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tradeoffs. In a short time, sponsored search has become one of the most active topics in computer science as well as in economics, and many new results are emerging.

¹ G. Ellison and S. F. Ellison, "Search, Obfuscation, and Price Elasticities on the Internet," NBER Working Paper No. 10570, June 2004, and *Econometrica* 77, 2009, pp.427–52.

² G. Ellison, "A Model of Add-On Pricing," NBER Working Paper No. 9721, May 2003, and *Quarterly Journal of Economics*, 120, 2005, pp.585–637.

³ G. Ellison and A. Wolitzky, "A

Search Cost Model of Obfuscation," NBER Working Paper 15237, August 2009. The paper builds on D. Stahl, "Oligopolistic Pricing with Sequential Consumer Search," *American Economic Review* 79, 1989, pp.700–12.

⁴ G. Ellison and S. F. Ellison, "Internet Retail Demand: Taxes Geography, and Online-Offline Competition," NBER Working Paper No. 12242, May 2006. Part of this work is forthcoming as G. Ellison and S. F. Ellison, "Tax Sensitivity and Home State Preferences in Internet Purchasing," *American Economic Journal: Economic Policy*, 2009

⁵ See G. Aggarwal, A. Goel, and

R. Motwani, "Truthful Auctions for Pricing Search Keywords," *ACM Conference on Electronic Commerce*, 2006; B. Edelman, M. Ostrovsky, and M. Schwarz, "Internet Advertising and the Generalized Second-Price Auction: Selling Billions of Dollars Worth of Keywords," *American Economic Review* 97, 2007, pp. 242–59; and H. Varian, "Position Auctions," *International Journal of Industrial Organization*, 25, 1997, pp. 1163–78.

⁶ S. Athey and G. Ellison, "Position Auctions with Consumer Search," NBER Working Paper 15253, August 2009.

Measuring Tariff Evasion and Smuggling

Raymond Fisman*

Tales of bribery and corruption date back to the beginning of recorded history. By the time the historian Suetonius was at work documenting the antics of Roman leaders, his chronicles were filled with extorting senators, vote-buying Caesars, and judges-for-sale. Needless to say, we do not want for stories of venality and excess among latter-day Caesars and senators. Whether it's the U.S. Senate seat that Illinois Governor Rod Blagojevich allegedly tried to sell to the highest bidder last year, or the "Versailles in the jungle" built with billions that some say were embezzled by Zaire's Mobutu Sese Seko, the corruption narrative is alive and well today.

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Yet we are not satisfied by stories—we want to see it in the data. For one thing, talk is cheap, so we don't know how much to trust casual retelling or survey evidence, particularly in a sensitive and secretive domain such as corruption. (Think about the incentives for truth telling in response to the question, "How much did you pay in bribes last year?"). For well-documented instances of corruption, we only observe cases that come to light via enforcement efforts, so lack of any evidence of misbehavior could be taken of proof that corruption is nonexistent—or so ubiquitous that the enforcers are on the take themselves.

Recent years have seen a blossoming of corruption research in economics, focused on approaches to getting around the cheap talk problem in measuring illicit behavior. In a series of papers with Shang-Jin Wei, I have looked for ways of analyzing what happens when corruption meets globalization, by studying the role of smuggling and tariff evasion

in international trade. Our work more broadly informs the discussion on how tax rates affect tax evasion.

Our core methodology is based on the simple observation that shippers moving goods across international borders are asked not just once but twice about the contents of their containers: by export officials at one end and import authorities at the other. In both cases, false claims have real and material costs, ranging from the forfeiture of shipped goods to fines to prison time (and in some extreme cases, a death sentence). Yet the benefits of deceit often differ widely at the points of import and export. Where such benefits are low, we may plausibly take the reported figures at face value, and use them as a benchmark against which to compare the numbers that would-be smugglers report where deception is required to ply their trade.

The idea of comparing mismatched import-export data isn't new. Jagdish Bhagwati observed back in 1964 that

importers might underinvoice the value of their shipments as a means of evading tariffs,¹ and suggested that this might explain the gap between reported exports and imports in global trade data. With this as inspiration, Wei and I set about analyzing the gap between goods reportedly leaving Hong Kong destined for mainland China and those reported arriving in China from Hong Kong.²

We were not interested in the *level* of this trade gap—many explanations ranging from reporting errors to transportation have been put forth to explain it—but rather its correlates. Most obviously, in the absence of any deliberate misreporting, there should be no relationship between tariff rates and the import-export reporting gap. It is tempting to presume that higher tariffs will necessarily increase evasion, since the benefits from evasion increase as the tariff rate goes up. But it turns out that this relationship depends crucially on the punishment for evasion and the stomach for risk among would-be evaders. Imagine, for example, that the penalty for attempted tariff evasion is a multiple of tariffs evaded—then both the benefit and cost of evasion increase when tariffs go up, and a risk-averse shipper will be more likely to opt for truthful reporting.

Given the frequent ambiguity and discretion in penal codes and the diversity of risk preferences, the tariff rate/tariff evasion relationship ultimately is an empirical matter. In Hong Kong-to-China trade, it turns out that higher tariffs indeed are associated with a bigger gap between reported exports and imports, implying a higher level of evasion.

We estimate that a single percentage point increase in tariffs results in a 3 percentage point increase in the “evasion gap.” This implies that the peak of the “smuggling Laffer Curve” is at 33 percent, with government revenues declining for any increase above this level because of evasion. Given this, Chinese tariffs were perplexingly high, with nearly half of all products having tax rates (the tariff plus a value added tax) above this 33 percent threshold in the mid-1990s.

A couple of explanations come to

mind for why the government might be foregoing potentially greater tariff revenues. First, the innocent one: the Chinese government may have been legitimately protecting infant automobile or computing industries (both high tariff products), nurturing them behind tariff walls regardless of the short-run losses in revenue. Similarly, the government may have been paternalistically setting high tariff barriers on some goods to protect its citizens from the temptations of Chanel perfume and Absolut vodka (also high tariff products).

A less honorable explanation is that tariff rates were kept high by corrupt government officials precisely because they forced importers to find a way around them. Under this “endogenous regulation” story, corrupt customs agents earn a fine living by turning a blind eye to smuggling (for a fee), and thus do their best to keep tariff rates at a high enough level to keep their “services” in high demand.

In addition to reporting the value of their cargo, shippers also must report the quantity of goods to both export and import authorities. By comparing the extent of misreporting on quantities versus values, we were further able to determine whether evasion occurred through underinvoicing quantities, prices, or relabeling high tariff goods as low tariff ones. Since the evasion gap in values was far more correlated with tariff rates than the gap in quantities, we concluded that most underinvoicing took place by reporting lower values for shipped goods. This is perhaps not surprising—it’s easy to weigh forty-foot containers and use this information to calculate how much is in each shipment, but potentially much harder to verify the final market price of incoming products.

Figuring out the extent of relabeling is a bit trickier—we assume that if relabeling is occurring, for the most part it is probably among relatively similar products (it’s easier to relabel a high-tariff chicken as a low-tariff turkey than as a low-tariff four-door sedan). Empirically, this would imply that as the tariff rate

on a particular good increases, the evasion gap on similar goods (in, say, the same 4-digit SIC industry category) should decline, because the relabeled goods appear only on the import side of the statistics. This is what we find for the Hong Kong/China case, with this type of relabeling accounting for most of the tariff evasion between the two countries.

What are the implications for tariff design? If it is indeed the case that evasion is most easily done through relabeling, then countries need not set uniformly low tariffs to keep evasion in check. Rather, it may be enough to minimize dispersion of tariff rates among similar products (that is, frozen chickens must have the same rate as frozen turkeys, but not midsize automobiles).

Of course, the extent to which this lesson can be broadly applied depends on the extent to which our findings hold more generally. While our analysis focused on Hong Kong/China trade, it may be extended to any country pair worldwide, and also can be used to assess the efficacy of changes in enforcement. Comparable results have been found in analyses of trade statistics for India,³ Eastern European nations,⁴ and beyond.⁵ Fellow NBER researcher Dean Yang has used this approach too in evaluating the impact of pre-shipment inspections on the scale of evasion.⁶

More broadly, our method of uncovering underground activities using the differing truth-telling incentives for importers and exporters can be applied to a much wider realm of trade issues. In our original tariff evasion study, export figures were the benchmark numbers; in our work on the smuggling of art⁷ the truth-telling incentives are reversed, but the principle remains the same.

Most countries prohibit or severely restrict the export of antique art and other cultural property. This includes big-time antiquities like Etruscan chariots and Greek statues that would fetch millions, but also covers hundred-dollar trinkets like pre-Columbian pottery shards and nineteenth-century coins. Such objects only can be exported with

special government permission, which is rarely forthcoming.

Either way, there's no problem on the import side in the United States: The Department of Homeland Security itself explains in its handbook for art importers that violating a foreign country's law doesn't necessarily mean you're in violation of U.S. law. While it's okay to bring illegally exported items into the country, you do have to be honest about what you report to the U.S. authorities. Otherwise, antiquities importers would be guilty of perjury and their merchandise subject to seizure.

Thus, there is likely truthful reporting on the U.S. import side, while exporters with weak rule of law may have "missing" exports, as antiques are taken out of the country without showing up in trade statistics. Once again, we hypothesize that smuggling gaps will appear in the trade data, this time correlated with a measure of the ease of getting around export controls. Consistent with this, the antique smuggling gap is widest for those countries where it's easiest to bribe your way around export restrictions — Nigeria, Russia, and Syria to name a few — the countries that also get rated as highly corrupt year after year in Transparency International's global rankings.

In a third variant on the theme of reporting incentives, we partnered with Peter Moustakerski to study the ubiquitous middleman in corrupt transactions. Lore has it that "facilitators" or "fixers" often sit between buyer and seller in illicit activities. But how to gauge their importance? Rather than looking for differences in the motivation for honest reporting between sellers (exporters) and buyers (importers), in this case we looked at whether the prevalence of trade middlemen was greater

for products with stronger tariff evasion incentives.

Trade intermediaries — or *entrepôts* — are a very common phenomenon in global commerce. Ports such as Macao, Singapore, Cyprus, and others are heavily dependent on their trading activities. Hong Kong, however, is by far the world's largest *entrepôt* economy, where trade was 259 percent of GDP in 1998, largely because of its role as intermediary between China and the rest of the world. Why route goods through Hong Kong rather than sending directly to and from China? Arguments largely have rested on the role of specialized agents with business connections and expertise in shipping.

In our paper on outsourcing tariff evasion⁸ we suggest that part of this expertise actually may be in the domain of smuggling and otherwise evading Chinese tariffs. The benefit of indirect trade for the purposes of evading tariffs is increasing in the value of tariffs evaded, and hence the tariff rate. Further, there's no other tax-related reason to ship goods via Hong Kong, since there is no preferential tax treatment of goods coming in through Hong Kong. Yet for high tariff goods, a much larger fraction of Chinese imports are in fact routed through Hong Kong, suggestive of evasion motives. Our calculations imply that as much as a quarter of all Hong Kong *entrepôt* trade to China may be accounted for by tariff evasion motivations.

Our research in this area first and foremost underscores the scale and importance of illicit trafficking in global trade. Thus far, our findings hint at methods for pinpointing where enforcement authorities should focus their efforts. The research findings also have implications for how to best design tariffs to discourage evasion while still allowing gov-

ernments to earn tariff revenues. Yet this field of research is still in its infancy, and we hope that future work by ourselves and others will continue to shed light on this dark side of international economic activity.

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⁸ R. Fisman and S. Wei, "Outsourcing Tariff Evasion: A New Explanation for *Entrepôt* Trade," NBER Working Paper No. 12818, January 2007.