Ben Ali firms which made extensive use of duty suspension regimes (column 3) however, the coefficient on Ben Ali privatizations drops considerably to -0.56 and becomes statistically significant at the 5% level, even when standard errors are conservatively clustered at the firm level.

Thus, the results suggest that privatization per se was not on average associated with a reduction in reported unit prices, but privatization to politically connected entrepreneurs was, though it should be borne in mind that these results are based on a small number of privatizations.

## **6 Conclusion**

While it is often assumed that politically connected firms are more likely to evade taxes, empirical examination of this hypothesis has been hampered by the difficulties associated with obtaining data on political connections and demonstrating tax evasion. Using unique data on firms with ownership connections to the Ben Ali family confiscated in the aftermath of Tunisia's Jasmine revolution, this paper documents evidence suggesting such politically connected firms were more likely to evade tariffs.

To start, evasion gaps measured at the source country-product-year level were strongly correlated with import share accounted for by firms owned by the family. The correlation between the import share of connected firms and evasion gaps was especially strong for goods subject to high tariffs, and due to underreporting of prices. While misreporting of quantities was an important

evasion tactic for all types of firms, the hypothesis that connected firms were not more or less likely to underreport quantities than other firms is not rejected.

Higher evasion gaps in product lines dominated by Ben Ali firms appear driven by their higher propensity to underreport prices; average unit prices reported by Ben Ali firms were lower than those reported by other firms importing the same product, and, moreover, declined significantly faster with tariffs than those reported by non-connected firms. In addition, privatizations to the Ben Ali are associated with reductions in reported unit prices, whereas privatizations per se are not. Last but not least, after the ousting of Ben Ali, unit price gaps diminished especially rapidly in product lines in which Ben Ali firms had been dominant that were subject to high tariffs.

The evidence suggests tariff evasion in Tunisia led to considerable fiscal losses, but also resulted in substantial inequality as politically connected entrepreneurs, who were well off, seem to have been especially likely to profit from tariff evasion. This endowed them with a cost advantage over those who were compliant that was not based on efficiency or performance. According to conservative estimates, underreporting of unit prices alone enabled connected firms to evade at least 1.2 billion USD worth of import taxes between 2002 and 2009. While the Jasmin Revolution has drastically diminished uncompetitive regulatory privileges enjoyed by the Ben Ali family, it has not put a halt to tariff evasion. On the contrary, tariff evasion in Tunisia has escalated since the Jasmin Revolution.

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**Table 1: Descriptive Statistics on Firm Characteristics – By Type of Firm**

| <b>Descriptive Statistics Firms</b>                               |      |                |                 |                |               |            |
|---|------|----------------|-----------------|----------------|---------------|------------|
| <b>Firm type</b>  |      | <i>Ben Ali</i> | <i>Offshore</i> | <i>Onshore</i> | <i>Public</i> | <i>All</i> |
| <i>Economic Significance</i>                                      |      |                |                 |                |               |            |
| Number of firms   | N    | 206            | 7074            | 20869          | 124           | 28273      |
| % of all firms  | %    | 0.73           | 25.02           | 73.81          | 0.44          | 100        |
| % of overall imports  | %    | 2.29           | 32.53           | 38.64          | 26.54         | 100        |
| % of source-product-years with at least one importer of this type | %    | 7.22           | 36.62           | 81.16          | 12.40         |            |
| <i>Firm Characteristics</i>                                       |      |                |                 |                |               |            |
| <i>By firm-year</i>   |      |                |                 |                |               |            |
|   | N    | 865            | 27926           | 82691          | 782           | 112264     |
| Y   | Mean | 14.389         | 13.268          | 13.138         | 17.057        | 13.202     |
|   | Sd   | 2.690          | 1.934           | 2.021          | 2.684         | 2.036      |
| L   | Mean | 2.436          | 2.983           | 1.925          | 2.470         | 2.198      |
|   | Sd   | 2.180          | 1.861           | 1.630          | 3.102         | 1.770      |
| Age   | Mean | 9.279          | 7.607           | 12.755         | 30.197        | 11.562     |
|   | Sd   | 10.776         | 6.746           | 11.250         | 18.585        | 10.731     |
| Log total imports   | Mean | 12.690         | 12.421          | 11.391         | 14.011        | 11.676     |
|   | Sd   | 2.444          | 2.410           | 2.092          | 3.438         | 2.245      |
| #source countries   | Mean | 5.318          | 3.294           | 3.267          | 8.944         | 3.329      |
|   | Sd   | 5.900          | 3.646           | 3.696          | 9.604         | 3.812      |
| #products   | Mean | 25.383         | 13.127          | 9.256          | 46.219        | 10.600     |
|   | SD   | 43.069         | 18.219          | 16.556         | 73.868        | 18.712     |
| #source countries*products  | Mean | 36.091         | 17.139          | 12.687         | 80.004        | 14.444     |
|   | SD   | 65.748         | 29.027          | 28.400         | 146.05        | 31.984     |
| <i>By source-country and year</i>                                 |      |                |                 |                |               |            |
|   | N    | 31219          | 478618          | 1049102        | 62563         | 1621502    |
| Log imports per source-country                                    | Mean | 9.115          | 9.457           | 9.184          | 9.585         | 9.279      |
|   | Sd   | 8.789          | 9.166           | 8.912          | 9.177         | 8.992      |
| Log (1+Tariffs)   | Mean | 3.540          | 3.432           | 3.334          | 3.259         | 3.366      |
|   | Sd   | 0.692          | 0.997           | 0.831          | 0.751         | 0.883      |
| Log(1+NTBs)   | Mean | 0.060          | 0.024           | 0.037          | 0.058         | 0.035      |
|   | Sd   | 0.309          | 0.202           | 0.255          | 0.293         | 0.243      |



**Table 2: Evasion Gaps**

| <b>Descriptive Statistics Evasion Gaps</b>   |             |                 |          |                             |                 |                |               |                 |
|--|-------------|-----------------|----------|-----------------------------|-----------------|----------------|---------------|-----------------|
| (Log Exports Reported by Partner minus Log Imports Reported in Tunisia at the HS6-source-country-year level) |             |                 |          |                             |                 |                |               |                 |
|  | <b>All</b>  |                 |          | <b>By Dominant Importer</b> |                 |                |               |                 |
|  | <u>Mean</u> | <u>Std.Dev.</u> | <u>N</u> | <i>Ben Ali</i>              | <i>Offshore</i> | <i>Onshore</i> | <i>Public</i> | <i>Residual</i> |
|  |             |                 |          | <u>Mean</u>                 | <u>Mean</u>     | <u>Mean</u>    | <u>Mean</u>   | <u>Mean</u>     |
| <b><i>Evasion Gap - Values</i></b>   |             |                 |          |                             |                 |                |               |                 |
| <i>(Log Export Value Reported by Partner – Log Import Value Reported in Tunisia)</i>                         |             |                 |          |                             |                 |                |               |                 |
| <i>All</i>   | -0.001      | 1.875           | 49347    | 0.356                       | 0.071           | -0.036         | -0.234        | 0.098           |
| High Tariff  | 0.099       | 1.939           | 24896    | 0.797                       | 0.090           | 0.094          | -0.101        | 0.170           |
| Low Tariff   | -0.104      | 1.801           | 24451    | -0.108                      | 0.033           | -0.136         | -0.293        | 0.048           |
| N  |             |                 |          | 760                         | 16068           | 29692          | 2106          | 721             |
| <b><i>Evasion Gap - Quantities</i></b>   |             |                 |          |                             |                 |                |               |                 |
| <i>(Log Export Quantity Reported by Partner – Log Import Quantity Reported in Tunisia)</i>                   |             |                 |          |                             |                 |                |               |                 |
| <i>All</i>   | -0.015      | 2.172           | 48724    | 0.134                       | 0.080           | -0.083         | 0.129         | 0.087           |
| High Tariff  | 0.080       | 2.173           | 24646    | 0.318                       | 0.104           | 0.037          | 0.389         | 0.127           |
| Low Tariff   | -0.112      | 2.167           | 24080    | -0.056                      | 0.033           | -0.176         | 0.014         | 0.059           |
| N  |             |                 |          | 749                         | 15,908          | 29,303         | 2,059         | 705             |
| <b><i>Evasion Gap - Unit Prices</i></b>  |             |                 |          |                             |                 |                |               |                 |
| <i>(Log Unit Price Reported by Partner – Log Unit Price Reported in Tunisia)</i>                             |             |                 |          |                             |                 |                |               |                 |
| <i>All</i>   | 0.020       | 1.026           | 48724    | 0.216                       | -0.006          | 0.056          | -0.357        | 0.028           |
| High Tariff  | 0.022       | 0.951           | 24646    | 0.465                       | -0.017          | 0.065          | -0.473        | 0.048           |
| Low Tariff   | 0.018       | 1.098           | 24080    | -0.042                      | 0.014           | 0.049          | -0.306        | 0.014           |
| N  |             |                 |          | 749                         | 15,908          | 29,303         | 2,059         | 705             |

Note: Sample is confined to product-source-year combinations(i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (ii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iii) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over this period. In this sample, Ben Ali dominated goods account for 4.75% of aggregate import value, offshore dominated goods for 44.17%, onshore dominated goods for 35.63%, state dominated goods for 14.56% and mixed goods for 1.04%.

**Table 3 Firm level Reported Import Values, Quantities and Prices – by Source-Origin**

| <b>Mean Import Values, Quantities, and Prices</b>   |                                   |                                     |                                    |                                 |                                |          |
|---|-----------------------------------|-------------------------------------|------------------------------------|---------------------------------|--------------------------------|----------|
| <i>Normalized by product-origin-year-industry weighted average<br/>(product-origin-year-industry average=1)</i> |                                   |                                     |                                    |                                 |                                |          |
| <b>Firm Type</b>  | <b><i>Ben Ali</i></b><br>(N=8140) | <b><i>Offshore</i></b><br>(N=15880) | <b><i>Onshore</i></b><br>(N=23775) | <b><i>Public</i></b><br>(N=237) | <b><i>All</i></b><br>(N=48032) |          |
|   | <i>Mean Import Value</i>          |                                     |                                    |                                 | <i>Std.Dev.</i>                | <i>N</i> |
| <i>All</i>  | 1.183                             | 1.030                               | 0.934                              | 1.403                           | 1.383                          | 48032    |
| High Tariffs  | 1.214                             | 1.032                               | 0.923                              | 1.458                           | 1.440                          | 33147    |
| Low Tariffs   | 1.131                             | 1.020                               | 0.955                              | 1.355                           | 1.246                          | 14885    |
|   | <i>Mean Import Quantity</i>       |                                     |                                    |                                 | <i>Std.Dev</i>                 | <i>N</i> |
| <i>All</i>  | 1.205                             | 1.009                               | 0.923                              | 1.340                           | 1.466                          | 48032    |
| High Tariffs  | 1.253                             | 1.010                               | 0.911                              | 1.414                           | 1.518                          | 33147    |
| Low Tariffs   | 1.124                             | 1.007                               | 0.960                              | 1.273                           | 1.342                          | 14885    |
|   | <i>Mean Unit Prices</i>           |                                     |                                    |                                 | <i>Std.Dev</i>                 | <i>N</i> |
| <i>All</i>  | 0.952                             | 1.022                               | 1.014                              | 1.086                           | 0.791                          | 48032    |
| High Tariffs  | 0.919                             | 1.027                               | 1.023                              | 1.056                           | 0.764                          | 33147    |
| Low Tariffs   | 1.008                             | 1.000                               | 1.000                              | 1.114                           | 0.851                          | 14885    |

Note: sample is confined to (5-digit) sector-product-source combinations in which (i) at least one Ben Ali firm and at least one other firm of a different type are simultaneously importing during the same year, (ii) for which tariff data exist, (iii) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (iv) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (v) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over this period. In addition, (vi) observations that fall in the top and bottom 1% of normalized prices, quantities and values are excluded. The sample comprises 9 public firms, 1787 onshore firms, 1145 offshore firms, and 113 BA firms.

**Table 4: The Determinants of Evasion Value Gaps**

| <b>The Determinants of Evasion Gaps</b>                                      |                      |                      |                      |                     |                      |                     |
|--|----------------------|----------------------|----------------------|---------------------|----------------------|---------------------|
| <i>Dependent Variable: Log Evasion Value Gaps by HS6-source country-year</i> |                      |                      |                      |                     |                      |                     |
|  | (1)                  | (2)                  | (3)                  | (4)                 | (5)                  | (6)                 |
|  | <b>coef/se</b>       | <b>coef/se</b>       | <b>coef/se</b>       | <b>coef/se</b>      | <b>coef/se</b>       | <b>coef/se</b>      |
| Log (Tariff+1)   | 0.058***<br>(0.022)  | 0.012<br>(0.051)     | 0.018<br>(0.053)     | 0.078***<br>(0.023) | 0.040<br>(0.053)     | 0.050<br>(0.056)    |
| Ben Ali %  | 0.419***<br>(0.133)  | 0.422***<br>(0.120)  | 0.174<br>(0.150)     | -0.850*<br>(0.474)  | -0.534<br>(0.462)    | -0.759<br>(0.480)   |
| Offshore %   | -0.034<br>(0.061)    | -0.288***<br>(0.051) | -0.464***<br>(0.06)  | 0.246<br>(0.182)    | 0.150<br>(0.164)     | 0.011<br>(0.219)    |
| Public %   | -0.312***<br>(0.076) | -0.339***<br>(0.082) | -0.459***<br>(0.089) | -0.229<br>(0.324)   | -0.612<br>(0.404)    | -0.621<br>(0.436)   |
| Ben Ali % * Log (Tariff+1)   |                      |                      |                      | 0.370***<br>(0.133) | 0.279**<br>(0.13)    | 0.275**<br>(0.136)  |
| Offshore % * Log (Tariff+1)  |                      |                      |                      | -0.080<br>(0.053)   | -0.130***<br>(0.047) | -0.143**<br>(0.061) |
| Public % * Log (Tariff+1)  |                      |                      |                      | -0.025<br>(0.095)   | 0.085<br>(0.120)     | 0.050<br>(0.130)    |
| Log (NTB + 1)  | 0.016<br>(0.022)     | -0.064<br>(0.040)    | -0.078<br>(0.050)    | 0.013<br>(0.022)    | -0.061<br>(0.040)    | -0.076<br>(0.050)   |
| Country*year FE  | Yes                  | Yes                  | Yes                  | Yes                 | Yes                  | Yes                 |
| Product FE   |                      | Yes                  |                      |                     | Yes                  |                     |
| Country*product FE   |                      |                      | Yes                  |                     |                      | Yes                 |
| N  | 49347                | 49347                | 49347                | 49347               | 49347                | 49347               |
| Number of products   | 1386                 | 1386                 | 1386                 | 1386                | 1386                 | 1386                |
| R2   | 0.036                | 0.258                | 0.627                | 0.037               | 0.258                | 0.627               |
| R2-Adjusted  | 0.034                | 0.234                | 0.534                | 0.035               | 0.235                | 0.534               |

Note: Standard errors are clustered by product. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. The sample is confined to product-source-year combinations (i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (ii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iii) products which account for at least 0.01 percentage points of cumulative import value (either as declared by partners or as declared by Tunisian customs) over this period.

**Table 5: The Determinants of Evasion Gap Quantity and Price Gaps**

| <i>Dependent Variable:</i>  | <b>Evasion Gaps – Prices or Quantities?</b>       |                      |                    |                   |  |                      |                      |                      |
|-----------------------------|---|----------------------|--------------------|-------------------|--|----------------------|----------------------|----------------------|
|                             | <i>Log Quantity Gap<br/>(by HS6-country-year)</i> |                      |                    |                   | <i>Log Price Gap<br/>(by HS6-country-year)</i> |                      |                      |                      |
|                             | Q   | Q                    | Q                  | Q                 | P  | P                    | P                    | P                    |
|                             | (1)   | (2)                  | (3)                | (4)               | (5)  | (6)                  | (7)                  | (8)                  |
|                             | <b>coef/se</b>                                    | <b>coef/se</b>       | <b>coef/se</b>     | <b>coef/se</b>    | <b>coef/se</b>                                 | <b>coef/se</b>       | <b>coef/se</b>       | <b>coef/se</b>       |
| Log (Tariff+1)              | 0.056**<br>(0.025)                                | -0.016<br>(0.063)    | 0.063**<br>(0.026) | -0.007<br>(0.067) | -0.001<br>(0.009)                              | 0.031<br>(0.030)     | 0.012<br>(0.011)     | 0.052<br>(0.033)     |
| Ben Ali %                   | 0.104<br>(0.134)                                  | -0.150<br>(0.168)    | 0.021<br>(0.548)   | -0.009<br>(0.595) | 0.297***<br>(0.081)                            | 0.321***<br>(0.102)  | -0.890***<br>(0.227) | -0.786**<br>(0.324)  |
| Offshore %                  | 0.034<br>(0.067)                                  | -0.372***<br>(0.070) | 0.123<br>(0.204)   | -0.221<br>(0.226) | -0.068***<br>(0.020)                           | -0.092**<br>(0.038)  | 0.124*<br>(0.064)    | 0.218*<br>(0.117)    |
| Public %                    | 0.093<br>(0.091)                                  | 0.006<br>(0.119)     | 0.041<br>(0.408)   | -0.361<br>(0.638) | -0.418***<br>(0.050)                           | -0.470***<br>(0.069) | -0.295*<br>(0.170)   | -0.274<br>(0.308)    |
| Ben Ali % * Log (Tariff+1)  |   |                      | 0.024<br>(0.153)   | -0.041<br>(0.170) |  |                      | 0.347***<br>(0.069)  | 0.327***<br>(0.093)  |
| Offshore % * Log (Tariff+1) |   |                      | -0.026<br>(0.058)  | -0.045<br>(0.064) |  |                      | -0.055***<br>(0.017) | -0.093***<br>(0.033) |
| Public % * Log (Tariff+1)   |   |                      | 0.016<br>(0.119)   | 0.114<br>(0.189)  |  |                      | -0.037<br>(0.051)    | -0.061<br>(0.091)    |
| Log (NTB + 1)               | 0.026<br>(0.025)                                  | -0.024<br>(0.060)    | 0.025<br>(0.025)   | -0.023<br>(0.060) | -0.012<br>(0.011)                              | -0.047*<br>(0.025)   | -0.014<br>(0.011)    | -0.045*<br>(0.026)   |
| Country*year FE             | Yes   | Yes                  | Yes                | Yes               | Yes  | Yes                  | Yes                  | Yes                  |
| Country*product FE          |   | Yes                  |                    | Yes               |  | Yes                  |                      | Yes                  |
| N                           | 48724   | 48724                | 48724              | 48724             | 48724  | 48724                | 48724                | 48724                |
| Number of products          | 1386  | 1386                 | 1386               | 1386              | 1386   | 1386                 | 1386                 | 1386                 |
| R2                          | 0.032   | 0.611                | 0.032              | 0.611             | 0.034  | 0.495                | 0.036                | 0.496                |
| Adjusted R2                 | 0.030   | 0.513                | 0.030              | 0.513             | 0.032  | 0.368                | 0.033                | 0.369                |

Note: Standard errors are clustered by product. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. The sample is confined to product-source-year combinations(i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (ii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iii) products which account for at least 0.01 percentage points of cumulative import value (either as declared by partners or as declared by Tunisian customs) over this period.

**Table 6: Robustness**

| <b>Robustness Checks</b>  |                            |                    |  |  |                            |                                    |  |
|---|----------------------------|--------------------|--|--|----------------------------|------------------------------------|--|
| <i>Dependent Variable: Log Evasion Value Gaps by NSH6-source country-year</i> |                            |                    |  |  |                            |                                    |  |
|   | <u>Alternative Proxies</u> |                    |  |  | <u>Alternative Samples</u> |                                    |  |
| <i>Sample</i>   | Main Sample                | Main Sample        | Products for which import shares are predicted | Products for which import shares are predicted | All products and countries | Germany, Netherlands, Belgium only | Excl. top and bottom 10% gaps by product class |
| <i>Proxy</i>  | Q                          | N                  | Predicted Import share                         | Predicted Import share                         | V                          | V                                  | V  |
|   | (1)<br>coef/se             | (2)<br>coef/se     | (3)<br>coef/se                                 | (4)<br>coef/se                                 | (5)<br>coef/se             | (6)<br>coef/se                     | (7)<br>coef/se                                 |
| Log (Tariff+1)  | 0.048<br>(0.055)           | 0.044<br>(0.055)   | -0.085<br>(0.055)                              | 0.063<br>(0.078)                               | 0.084***<br>(0.014)        | -0.167<br>(0.12)                   | -0.012<br>(0.037)                              |
| Ben Ali %   | -0.791*<br>(0.469)         | -0.677<br>(0.684)  | 4.304**<br>(1.788)                             | 2.601<br>(6.146)                               | -0.443<br>(0.329)          | -2.029<br>(1.342)                  | -0.242<br>(0.338)                              |
| Offshore %  | 0.142<br>(0.185)           | 0.144<br>(0.207)   | 0.138<br>(0.162)                               | 1.180<br>(1.039)                               | 0.225**<br>(0.109)         | 0.406<br>(0.557)                   | -0.131<br>(0.131)                              |
| Public %  | -0.753*<br>(0.43)          | -0.655<br>(0.532)  | -0.784***<br>(0.220)                           | 1.358<br>(0.827)                               | -0.228<br>(0.230)          | -0.277<br>(0.847)                  | -0.126<br>(0.226)                              |
| Ben Ali % *Log (Tariff+1)   | 0.271**<br>(0.129)         | 0.281<br>(0.19)    |  | 0.151<br>(1.687)                               | 0.182**<br>(0.090)         | 0.685*<br>(0.379)                  | 0.165*<br>(0.097)                              |
| Offshore % *Log (Tariff+1)  | -0.146***<br>(0.052)       | -0.103*<br>(0.059) |  | -0.266<br>(0.259)                              | -0.083**<br>(0.032)        | -0.195<br>(0.158)                  | -0.035<br>(0.038)                              |
| Public%*Log (Tariff+1)  | 0.105<br>(0.13)            | 0.115<br>(0.158)   |  | -0.596**<br>(0.252)                            | -0.039<br>(0.067)          | -0.016<br>(0.262)                  | -0.039<br>(0.066)                              |
| Log (NTB + 1)   | -0.072<br>(0.049)          | -0.067<br>(0.049)  | 0.065**<br>(0.302)                             | 0.055*<br>(0.294)                              | 0.025*<br>(0.137)          | -0.033<br>(0.086)                  | -0.047<br>(0.029)                              |
| Country*year FE   | Yes                        | Yes                | Yes  | Yes  | Yes                        | Yes                                | Yes  |
| Country*product FE  | Yes                        | Yes                |  |  | No                         | Yes                                | Yes  |
| N   | 49347                      | 49347              | 10395  | 10395  | 107299                     | 9442                               | 39477  |
| Number of products  | 1386                       | 1386               | 421  | 421  | 4095                       | 1149                               | 1372   |
| R2  | 0.626                      | 0.625              | 0.068  | 0.070  | 0.0421                     | 0.592                              | 0.542  |
| Adjusted R2   | 0.533                      | 0.531              | 0.018  | 0.030  | 0.0361                     | 0.494                              | 0.403  |

Note: Standard errors are clustered by product. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. For sample restrictions for the main see notes to Table 4; these apply to columns (1), (2),(6), and (7); note that columns (6) and (7) impose additional restrictions, notably restricting the sample to Germany the Netherlands and Belgium only (column 6) and excluding the top and bottom 10% largest gaps by product class (column 7). For construction of the predicted import share, see the Appendix.

**Table 7 The Determinants of Evasion Gaps -Allowing for More Flexible Functional Form**

| The Determinants of Evasion Gaps – Allowing for More Flexible Functional Form |                      |                      |                         |                     |                      |                      |
|---|----------------------|----------------------|-------------------------|---------------------|----------------------|----------------------|
| <i>Dependent Variable:</i>  | <i>Log Value Gap</i> |                      | <i>Log Quantity Gap</i> |                     | <i>Log Price Gap</i> |                      |
|   | V                    |                      | Q                       |                     | P                    |                      |
|   | (1)                  | (2)                  | (3)                     | (4)                 | (5)                  | (6)                  |
|   | coef/se              | coef/se              | coef/se                 | coef/se             | coef/se              | coef/se              |
| (T≥40)  | 0.169***<br>(0.058)  | 0.246***<br>(0.065)  | 0.163**<br>(0.070)      | 0.227***<br>(0.079) | 0.000<br>(0.026)     | 0.014<br>(0.032)     |
| (20≤T<40)   | -0.047<br>(0.054)    | -0.068<br>(0.058)    | -0.034<br>(0.066)       | -0.065<br>(0.073)   | -0.016<br>(0.025)    | -0.010<br>(0.030)    |
| Ben Ali %   | 0.426***<br>(0.132)  |                      | 0.111<br>(0.134)        |                     | 0.298***<br>(0.08)   |                      |
| Offshore %  | -0.076<br>(0.061)    |                      | -0.004<br>(0.067)       |                     | -0.071***<br>(0.021) |                      |
| Public %  | -0.286***<br>(0.076) |                      | 0.117<br>(0.091)        |                     | -0.417***<br>(0.050) |                      |
| Ben Ali % * (T≥40)  |                      | 0.881***<br>(0.209)  |                         | 0.138<br>(0.200)    |                      | 0.705***<br>(0.138)  |
| Ben Ali % * (20≤T<40)   |                      | 0.234<br>(0.162)     |                         | 0.209<br>(0.200)    |                      | 0.034<br>(0.103)     |
| Ben Ali % * (T<20)  |                      | -0.339<br>(0.343)    |                         | -0.265<br>(0.361)   |                      | -0.077<br>(0.132)    |
| Offshore % * (T≥40)   |                      | -0.206**<br>(0.086)  |                         | -0.112<br>(0.090)   |                      | -0.098***<br>(0.027) |
| Offshore % * (20≤T<40)  |                      | 0.110<br>(0.097)     |                         | 0.147<br>(0.112)    |                      | -0.024<br>(0.037)    |
| Offshore%* (T<20)   |                      | 0.038<br>(0.119)     |                         | 0.085<br>(0.144)    |                      | -0.044<br>(0.050)    |
| Public% * (T≥40)  |                      | -0.446***<br>(0.138) |                         | 0.045<br>(0.170)    |                      | -0.482***<br>(0.097) |
| Public% * (20≤T<40)   |                      | -0.223**<br>(0.102)  |                         | 0.208*<br>(0.116)   |                      | -0.441***<br>(0.075) |
| Public%* (T<20)   |                      | -0.194<br>(0.158)    |                         | 0.089<br>(0.199)    |                      | -0.318***<br>(0.089) |
| Log (NTB+1)   | 0.007<br>(0.022)     | 0.003<br>(0.022)     | 0.018<br>(0.025)        | 0.013<br>(0.025)    | -0.013<br>(0.011)    | -0.013<br>(0.011)    |
| Country*Year FE   | Yes                  | Yes                  | Yes                     | Yes                 | Yes                  | Yes                  |
| N   | 49347                | 49347                | 48724                   | 48724               | 48724                | 48724                |
| Number of products  | 1386                 | 1386                 | 1386                    | 1386                | 1386                 | 1386                 |
| R2  | 0.038                | 0.040                | 0.034                   | 0.034               | 0.034                | 0.036                |
| Adjusted R2   | 0.036                | 0.037                | 0.031                   | 0.032               | 0.032                | 0.034                |

Note: Standard errors are clustered by product. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. The sample is confined to product-source-year combinations (i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (ii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iii) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over this period.

**Table 8 The Evolution of Evasion Gaps After the Revolution**

| <b>The Evolution of Log Evasion Gaps In the Afermath of the Revolution</b> |   |                |                                      |
|--|---|----------------|--------------------------------------|
|  | Previously Ben Ali<br>Dominated<br>Products | Other products | <u>Difference-in-<br/>Difference</u> |
|  | (1)   | (2)            | (1-2)                                |
| <b><i>Change in Average Log Value Gaps</i></b>                             |   |                |                                      |
| <i>All</i>   | -0,162                                      | 0,057**        | -0.219*                              |
| High Tariff  | -0,164                                      | 0,061**        | -0.225                               |
| Low Tariff   | -0,094                                      | 0,058*         | -0.152                               |
| N  | 858   | 55,705         | 55,933                               |
| <b><i>Change in Average Log Weight Gap</i></b>                             |   |                |                                      |
| <i>All</i>   | 0,050                                       | 0,093***       | -0.042                               |
| High Tariff  | 0,311                                       | 0,086**        | 0.224                                |
| Low Tariff   | -0,175                                      | 0,103***       | -0.278*                              |
| N  | 835   | 53,988         | 54,823                               |
| <b><i>Change in Average Log Price Gap</i></b>                              |   |                |                                      |
| <i>All</i>   | -0,165***                                   | -0,028**       | -0.138                               |
| High Tariff  | -0,434***                                   | -0,033**       | -0.401***                            |
| Low Tariff   | 0,121                                       | -0,023         | 0.144                                |
| N  | 835   | 53,988         | 54,823                               |

Note: \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. Tests for whether differences in means are statistically significant are based on regressions of the form  $\log gap = \alpha_1 + \beta_1 * Post + \beta_2 * BA\ dominated + \beta_3 * Post * BA\ dominated$  where Post is a dummy taking the value 1 for years after 2010 and 0 otherwise and BA dominated a dummy variable indicating whether a Ben Ali firms accounted for more than 50% of reported imports. Standard errors are clustered at the product level. The sample is confined to product-source-year combinations(i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive (ii) imported both at least once between 2002and 2009 and at least once between 2010 and 2013, (iii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iv) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009.

**Table 9 The Evolution of Evasion Gaps**

| <b>The Evolution of Evasion Gaps</b> |  |                         |                      |                      |                         |                      |
|--------------------------------------|--|-------------------------|----------------------|----------------------|-------------------------|----------------------|
| <i>Dependent Variable:</i>           | <i>Log Value Gap</i>   | <i>Log Quantity Gap</i> | <i>Log Price Gap</i> | <i>Log Value Gap</i> | <i>Log Quantity Gap</i> | <i>Log Price Gap</i> |
|                                      | V  | Q                       | P                    | V                    | Q                       | P                    |
|                                      | (1)  | (2)                     | (3)                  | (4)                  | (5)                     | (6)                  |
|                                      | <b>coef/se</b>   | <b>coef/se</b>          | <b>coef/se</b>       | <b>coef/se</b>       | <b>coef/se</b>          | <b>coef/se</b>       |
| Post*Log (Tariff+1)                  | 0.004<br>(0.022)   | 0.010<br>(0.024)        | -0.013<br>(0.012)    | -0.057**<br>(0.026)  | -0.053*<br>(0.03)       | -0.015<br>(0.016)    |
| Post*Ben Ali %                       | -0.051<br>(0.179)  | 0.120<br>(0.194)        | -0.221*<br>(0.123)   | -0.282<br>(0.469)    | -1.123*<br>(0.619)      | 0.765*<br>(0.420)    |
| Post*Offshore %                      | 0.045<br>(0.062)   | -0.007<br>(0.068)       | 0.048*<br>(0.029)    | -0.474**<br>(0.230)  | -0.518**<br>(0.248)     | -0.041<br>(0.119)    |
| Post*Public %                        | 0.196<br>(0.130)   | -0.116<br>(0.161)       | 0.366***<br>(0.081)  | -0.805<br>(0.600)    | -1.440<br>(0.877)       | 0.589*<br>(0.301)    |
| Post*Ben Ali %*Log (Tariff+1)        |  |                         |                      | 0.076<br>(0.141)     | 0.382**<br>(0.179)      | -0.283**<br>(0.120)  |
| Post*Offshore % *Log (Tariff+1)      |  |                         |                      | 0.150**<br>(0.063)   | 0.152**<br>(0.068)      | 0.025<br>(0.032)     |
| Post*Public*Log (Tariff+1)           |  |                         |                      | 0.307*<br>(0.176)    | 0.397<br>(0.255)        | -0.069<br>(0.087)    |
| Post* Log (NTB + 1)                  | -0.028<br>(0.021)  | -0.020<br>(0.024)       | 0.006<br>(0.012)     | -0.022<br>(0.022)    | -0.020<br>(0.025)       | 0.006<br>(0.012)     |
| <i>Simple Controls</i>               | <i>Ben Ali%, Offshore%,Public%, log (NTB+1), log(Tariff+1)</i><br><i>(all held constant at their last observed pre-Revolution levels in the post 2010 period)</i>                  |                         |                      |                      |                         |                      |
|                                      | Yes  | Yes                     | Yes                  | Yes                  | Yes                     | Yes                  |
| <i>Interacted Controls</i>           | <i>Ben Ali%*Log (Tariff+1), Offshore%*Log (Tariff+1),Public%*Log (Tariff+1)</i><br><i>(all held constant at their last observed pre-Revolution levels in the post 2010 period)</i> |                         |                      |                      |                         |                      |
|                                      |  |                         |                      | Yes                  | Yes                     | Yes                  |
| Country*year FE                      | Yes  | Yes                     | Yes                  | Yes                  | Yes                     | Yes                  |
| Country*product                      | Yes  | Yes                     | Yes                  | Yes                  | Yes                     | Yes                  |
| N                                    | 55933  | 54823                   | 54823                | 55933                | 54823                   | 54823                |
| Number of products                   | 1217   | 1217                    | 1217                 | 1217                 | 1217                    | 1217                 |
| R2                                   | 0.524  | 0.237                   | 0.358                | 0.525                | 0.500                   | 0.358                |
| Adjusted R2                          | 0.470  | 0.217                   | 0.283                | 0.470                | 0.441                   | 0.283                |

Note: Standard errors are clustered by product. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. Sample is confined to product-source-year combinations (i) in which imports reported in Tunisia and exports reported in partner countries are strictly positive and (ii) which were imported both before and after the revolution, (iii) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (iv) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over this period.



**Table 10 Elasticity of reported import values, quantities and prices with respect to tariffs at firm-product-source country level**

| <b>The Elasticity of Imports With Respect to Tariffs at the Firm-Product-Source Country level</b> |                |                |                |                |                |                |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| <i>Dependent Variable:</i>  | <i>Log V</i>   | <i>Log Q</i>   | <i>Log P</i>   | <i>Log V</i>   | <i>Log Q</i>   | <i>Log P</i>   |
|   | (1)            | (2)            | (3)            | (4)            | (5)            | (6)            |
|   | <b>coef/se</b> | <b>coef/se</b> | <b>coef/se</b> | <b>coef/se</b> | <b>coef/se</b> | <b>coef/se</b> |
| Log (Tariff+1)  | -0.133*        | -0.133         | 0.001          |                |                |                |
|   | (0.073)        | (0.098)        | (0.059)        |                |                |                |
| Ben Ali *Log (Tariff+1)   | 0.098          | 0.211***       | -0.113**       | 0.092          | 0.194***       | -0.102*        |
|   | (0.062)        | (0.078)        | (0.057)        | (0.071)        | (0.074)        | (0.054)        |
| Offshore*Log (Tariff+1)   | 0.251***       | 0.152*         | 0.099          | 0.193*         | 0.042          | 0.150**        |
|   | (0.066)        | (0.081)        | (0.055)        | (0.081)        | (0.092)        | (0.060)        |
| Public *Log (Tariff+1)  | -0.070         | 0.223          | -0.293**       | 0.127          | 0.562***       | -0.434***      |
|   | (0.144)        | (0.183)        | (0.129)        | (0.170)        | (0.140)        | (0.141)        |
| Ben Ali firm  | -0.279         | -0.498*        | 0.218          | -0.185         | -0.425*        | 0.239          |
|   | (0.226)        | (0.289)        | (0.190)        | (0.242)        | (0.249)        | (0.156)        |
| Offshore  | 0.251***       | 0.152*         | 0.099*         | -0.372         | -0.009         | -0.363*        |
|   | (0.213)        | (0.300)        | (0.214)        | (0.277)        | (0.358)        | (0.205)        |
| Public  | 1.168**        | 0.177          | 0.991**        | 0.633          | -0.877*        | 1.510***       |
|   | (0.515)        | (0.651)        | (0.460)        | (0.664)        | (0.499)        | (0.495)        |
| Log Y   | 0.136***       | 0.142***       | -0.006         | 0.157***       | 0.159***       | -0.002         |
|   | (0.027)        | (0.029)        | (0.016)        | (0.022)        | (0.024)        | (0.016)        |
| Log L   | 0.100***       | 0.029          | 0.071**        | 0.099***       | 0.055*         | 0.044          |
|   | (0.024)        | (0.033)        | (0.029)        | (0.021)        | (0.029)        | (0.027)        |
| Log Age   | -0.028         | -0.009         | -0.019         | -0.037         | -0.023         | -0.014         |
|   | (0.027)        | (0.042)        | (0.030)        | (0.028)        | (0.040)        | (0.026)        |
| Log (NTB + 1)   | -0.039         | -0.091         | 0.052          |                |                |                |
|   | (0.057)        | (0.072)        | (0.045)        |                |                |                |
| N   | 48032          | 48032          | 48032          | 48032          | 48032          | 48032          |
| Number of firms   | 3052           | 3052           | 3052           | 3052           | 3052           | 3052           |
| Sector FE   | Yes            | Yes            | Yes            |                |                |                |
| Country*Year FE   | Yes            | Yes            | Yes            |                |                |                |
| Product FE  | Yes            | Yes            | Yes            |                |                |                |
| Product*Country*Sector*Year FE  |                |                |                | Yes            | Yes            | Yes            |
| R2  | 0.363          | 0.577          | 0.703          | 0.471          | 0.672          | 0.790          |
| Adjusted R2   | 0.352          | 0.569          | 0.698          | 0.377          | 0.614          | 0.753          |

Note: Standard errors are robust and clustered by firm. \*\*\* p<0.01, \*\* p<0.05, \* p=0.10. Note: sample is confined to (5-digit) sector-product-source combinations in which (i) at least one Ben Ali firm and at least one other firm of a different types are simultaneously importing during the same year, (ii) for which tariff data exist, (iii) in which imports reported in Tunisia and exports reported in partner countries are strictly positive, (iv) from countries which are among the top 15 source countries in terms of cumulative import value (either as declared by partners or as declared by Tunisian customs) over the period 2002-2009, and (v) products which account for at least 0.01 percentage points of import value (either as declared by partners or as declared by Tunisian customs) over this period. In addition, (vi) observations that fall in the top and bottom 1% of normalized prices, quantities and values are excluded. The sample comprises 9 public firms, 1787 onshore firms, 1145 offshore firms, and 113 Ben Ali firms.

**Table 11: Import prices: Before and after being privatized to the Ben Ali family**

| <b>The Evolution of Log Unit Prices Before and After Privatization</b> |                     |                   |  |
|--|---------------------|-------------------|--|
| Dependent Variable: log price  |                     |                   |  |
| <i>Standard errors clustered by</i>                                    | <i>Firm-product</i> | <i>Product</i>    | <i>Product</i><br>Excluding outlier firm |
|  | (1)                 | (2)               | (3)                                      |
|  | <b>coef/se</b>      | <b>coef/se</b>    | <b>coef/se</b>                           |
| Post-Privatization   | -0.003<br>(0.051)   | -0.003<br>(0.069) | -0.008<br>(0.071)                        |
| Post-Privatization*Ben Ali Owned                                       | -0.179**<br>(0.080) | -0.179<br>(0.230) | -0.556**<br>(0.280)                      |
| Firm*Product*Source Country FE   | Yes                 | Yes               | Yes                                      |
| Product*Source Country*Year FE   | Yes                 | Yes               | Yes                                      |
| N  | 55452               | 55452             | 38409                                    |
| Firms  | 1016                | 1016              | 984                                      |
| Privatized Firms   | 23                  | 23                | 22                                       |
| Privatized to the Ben Ali family                                       | 5                   | 5                 | 4  |
| #products  | 365                 | 365               | 295                                      |
| #firm*products   | 9382                | 9382              | 6374                                     |
| R2   | 0.849               | 0.849             | 0.857                                    |
| Adjusted R2  | 0.794               | 0.794             | 0.794                                    |

Note: Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p = 0.10$ . Sample confined to source-product-years in which (to be) privatized firms are importing, and source-product combinations imported by at least one privatized firm both at least once before and at least once after privatization. Competitor firms are included if they import at least twice from the same source-product country combination and operate in the same sector as (to be) privatized firms.

## Appendix A: Data Construction

| Variable                                | Description  | Source     |
|---|--|------------|
| <b><u>Firm Types</u></b>                |  |            |
| <i>Ben Ali Firm</i>                     | Dummy variable taking the value 1 if the firm is owned, fully or in part, by a member of the Ben Ali clan.   | CC and MoF |
| <i>Offshore Firm</i>                    | A dummy variable taking the value 1 if a firm is privately owned by entities other than the Ben Ali clan and operates in the tax regime 'totalement exportatrice', commonly referred to as the "offshore" sector. Firms in this tax regime do not have to pay output and import taxes, provided they export at least 70% of their output or sell it to other "offshore" firms. | INS        |
| <i>Onshore Firm</i>                     | A dummy variable taking the value 1 if a firm is privately owned and neither operates in the 'totalement exportatrice' tax regime nor is owned by the Ben Ali clan.  | INS        |
| <i>Public Firm</i>                      | A dummy variable taking the value 1 if a firm is state owned.  | INS        |
| <b><u>Firm Characteristics</u></b>      |  |            |
| <i>Y</i>                                | Output as reported in firm's annual tax declaration.   | MoF        |
| <i>L</i>                                | Number of salaried employees (annual average over 4 quarters).   | INS        |
| <i>Age</i>                              | The age of the firm defined as the difference between the current year minus the year in which it first registered.  | INS        |
| <i>Sector</i>                           | Classification of a firm's main activity based on the Nomenclature d'Activités Tunisienne (NAT) 1996 5 digit classification, the most disaggregated sector classification available in Tunisia.  | INS        |
| <i>Post Privatization</i>               | Dummy value that takes the value 1 after a firm has been privatized and zero while the firm is still public or is never privatized.  | MoF        |
| <i>Post-Privatization*Ben Ali Owned</i> | Dummy value that takes the value 1 after a firm has been privatized and is owned by the Ben Ali family, and zero while the firm is still public, is never privatized, or privatized to owners not belonging to the Ben Ali clan.   | MoF        |
| <b><u>Trade policy data</u></b>         |  |            |
| <i>Tariff</i>                           | Bilateral tariff between Tunisia and a partner country at year t for a certain product (HS6); note that for years for which such information is missing, the last year for which such information is available is used. Tariff data are missing altogether for 2007 and 2009; for these years we use the values from 2006 and 2008 respectively.                               | WITS       |
| <i>Non-Tariff Barrier (NTB)</i>         | This variable measures the sum of all import-related non-tariff barriers at the product-year level. The raw data contain the year of creation of these non-tariff measures, but not the year of their removal.   | WITS       |

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**Trade**

|                |  |          |
|----------------|--|----------|
| <i>Exports</i> | Exports of a certain product (HS6) from a specific country (s) at a year t | COMTRADE |
| <i>Imports</i> | Imports of a certain product (HS6) from a specific country (s) at a year t | COMTRADE |

**Evasion Gaps**

|                     |  |          |
|---------------------|--|----------|
| <i>Value Gap</i>    | Log Export Value Reported by Partner – Log Import Value Reported in Tunisia, measured at the HS6-country-year level.           | COMTRADE |
| <i>Quantity Gap</i> | Log Export Quantity Reported by Partner – Log Import Value Reported in Tunisia, measured at the HS6-country-year level.        | COMTRADE |
| <i>Price Gap</i>    | Log Export Unit Price Reported by Partner – Log Import Unit Price Reported in Tunisia, measured at the HS6-country-year level. | COMTRADE |

**Definition of Tariff Categories**

|                    |  |      |
|--------------------|--|------|
| <i>High Tariff</i> | The tariff rate is greater than or equal to 36   |      |
| <i>Low Tariff</i>  | The tariff rate is strictly smaller than 36.   |      |
| $(T \geq 40)$      | Dummy variable taking the value 1 if the tariff rate is at least 40% and zero otherwise.                                     | WITS |
| $(20 \leq T < 40)$ | Dummy variable taking the value 1 if the tariff rate is equal to or greater than 20% but smaller than 40% but zero otherwise | WITS |
| $(T < 20)$         | Dummy variable taking the value 1 if the tariff rate is smaller than 20% and zero otherwise.                                 | WITS |

**Predicted Import Share**

|                               |  |   |
|-------------------------------|--|---|
| <i>Predicted import share</i> | The predicted import share of different groups of firms (Ben Ali firms, offshore firms, onshore firms, and public firms) based on the consumption weighted average of their market shares across industries, with industry consumption weights depending on how intensively a particular HS6 product is used by a given industry. Specifically, comprehensive tax data were used to compute the aggregate market shares of the different types of firms in each 5-digit sector in a given year. Subsequently, an IO table was used to identify what share of imports of a particular HS6 product is used by a given sector; consumption weights (summing to 1) were assigned to each of the different sectors (note that if a certain sector does not use these imports the consumption weight is zero by construction). The predicted import share of firms of type j was calculated as the sum of the aggregate market shares of firms of type j across sectors multiplied by the relevant consumption weights for those sectors. Not all products were covered by the IO table, so the predicted import shares could only be calculated for a subset of all products (mostly comprising intermediate inputs). | Own calculations with help from the INS |
|-------------------------------|--|---|

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INS=Institut National de la Statistique, MoF=Tunisian Ministry of Finance, CC=La Commission Nationale de Gestion d'Avoirs et des Fonds objets de Confiscation ou de Récupération