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Chinese Networks and Tariff Evasion

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1. INTRODUCTION

THE prevalence of illicit trade has come as the dark side of globalisation, resulting in violence, distorted competition and loss of tariff revenue (Fisman and Wei, 2004, 2009; Naim, 2005). Despite various campaigns, policies to tackle it have so far proved futile (see e.g. Anson et al. 2006; Yang, 2008). This paper aims at shedding more light on the determinants of this underground activity.

Recent research has used discrepancies in official trade statistics to detect smuggling, asserting that imports missing from one country's reports may have been smuggled, misreported or underinvoiced, as first noted by Bhagwati (1964). While missing imports cannot be used to quantify smuggling precisely, they are still relevant to identify correlation patterns and uncover the causes of illicit flows such as bumpy tariff schedules and corrupt environments (Fisman and Wei, 2004, 2009).

In this paper, we argue that international networks play an important role in international smuggling. Networks have been found to facilitate international trade by enforcing contracts and providing market information (Greif, 1993; Rauch and Trindade, 2002). As smuggling occurs outside the law, market information is hard to find and trust is all the more important to overcome hold-up problems (Marcouiller, 2000). Networks should hence also play an important role in illicit trade.

To test for this prediction, we study the case of China. There are two main reasons for this focus. The first is that tariff evasion at China's borders is a severe

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problem authorities have been trying to tackle for many years. According to the General Administration of Customs, customs and police departments have prosecuted more than 90,000 smuggling cases involving goods worth $24.2 billion from 1999 to 2004. But much of it remains undetected. FedEx (2010) warns on its website that Chinese 'customs officials still have wide discretion concerning the category in which an import is placed [and have] the flexibility [. . .] to "negotiate" duties'. The second reason is the presence of overseas Chinese networks that act as trade catalysts (Rauch and Trindade, 2002).

We test whether Chinese networks increase tariff evasion in Chinese trade by combining the analysis of Fisman and Wei (2004), which captures tariff evasion through the tariff semi-elasticity of missing imports, with that of Rauch and Trindade (2002), which uses a gravity equation to show that overseas Chinese increase trade flows. More precisely, we show that the tariff semi-elasticity of Chinese missing imports increases significantly in the number of ethnic Chinese migrants in the exporting country. This result holds under various specifications, different periods and when Chinese networks are proxied by the ethnic Chinese migrant share of the total population.

As some may argue that missing trade values are too noisy of a measure to capture smuggling as they include exchange-rate errors and freight and insurance costs, we show that the results also hold when missing imports are measured in quantities.

To show that our results are not due to an omitted variable bias, that is, because of any country characteristic possibly correlated with Chinese immigration, we include in our regressions variables interacting the tariff with all country characteristics that may be correlated with Chinese immigration, such as GDP, distance to China and trade with China. We find that the interaction with Chinese networks is very robust, never losing significance.

We then examine more carefully whether Chinese networks facilitate tariff evasion through misreporting, that is, the declaration of imports as similar goods with lower tariffs, through under-invoicing, that is, the declaration of lower unit prices, or through the under-declaration of quantities.

To test for misreporting, we follow Fisman and Wei (2004) and include the average tariff on similar goods as a variable explaining missing imports, as lower tariffs on similar goods increase the incentive to disguise products. We also add its interaction with the tariff spread within similar product categories as bigger spreads also increase the incentive to misreport. We find no evidence of misreporting or of Chinese networks increasing this practice.

To test for under-invoicing, we follow Javorcik and Narciso (2008). We first regress unit-price differences on tariffs but find no evidence of tariffs affecting unit-price differences between exports and imports no matter the size of the Chinese network. We then check whether Chinese networks play a bigger role when products are differentiated, as a higher level of product differentiation

increases the difficulty in ascertaining prices and classifications, and hence in detecting misreporting or under-invoicing. While we do find that tariff evasion is more pronounced in differentiated products, we find that Chinese networks play an equal role no matter the type of goods.

Taken together, these results suggest Chinese networks help tariff evasion mostly through the under-declaration of quantities. To further investigate this possibility, we check whether Chinese networks facilitate evasion more when goods are reported in kilograms, and hence harder to under-declare as it is easier to weigh a container than to count the number of packaged units. We find that Chinese networks play less of a role in tariff evasion when goods are in kilograms, highlighting their role in under-declaring quantities when goods are harder to count.

Finally, we find that Chinese migrants also facilitate tariff evasion in their host countries and that this effect is highest in corrupt countries, though not significantly.

In the next section, we review the literature. Section 2 presents the theoretical background. Section 3 describes the data and empirical strategy. Section 4 discusses the results and the final section concludes.

2. LITERATURE REVIEW

The idea that discrepancy in trade statistics could be attributed to smuggling dates back to Bhagwati (1964). In theory, what one country reports as imports should be equal to what its partner reports as exports (or plus cost of freight and insurance (cif) if values are reported, rather than quantities). In practice, this is rarely the case. Tariff evasion may be one of the reasons. Goods may be under-declared or misreported at import customs or may circumvent customs altogether.

Fisman and Wei (2004) looked at the missing trade between Hong Kong and China. They found that an increase in tariff (plus VAT) of one percentage point resulted in a 3 per cent increase in missing imports on average. They also argued that tariff evasion happened through misreporting in similar categories. For example, frozen chicken breasts are passed as turkey breasts to avoid high tariffs (Fisman and Miguel, 2008). Javorcik and Narciso (2008) confirmed the tariff evasion result, using data on trade between Germany and 10 Eastern European countries. They also argued that a higher level of product differentiation increases tariff evasion as it increases the difficulty in ascertaining prices and classifications and hence in detecting misreporting or under-invoicing. Mishra et al. (2008) confirmed these tariff evasion results for India and found a higher tariff semi-elasticity of missing imports for products where enforcement of customs law, proxied by the mode of entry, was laxer. More recently, many studies have confirmed the tariff evasion result for various African countries

(Arndt and Van Dunem, 2006; Levin and Widell, 2007; Bouet and Roy, 2009), North America (Stoyanov, 2009), Brazil (Kume et al., 2010), and for a cross section of 74 countries (Jean and Mitaritonna, 2010).

Yet very little research has gone further to identify the determinants of tariff evasion beyond high tariffs and corruption. Two notable exceptions have focused on the effect of policies. Yang (2008) studied the effect of customs reforms, that is, increased enforcement, on tariff evasion in the Philippines, and Anson et al. (2006) examined the effect of preshipment inspection in Indonesia, the Philippines and Argentina. Both studies reported mixed results. Another exception, Fisman et al. (2008) underlined the role of experts' knowledge in facilitating smuggling. It provided evidence that China's indirect trade through Hong Kong's warehouses, which involves agents specialised in processing and distribution, is not only a quality sorting and business matching process (Feenstra and Hanson, 2004) but also a tariff evasion process.

Another branch of international trade examined the role of migrant networks in facilitating trade. Greif (1993) pioneered this field, studying how Maghribi trading networks of the eleventh century could promote trade by providing community enforcement of sanctions that deter violations of contracts. Gould (1994) showed empirically that migrant networks played a key role in fostering US bilateral trade linkages, arguing that immigrants possess knowledge of home-country markets, language, preferences and business contacts that have the potential to decrease transaction costs. His analysis has been replicated by many studies that confirmed the protrade effect of migrant networks in most countries (see the latest wide-ranging literature review in Egger et al., 2012).

The literature has put forward two main channels through which migrant networks increase trade. The first is the information channel. By providing specific knowledge about products' supply and demand, migrant networks can lower the informational frictions associated with search costs. Rauch and Trindade (2002) showed this mechanism was at play by pointing up that ethnic Chinese networks promoted trade more intensely for search-intensive differentiated goods than for homogenous goods. The second is the trust channel. When there is a high degree of uncertainty about contract enforcement, as in international trade with corrupt countries, a high level of trust is required for transactions to happen (Guiso et al., 2009). Migrant networks provide this trust through cultural proximity, repeated transactions and knowledge of implicit business rules. Dunlevy (2006) and White and Tadesse (2008) provided evidence that this mechanism was at play; the former by showing that migrant networks were most important for trade in corrupt environments, and the latter by showing that cultural distance, which captures lack of trust, increased the role of migrant networks.

These mechanisms, that is, market information and trust, should hence also be at work for tariff evasion and might have even stronger impacts, for reasons we explain in the next section.

3. THEORETICAL BACKGROUND

There are at least two reasons why migrant networks should also be at work for illicit trade and might have even stronger impacts than on legal trade. The first is that trade matching in an underground activity is even more complicated. Market information does not flow freely and this makes it difficult to learn about illegal opportunities. Overseas Chinese may know exactly which businessmen are ready to engage in tariff evasion transactions and which varieties are in supply and demand in both China and their host countries. Besides market information, they may know how to package the goods to disguise them and how to fill export declarations appropriately. They may know which customs agents are corrupt, both in China and in their host country, and thus smooth the process of evasion and diminish the probability of getting caught. Indeed, an OECD report (2009) on foreign bribery through intermediaries explains how, when family, friends and other third persons act as intermediaries, 'the principal company knows the identity of the foreign public official who receives the bribe'.

Second, the total absence of a legal contract enforcement mechanism means mutual trust is crucial for traders wishing to evade tariffs. Chinese networks provide this trust notably through interpersonal relationships between members with a common background known as *guanxi*. Lee (2010) states that, in China, a *guanxi* based on loyalty 'may be crucial in determining business successes or at least in pursuing business opportunities since the rules of law have long been absent for the protection of private property rights and economic interests'.

These two mechanisms, that is, mutual trust and information (or *savoir faire*), should reduce the costs of tariff evasion, namely the search and matching costs, the informal contract enforcement costs, as well as the expected punishment costs by lowering the probability of getting caught.

Similarly to Mishra et al. (2008) who assume that the benefits of evasion increase in the tariff rate while the costs increase in the quality of enforcement, we can model the cost of evasion as a decreasing function of the size of the overseas networks[1]. Following the assumptions in Mishra et al. (2008),[2] an increase in the size of the network increases the tariff elasticity of evasion. The empirical analysis aims at testing this prediction.

[1] See Appendix A1, available at http://pierrelouisvezina.weebly.com/ethnic-chinese-heatmap.html, for a simple derivation.

[2] The required assumption is that the marginal cost of smuggling is increasing in the fraction smuggled. As explained by Mishra et al. (2008), convex smuggling costs have been assumed commonly in the prior literature. One explanation is that authorities devote more effort to detecting larger smugglers (Yang, 2008). Also, we need to assume that the bigger the network, the less rapidly the marginal cost of smuggling rises with the amount smuggled.

4. DATA AND EMPIRICAL STRATEGY

We use 2005 trade data from Comtrade to compute, for each HS6 product (about 5000 products) and around 130 trade partners, missing imports as log (1 + exports to China declared by exporting countries) − log (1 + imports declared by China). We use both values and quantity data.[3] A list of countries can be found in appendix A2.[4]

We use tariff data from TRAINS (simple averages of applied tariffs). Figure 1a gives the distribution of tariffs in China. Most tariffs are between 0 per cent and 20 per cent, with 10 per cent being the most common tariff. Only 5 per cent of products (about 250 HS6 categories) have tariffs above 20 per cent.

Data on ethnic Chinese migrants, that is, foreign-born migrants from China, Hong Kong, Taiwan and Macau, are from the Global Migrant Origin Database, which extends the UN migrants stock data based on the 2000 round of censuses (i.e. between 1995 and 2004; see Parsons et al., 2007, for a detailed description). The world distribution of ethnic Chinese is given in the heat map in Figure 1b. The biggest ethnic Chinese population outside China can be found in Hong Kong (about 2.3 million). We treat Hong Kong as a trading partner since it has its own customs, being a special administrative region within China. The US hosts the second biggest community, at about 1.5 million, followed by Canada, Malaysia, the Philippines and Japan.[5] Population data, which we use to calculate Chinese networks as a share of total population, are from CEPII.

To measure corruption, we take the reverse of control-of-corruption, an index developed by Kaufmann et al. (2010), which is an aggregation of various indicators that measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests. China is among the most corrupt countries in the world (in 2005, it was at the 28 percentile), punching above its weight when compared to countries with a similar income or with neighbouring countries. Summary statistics are given in Table 1.

We use 2005 tariff and trade data for two main reasons. The first is that it maximises data availability. The second is that, as explained by Ahn et al. (2010), by 2005, any Chinese firm that wished to directly trade with foreign partners was free to do so, as WTO accession in 2001 implied a progressive removal of trading licence and firm size requirements. This freedom to trade for all businesses should increase the relevance of overseas networks.

[3] For quantities, we use all reported quantities except when reported units do not match.
[4] Our online appendix also includes links to our full data set and a replication do-file.
[5] It should be noted that this data only proxies for ethnic Chinese networks. It is however the best-available estimate and is an updated version of the data used by Rauch and Trindade (2002).

FIGURE 1
(a) Chinese MFN Tariffs, (b) The World Distribution of Ethnic Chinese Migrants in 2000 (Log Scale), (c) Missing Imports

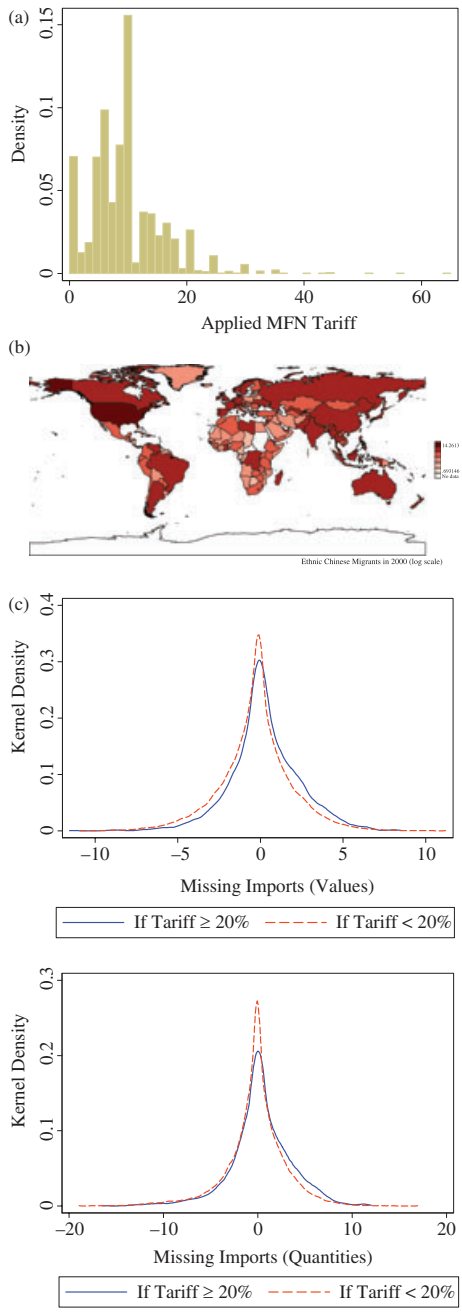


TABLE 1
Summary statistics

Variable	*Observations*	*Mean*	*Median*	*Standard Deviation*	*Min*	*Max*
Chinese missing imports						
Export_value	59,627	6188.327	109.222	75751.65	0	8,220,975
Import_value	59,627	7769.374	145.838	97684.44	0.001	9,691,029
Missing_import_value	59,627	−0.23224	−0.1661	2.13465	−11.5466	11.21912
Export_quantity	56,963	1.16E+07	7,200	6.43E+08	0	1.17E+11
Import_quantity	56,963	1.26E+07	8,132	6.09E+08	0	1.11E+11
Missing_ import_ qty	56,963	−0.17297	−0.04082	3.133047	−18.952	17.03606
China tariff	59,627	9.109961	8.4	6.005032	0	65
Partners' missing imports						
Export_value	194,538	3368.004	73.531	59929.77	0	8,777,217
Import_value	194,538	4528.789	102.445	73434.97	0	1.13E+07
Missing_import_value	194,538	−0.34684	−0.26574	2.003272	−11.8058	11.87726
Export_quantity	193,038	7,266,861	17,000	1.76E+09	0	7.71E+11
Import_quantity	188,213	2,790,668	18,265	1.46E+08	0	4.18E+10
Missing_ import_ qty	187,593	−0.22634	−0.05482	3.554737	−19.3725	20.9572
Partner tariff	194,538	8.031344	5	10.30302	0	991.49
Chinese immigrants and corruption						
Chinese	128	54034.05	1243.5	251436.8	0	2,267,183
Chinese share	126	0.004618	0.000152	0.030816	0	0.340163
Corruption	125	−0.16529	0.174383	1.005679	−2.52976	1.385773

Note:
(i) Summary statistics are computed on the data sets that are used for the main estimations. Statistics for Chinese, Chinese share and corruption are calculated using the data set with variables for tariff evasion in China.

It is important to note that missing trade is a noisy measure that captures much more than smuggling activities. Import values include cost-insurance and freight (cif) costs whereas export values are free on board (fob), so the difference in reports also includes some trade costs. It may also be noisy because of exchange-rate miscalculations, lax custom statisticians and indirect trade confusing reports. Nitsch (2011) discusses in detail the various reasons for discrepancies in bilateral trade statistics. Still, as Fisman (2009) reminds us, while the trade gap cannot be used to quantify smuggling precisely, it is still relevant to identify correlation patterns and uncover the causes of illicit flows.

Figure 1c gives the distribution of missing imports. When imports restrictions are high, for example, when a tariff is above the 95th percentile (20%), the distribution of missing imports shifts slightly to the right, suggesting more imports go missing from the importer's reports. In appendix A1, we provide the values of missing imports by partner country and at the two levels of tariffs. In more than 75 per cent of the cases, missing import values are greater when tariffs are high.

Before testing our main prediction, we estimate the effect of tariffs on Chinese missing imports using the following model:

$$missing\ imports_{ik} = \alpha_i + \beta\, tariff_{ik} + \epsilon_{ik}, \quad (1)$$

where α_i is a partner fixed effect and k is a product (HS6-digit tariff line) indicator.[6] Columns 1 and 6 of Table 2 summarise the results for missing imports in values and quantities, respectively. In both cases, we find that a 10 percentage point increase in tariff increases missing imports by about 30 per cent, which confirms the result of Fisman and Wei (2004) for imports from Hong Kong.

We then estimate the tariff semi-elasticity of Chinese missing imports per partner country, dropping countries with too few observations (less than 70 observations), and plot it against the size of the Chinese migrant community (Figure 2). We find a positive relationship, suggesting migrant networks may increase tariff evasion.[7]

To examine the role of migrant networks more carefully and test our main prediction, we interact the migrant network variable with tariffs and estimate:

$$missing\ imports_{ik} = \alpha_i + \beta_1\, tariff_{ik} + \beta_2\, (tariff_{ik} \times ln(1 + Chinese_i)) + \epsilon_{ik}, \quad (2)$$

where $Chinese_i$ is the number of ethnic Chinese migrants in country i. We also use a specification replacing ln (1 + $Chinese_i$) with $Chinese\ share_i$, that is, the share of ethnic Chinese migrants in country i's population (expressed as the log-difference). As suggested by Rauch and Trindade (2002), the number of Chinese migrants may indicate the number of potential Chinese connections with the partner country, while the share of the country's population may proxy the probability of picking a Chinese business partner in the foreign country.

Our theoretical framework suggests that the tariff semi-elasticity of missing imports should increase with the (log) number of Chinese migrants in the exporting country, that is, $\beta_2 > 0$.

5. RESULTS

Results are presented in Table 2. For both values and quantities and both measures of ethnic Chinese networks, we find evidence of a positive and significant coefficient on the interaction of *Chinese* (or *Chinese share*) and *tariff*, which also holds when including product fixed effects and thus when

[6] Besides import tariffs, VAT rates can create incentives to underreport imports. China's VAT rates vary from 13 per cent to 17 per cent (besides exemptions). In their paper on tariff evasion in trade between Hong Kong and China, Fisman and Wei (2009) add VAT rates to import tariffs at the HS8-digit level, but they report that their results are unchanged if VAT rates are dropped.

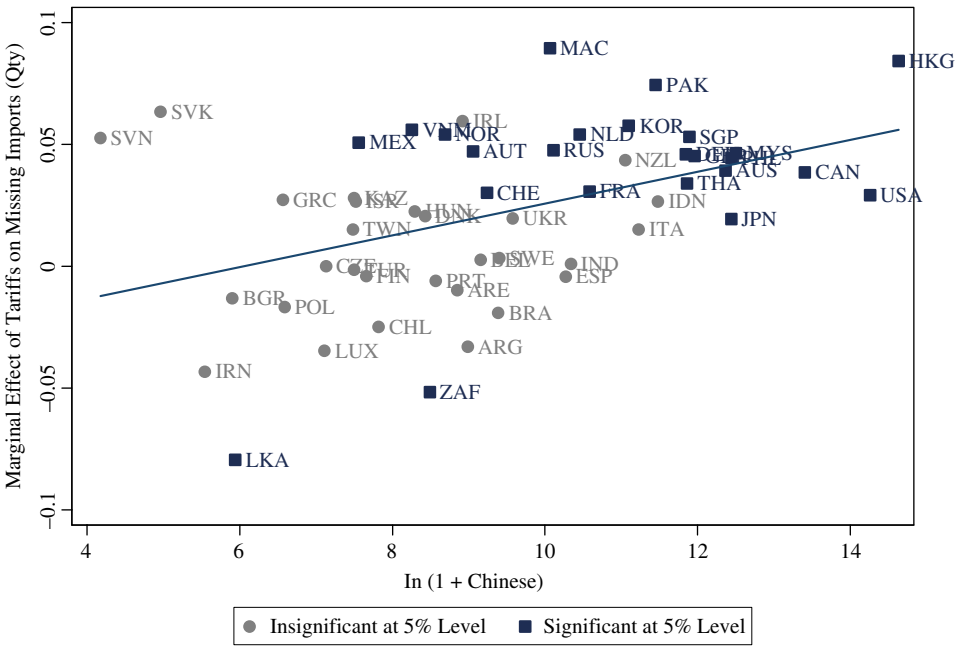
[7] Plotting Chinese migrants as a share of the total partner's population on the horizontal axis, or using missing import values rather than quantities, does not alter the figure.

TABLE 2
The role of Chinese networks in tariff evasion in China

	Missing Import Values					*Missing Import Quantities*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Tariff	0.03***	0.0037		0.052***		0.031***	−0.031***		0.082***	
	(0.0022)	(0.0076)		(0.0056)		(0.0032)	(0.012)		(0.0093)	
Tariff × Chinese		0.0031***	0.0028***				0.0057***	0.0046***		
		(0.00067)	(0.0007)				(0.0011)	(0.0011)		
Tariff × Chinese share				0.0034***	0.0034***				0.0078***	0.0078***
				(0.00080)	(0.00088)				(0.0013)	(0.0014)
Observations	59,627	59,627	59,627	56,354	56,354	59,627	56,963	56,963	54,331	54,331
R2	0.089	0.089	0.234	0.092	0.239	0.167	0.168	0.307	0.172	0.313
Fixed effects	Partner	Partner	Partner, product	Partner	Partner, product	Partner	Partner	Partner, product	Partner	Partner, product

Note:
(i) Standard errors clustered at the product level. ***denotes statistical significance at the 1% level.

FIGURE 2
Tariff Semi-elasticity of Missing Import Quantities and Ethnic Chinese Migrants

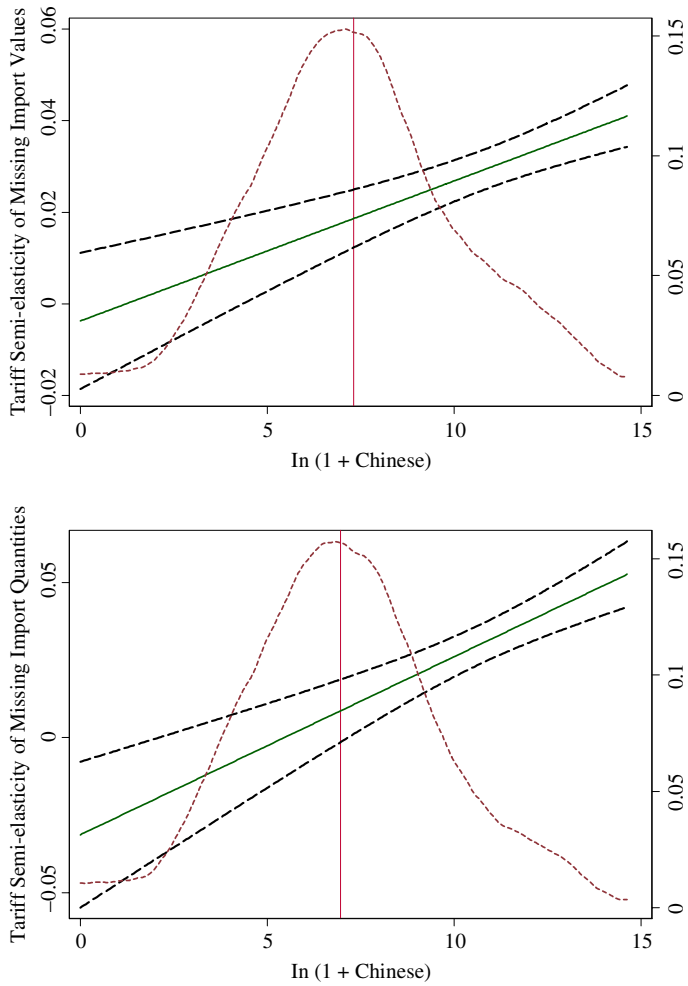


controlling for all product and partner level characteristics. This confirms our prediction that Chinese networks increase tariff evasion in Chinese imports.

Figure 3 summarises the result of columns (2) and (7) in Table 2, showing how the effect of *tariff* on *missing imports* increases as the size of the ethnic Chinese network increases. This suggests that tariff evasion occurs more on trade from countries with a larger Chinese network. It implies that tariff cuts targeted at some countries would reduce evasion more effectively. For instance, in trade with the US, where there is more than 1.5 million Chinese-born, a tariff cut from 20 per cent to 10 per cent could decrease the value of missing imports by as much as 47 per cent. However, in trade with France, where only about 40,000 Chinese migrants live, the same tariff change would decrease evasion by less than 37 per cent. The same tariff cut would reduce evasion on Brazilian imports by around 32 per cent. Table 3 provides a few simulations to show how tariff cuts would reduce evasion on imports from various countries.

These results are robust to an alternative construction of the data set where we replace missing data on trade values and quantities with zeros (Table S1).

FIGURE 3
Tariff Evasion and Ethnic Chinese Networks



Notes:
(i) Thick Dashed Lines Give 95% Confidence Interval.
(ii) Thin Dashed Line is a Kernel Density Estimate of In (1 + Chinese).

A possible concern about our estimation is that the results are just applicable to a specific time period. To check for this possibility, we use data on Chinese migrants from Rauch and Trindade (2002) that refers to a period around 1990. The correlation between the logs of Chinese circa 1990 and circa 2000 is 0.61. Trade and tariff data are from 1994 (previous years have very little Chinese data). As reported in Table 4, the main result still holds when using *Chinese* or *Chinese share*, and when including both product and partner fixed effects. This

TABLE 3
Simulated drops in missing imports following tariff cuts

Exporting Country	*Ethnic Chinese Migrants and Share of Total Population (%)*	*Tariff Cut (%)*		
		5 points	*10 points*	*15 points*
Hong Kong	2,267,183	24.53	49.07	73.60
	34%	24.17	48.33	72.50
US	1,561,674	23.95	47.91	71.86
	0.55%	17.15	34.31	51.46
France	39,490	18.25	36.51	54.76
	0.07%	13.65	27.30	40.95
Brazil	11,950	16.40	32.80	49.21
	0.007%	9.74	19.47	29.21

TABLE 4
Effect of Chinese networks on tariff evasion – 1994

	Missing Import Values		*Missing Import Quantities*	
Tariff × Chinese	0.0015***		0.0062***	
	(0.00031)		(0.0012)	
Tariff × Chinese share		0.0016***		0.0070***
		(0.00026)		(0.00097)
Observations	26,464	26,464	23,482	2,3482
R2	0.363	0.364	0.577	0.581

Notes:
(i) Partner and product fixed effects regressions. Standard errors clustered at the product level.
(ii) *** denotes statistical significance at the 1% level.

is despite the more limited coverage of the data set (only 43 countries could be used in the estimation).[8]

We also run a panel regression covering the 2000–08 period, holding *Chinese* constant throughout the years and including partner–product and year fixed effects. We find evidence of Chinese networks increasing tariff evasion for both values and quantities but only when networks are measured as *Chinese share* (Table S2).

As ethnic Chinese migrants could be capturing other country characteristics or bilateral affinity, our coefficient on the interaction of *Chinese* and *tariff* could be biased. To address this potential endogeneity concern, we add variables interacting *tariff* with a set of country characteristics that could be driving both tariff evasion and Chinese immigration. Chinese migrants could target larger countries where labour demand is higher, or locate in richer and more

[8] We also run a specification in first-differences, but do not find a statistically significant correlation between the difference in missing imports and the difference in applied tariff in 2005 and 1994 (after having ensured that both data were classified according to the HS1992 system).

industrialised countries that tend to have more experience in international commerce and, possibly, tariff evasion transactions. The interactions between *tariff* and the exporters' GDP, GDP *per capita*, and manufacturing value-added as a share of GDP should thus isolate these effects. We also control for the interaction of *tariff* with aggregate bilateral trade flows as tariff evasion might be easier with established trading partners and Chinese migrants are associated with larger bilateral trade flows, as Rauch and Trindade (2002) show. Tariff evasion could be easier when imports come from neighbouring countries where Chinese migrants tend to concentrate; the interactions with geographic distance and a border dummy control for these channels. We also add an interaction of *tariff* with genetic distance from China (see Spolaore and Wacziarg, 2009), as cultural proximity is a fundamental ingredient for trust-based transactions and Chinese might migrate more towards culturally close countries. Finally, *tariff* is also interacted with an indicator of corruption in the exporting country as criminal networks may be more likely to operate where law enforcement is weak. The results are in Table 5. Standardised beta coefficients are reported to help comparison of the marginal effect of each interaction on tariff evasion. The interaction of *tariff* with *Chinese* does not lose significance. The results also hold when using *Chinese share*. We also find that in some cases a lower GDP

TABLE 5
Robustness to omitted factors

	Missing Import Values		*Missing Import Quantities*	
	(1)	*(2)*	*(3)*	*(4)*
Tariff × Chinese	*0.25 (0.11)***		*0.55 (0.17)****	
Tariff × Chinese share		0.15 (0.070)**		0.34 (0.11)***
Tariff × distance	−0.0057 (0.19)	−0.0080 (0.20)	−0.31 (0.28)	−0.32 (0.28)
Tariff × GDP	−1.33 (0.50)***	−0.75 (0.54)	−1.92 (0.70)***	−0.63 (0.76)
Tariff × GDPPC	0.097 (0.22)	−0.11 (0.23)	0.54 (0.31)*	0.080 (0.32)
Tariff × total trade	0.28 (0.21)	0.28 (0.21)	−0.047 (0.31)	−0.047 (0.31)
Tariff × genetic distance	0.13 (0.067)*	0.13 (0.067)*	0.090 (0.095)	0.088 (0.095)
Tariff × border	0.0078 (0.12)	0.0069 (0.12)	−0.058 (0.16)	−0.060 (0.16)
Tariff × corruption	−0.018 (0.042)	−0.018 (0.042)	−0.060 (0.059)	−0.060 (0.059)
Tariff × manufacturing	−0.031 (0.11)	−0.031 (0.11)	0.19 (0.16)	0.19 (0.16)
Observations	55985	55985	54007	54,007
R2	0.240	0.240	0.314	0.314

Notes:
(i) Standardised beta coefficients from partner and product fixed effects regressions. (ii) All country-level variables except border and corruption are in natural logarithm. (iii) Standard errors clustered at the product level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

is associated with increased tariff evasion. However, this result does not hold across all specifications. Overall, these tests suggest that the effect of Chinese networks on tariff evasion is not channelled through any other partner country characteristics related to trade or income nor through any other measure of bilateral affinity with China.[9]

a. Different Modes of Tariff Evasion

To take our analysis further, we examine whether tariff evasion occurs through misreporting, under-invoicing or quantity under-declaring and whether Chinese networks have different effects on these practices.

As outlined above, Chinese migrants might know how to package the goods to disguise them and how to fill export declarations appropriately to smooth the misreporting process. We first replicate the misreporting tests of Fisman and Wei (2004) who include the average tariff on similar goods (within the same HS4 category) on the right-hand side of our benchmark regression model (equation 1) to capture incentives to misclassify imports. A negative coefficient on the average tariff on similar products would provide evidence of misreporting. Unlike Fisman and Wei (2004), we find no evidence of misreporting (results not reported). This is in line with Javorcik and Narciso (2008) who find insignificant coefficients on misreporting. However, misreporting may depend on the tariff spread between similar goods. The lower the tariff on similar goods, the higher is the tariff dispersion, and the higher the incentive to misreport. To test for this, we interact tariff on similar goods with the spread of tariffs within HS4 categories. We find no indication of misreporting, no matter how big the tariff spread. We then investigate whether Chinese networks increase the misreporting results but do not find any such evidence (results not reported[10]).

This test cannot capture all types of misreporting. Misreporting may occur in similar goods at the 6-digit level, or in any type of service. For example, a portion of the true value of chicken imports might be declared as marketing services. We leave these questions to further research as our data do not allow computing average tariffs of similar products within 6-digit categories and do not cover trade in services.

To investigate whether tariff evasion occurs through under-declaration of prices, we first regress unit-price differences on *tariff* (as Javorcik and Narciso, 2008) and its interaction with *Chinese*. We find no indication that *tariff* is correlated with unit-price differences, no matter how big the Chinese network

[9] The coefficient on the interaction between *tariff* and *Chinese* stays positive and significant also when we introduce one extra interaction at a time (results not reported).
[10] Results are available in online appendix A3.

(results not reported[11]). As both Javorcik and Narciso (2008) and Mishra et al. (2008) argue that a higher level of product differentiation increases tariff evasion due to a greater difficulty in ascertaining product price and hence in detecting false reports, we check whether this is also the case for Chinese tariff evasion. We use the Rauch (1999) classification and identify products as non-differentiated when either the liberal or the conservative classification indicates that the product is traded on organised markets or listed in trade publications. Results in Table 6 indicate that, as found in previous research, for both values and quantities, a higher degree of product differentiation increases tariff evasion. However, the role of Chinese networks does not depend on product differentiation as the coefficient on the interaction of *Chinese*, *tariff* and the *non-differentiated* dummy is insignificant. This might be because importers under-declare quantities rather than prices, hence product differentiation does not matter. Results using *Chinese share* confirm this result and provide weak evidence that Chinese networks might play an increased role in smuggling homogenous goods.

We thus examine further whether the under-declaration of quantities is the main method of evasion, since we find no evidence of misreporting or under-invoicing. To do so, we exploit the different units under which goods are classified. About 72 per cent of goods' quantities are reported in kilograms. A further 25 per cent are in number of items. The remaining 3 per cent are a few various measures such as carat or square metres. We first find that reporting quantities in kilograms reduces missing import quantities by about 67 per cent. This might be because it is easy for customs agents to verify the weight of a container while it is much more demanding to count the number of packaged goods. In other words, lying about quantities should be easier when not in kilograms. We thus compare the role of networks in under-declaring quantities when the latter are in kilograms rather than the various other units. We find that networks play a smaller role when goods are measured in kilograms (Table 7). This suggests that networks facilitate tariff evasion through under-declaring most when it is harder to lie about quantities.

b. Tariff Evasion in Partner Countries

We now look at tariff evasion in partner countries, verifying whether the results hold when looking at missing imports from China. Anecdotal evidence suggests this might indeed by the case. In a 2007 press release, the European Anti-Fraud Office (2007) revealed a large-scale fraud scheme in imports of textiles and shoes from China involving overseas Chinese:

[11] Results are available in online appendix A3.

TABLE 6
Product differentiation and tariff evasion in China

	Missing Import Values					*Missing Import Quantities*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Tariff	0.031	0.0033		0.048		0.025	−0.0053		0.046	
	(0.0025)***	(0.0084)		(0.0063)***		(0.0036)***	(0.013)		(0.0099)***	
Non-differentiated	0.067	0.48		−0.26		−0.45	1.48		−2.16	
	(0.056)	(0.19)**		(0.15)*		(0.077)***	(0.29)***		(0.24)***	
Tariff ×	−0.011	−0.029		−0.011		0.0028	−0.058		0.053	
non-differentiated	(0.0060)*	(0.022)		(0.016)		(0.0084)	(0.034)*		(0.027)*	
Tariff ×		0.0025	0.0026				0.0027	0.0024		
log Chinese		(0.00074)***	(0.00079)***				(0.0012)**	(0.0012)**		
Tariff ×		0.0017	−0.00081				0.0057	0.0035		
log Chinese × non-differentiated		(0.0019)	(0.0023)				(0.0032)*	(0.0037)		
Log Chinese ×		−0.037	−0.017				−0.18	−0.15		
non-differentiated		(0.017)**	(0.019)				(0.027)***	(0.031)***		
Tariff ×				0.0027	0.0029				0.0033	0.0040
log Chinese share				(0.00088)***	(0.00095)***				(0.0014)**	(0.0015)***
Tariff ×				0.000013	−0.00096				0.0079	0.0075
log Chinese share × non-differentiated				(0.0022)	(0.0027)				(0.0038)**	(0.0045)*
Log Chinese share ×				−0.055	−0.043				−0.27	−0.26
non-differentiated				(0.020)***	(0.024)*				(0.034)***	(0.039)***
Observations	59,627	59,627	59,627	56,354	56,354	56,963	56,963	56,963	54,331	54,331
R2	0.089	0.089	0.234	0.092	0.239	0.171	0.173	0.308	0.179	0.316
Fixed effects	Partner	Partner	Partner and product	Partner	Partner and product	Partner	Partner	Partner and product	Partner	Partner and product

Notes:
(i) Standard errors clustered at the product level. (ii) ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively. (iii) 'Non-differentiated' equals 1 if both the liberal and conservative classifications of Rauch (1999) indicate that the product is either traded on organised markets or listed in trade publications and 0 otherwise.

TABLE 7
Effect of kg and Chinese networks on tariff evasion

	Missing Import Quantities	
Tariff × Chinese	0.00685***	
	(0.00150)	
Tariff × Chinese × kg	−0.00383***	
	(0.00144)	
Tariff × Chinese share		0.0116***
		(0.00176)
Tariff × Chinese share × kg		−0.00700***
		(0.00165)
Observations	56,963	54,331
R2	0.307	0.314

Notes:
(i) Partner and product fixed effects regressions. (ii) Standard errors clustered at the product level.
(iii) *** denotes statistical significance at the 1% level.

> The cover was blown off a band of Chinese, Hungarian and Austrian citizens who have smuggled large quantities of textiles and shoes from China into the EU by means of heavily undervalued and false invoices. The investigation revealed that mainly small customs clearance agents were used to do the customs clearance on behalf of Asian citizens. The overall quantity of textiles and footwear affected by this type of fraud until now can be estimated at around 600,000 tons.

Here, the missing import variable is the log difference between exports reported by China and imports reported by partner countries. The tariffs are those imposed on Chinese imports in partner countries. We also add corruption to the specification as it captures the borders' bribe-friendliness. Corruption should reduce the cost of evasion as tariff dodgers are less likely to face legal penalties in corrupt countries when offering a bribe. Results are shown in Table 8.

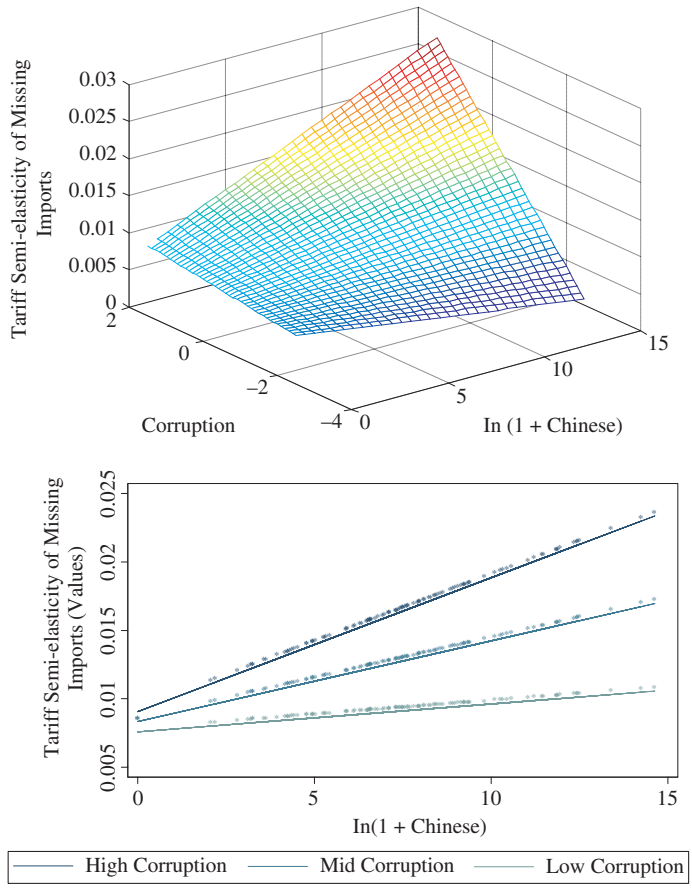
We find evidence, for both values and quantities, that *Chinese* increases tariff evasion on goods from China, even when we control for the possible effect of corruption in the importing countries. The result is not as robust as for tariff evasion in China as the coefficient of interest loses significance or turns even negative when we proxy Chinese networks with the Chinese share of total population. While their expertise is found to be most useful in the most corrupt countries (though not significantly), it remains so in countries with all levels of corruption. This is illustrated in Figure 4 which is based on results of column 2 in Table 8 and shows how the effect of tariff on missing imports is highest when corruption is high and when Chinese communities are biggest. The statistical significance of the coefficients can be verified in the lower panel. Our results using our alternative measure of missing imports which replaces missing values with zeros confirm that Chinese networks are more useful in corrupt countries (Table S3).

TABLE 8
The role of Chinese networks in tariff evasion in trading partners

	Missing Import Values					*Missing Import Quantities*				
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Tariff		0.0083		0.013			−0.0052		0.022	
		(0.0028)***		(0.0037)***			(0.0051)		(0.0053)***	
Tariff × Chinese	0.001	0.00059	0.0015			0.00085	0.0013	0.0012		
	(0.00017)***	(0.00029)**	(0.00011)***			(0.00016)***	(0.00046)***	(0.00016)***		
Tariff × Chinese share				0.000019	−0.0013				−0.0026	−0.0099
				(0.00043)	(0.00011)***				(0.0051)	(0.0054)*
Tariff × corruption		0.00074	0.0043	0.0055	−0.0011		0.019	0.021	0.0021	−0.0009
		(0.0039)	(0.0031)	(0.0037)	(0.0037)		(0.0068)***	(0.0060)***	(0.00070)***	(0.00017)***
Tariff × corruption × Chinese		0.00039	0.00028				−0.00090	−0.0011		
		(0.00036)	(0.00032)				(0.00058)	(0.00056)**		
Tariff × corruption × Chinese share				0.00020	−0.00069				−0.0020	0.0024
				(0.00051)	(0.00059)				(0.00081)**	(0.00086)***
Observations	193,331	193,331	193,331	190,214	190,214	186,490	186,490	186,490	184,103	184,103
R2	0.262	0.076	0.263	0.077	0.264	0.271	0.058	0.271	0.058	0.272
Fixed effects	Partner, product	Partner	Partner, product	Partner	Partner, product	Partner, product	Partner	Partner, product	Partner	Partner, product

Notes:
(i) Standard errors clustered at the product level. (ii) ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

FIGURE 4
The Impact of Corruption and Chinese Networks on Tariff Evasion



6. CONCLUSIONS

This paper argues that the presence of international networks is a greasing oil for tariff evasion. As tariff evasion occurs outside the law, market information is scant and formal institutions non-existent, rendering networks the more important for the matching of illicit-minded traders, identification of corrupt customs agents and enforcement of informal contracts. Combining the analysis of Fisman and Wei (2004) with that of Rauch and Trindade (2002), we find strong evidence that international Chinese networks, proxied by ethnic Chinese migrant populations, play a role in tariff evasion in Chinese trade. More precisely, we show that the tariff semi-elasticity of Chinese missing imports increases significantly in the number of ethnic Chinese migrants in the trade partner. Our baseline estimates suggest that a 10 per cent increase in 2005

import tariffs by China would have increased tariff evasion by 36% on imports from countries like France with around 40,000 ethnic Chinese migrants, while it would have led to a 48% increase on imports from countries with much larger Chinese communities like the US (about 1.5 million Chinese migrants).

While this paper provides evidence of a role of networks in tariff evasion through under-declaring import quantities, tariff evasion can take many other forms, such as transhipment via third countries and misreporting of goods as services, where networks might play even stronger roles. Identifying these practices makes for promising future research.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table S1. The role of Chinese networks in tariff evasion in China (data including zeros).

Table S2. Panel regressions – 2000–08.

Table S3. The role of Chinese networks in tariff evasion in trading partners (data including zeros).

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REFERENCES

Ahn, J. B., A. Khandelwal, A. Kumar and W. Shang-Jin (2010), 'The Role of Intermediaries in Facilitating Trade', Working Paper 15706 (Cambridge, MA: NBER).

Anson, J., O. Cadot and M. Olarreaga (2006), 'Tariff Evasion and Customs Corruption: Does Pre-Shipment Inspecxtion Help?', *The B.E. Journal of Economic Analysis & Policy, Berkeley Electronic Press*, **6**, 1, Available at http://ideas.repec.org/s/bpj/bejeap2.html.

Arndt, C. and J. Van Dunem. (2006), 'Confronting the Issue of the Elasticity of Customs Evasion in Mozambique: An Empirical Study', GTAP Conference on Global Economic Analysis, Addis Ababa, Ethiopia.

Bhagwati, J. (1964), 'On the Underinvoicing of Imports', *Bulletin of the Oxford University Institute of Economics & Statistics*, **26**, 4, 389–97.

Bouet, A. and D. Roy (2009), 'Trade protection and tax evasion: evidence from Kenya, Mauritius and Nigeria', Working Papers 1 (Pau: CATT – UPPA – Université de Pau et des Pays de l'Adour).

Dunlevy, J. A. (2006), 'The Influence of Corruption and Language on the Protrade Effect of Immigrants: Evidence from the American States', *The Review of Economics and Statistics, MIT Press*, **88**, 1, 182–86.

Egger, P., M. Von Ehrlich and D. R. Nelson. (2011), 'Migration and Trade', *The World Economy*, **35**, 2, 216–41.
European Anti-Fraud Office (2007), *Fraudulent Imports Of Chinese Textiles And Shoes.* OLAF Press Release 07/12. Available at: http://ec.europa.eu/anti_fraud/media-corner/press-releases/press-releases/2007/20071022_01_en.htm.
FedEx (2010), China Country Profile. Available at: http://www.fedex.com/us/international/irc/profiles/irc_cn_profile.html.
Feenstra, R. C. and G. H. Hanson, (2004), 'Intermediaries in Entrepot Trade: Hong Kong Re-Exports of Chinese Goods', *Journal of Economics & Management Strategy*, **13**, 1, 3–35.
Fisman, R. (2009), 'Measuring Tariff Evasion and Smuggling', NBER Reporter: Research Summary 2009 Number 3 (Cambridge, MA: NBER).
Fisman, R. J. and E. Miguel (2008), *Economic Gangsters* (Princeton, NJ: Princeton University Press).
Fisman, R. J., P. Moustakerski and S.-J. Wei (2008), 'Outsourcing Tariff Evasion: A New Explanation for Entrepôt Trade', *The Review of Economics and Statistics*, **90**, 3, 587–92.
Fisman, R. J. and S.-J. Wei (2004), 'Tax Rates and Tax Evasion: Evidence from "Missing Imports" in China', *Journal of Political Economy*, **112**, 2, 471–500.
Fisman, R. J. and S.-J. Wei (2009), 'The Smuggling of Art, and the Art of Smuggling: Uncovering the Illicit Trade in Cultural Property and Antiques', *American Economic Journal: Applied Economics*, **1**, 3, 82–96.
Gould, D. M. (1994), 'Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows', *The Review of Economics and Statistics*, **76**, 2, 302–16.
Greif, A. (1993), 'Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Trader's Coalition', *American Economic Review*, **83**, 3, 525–48.
Guiso, L., P. Sapienza and L. Zingales (2009), 'Cultural Biases in Economic Exchange?', *The Quarterly Journal of Economics*, **124**, 3, 1095–131.
Javorcik, B. S. and G. Narciso (2008), 'Differentiated Products and Evasion of Import Tariffs', *Journal of International Economics*, **76**, 2, 208–22.
Jean, S. and C. Mitaritonna (2010), '*Determinants and pervasiveness of the evasion of custom duties*' Mimeo.
Kaufmann, D., A. Kraay and M. Mastruzzi (2010) 'The Worldwide Governance Indicators: Methodology and Analytical Issues', Policy Research Working Paper No. 5430 (Washington, DC: World Bank).
Kume, H., G. Piani and P. Miranda (2010), 'Tarifas De Importação E Evasão Fiscal No Brasil', Discussion Papers 1468 (Brasilia: Instituto de Pesquisa Econômica Aplicada – IPEA).
Lee, S. Y. (2010), 'Economics of Guanxi as an Interpersonal Investment Game', *Review of Development Economics*, **14**, 2, 333–42.
Levin, J. and L. Widell (2007), 'Tax Evasion in Kenya and Tanzania: Evidence from Missing Imports', Working Papers 2007:8, (Örebro: Swedish Business School).
Marcouiller, D. S. J. (2000), 'Hijacking, Hold-Up, and International Trade', Working Papers in Economics 477 (Boston, MA: Boston College).
Mishra, P., A. Subramanian and P. Topalova (2008), 'Tariffs, Enforcement, and Customs Evasion: Evidence from India', *Journal of Public Economics*, **92**, 1, 10–11.
Naim, M. (2005), *Illicit: How Smugglers, Traffickers, and Copycats are Hijacking the Global Economy* (New York: Doubleday).
Nitsch, V. (2011), 'Trade Mispricing and Illicit Flows', Discussion Papers in Economics 54540 (Darmstadt: Darmstadt Technical University).
OECD (2009), 'Typologies on the role of intermediaries in international business transactions', Final Report, October.
Parsons, R. C., R. Skeldon, T. L. Walmsley and L. Alan Winters (2007), 'Quantifying International Migration: A Database of Bilateral Migrant Stocks', Policy Research Working Paper 4165 (Washington, DC: World Bank).
Rauch, J. E. (1999), 'Networks versus markets in international trade', *Journal of International Economics*, **48**, 1, 7–35.

Rauch, J. E. and V. Trindade (2002), 'Ethnic Chinese Networks In International Trade', *The Review of Economics and Statistics*, **84**, 1, 116–30.
Spolaore, E. and R. Wacziarg (2009), 'The Diffusion of Development', *The Quarterly Journal of Economics*, **124**, 2, 469–529.
Stoyanov, A. (2009), 'Tariff Evasion Under Free Trade Agreement: Empirical Evidence from NAFTA', Working Paper 139 (San Rafael, CA: FREIT).
White, R. and B. Tadesse (2008), 'Cultural Distance and the US Immigrant-Trade Link', *The World Economy*, **31**, 8, 1078–96.
Yang, D. (2008), 'Can Enforcement Backfire? Crime Displacement in the Context of Customs Reform in the Philippines', *The Review of Economics and Statistics*, **90**, 1, 1–14.