

WTO Membership and Corruption

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Abstract

Despite widespread belief that membership in the World Trade Organization (WTO) improves the quality of governance, there is no convincing empirical evidence. Here, we investigate whether WTO membership has a causal effect on firm-level reports of political corruption using a nonparametric partial identification approach to bound the average treatment effect (ATE). We also analyze conditional ATEs to explore various sources of potential heterogeneity. Contrary to existing thought, we find that WTO membership is likely to increase corruption, particularly among government-owned firms and economies with stringent market entry regulation and low outflows of foreign direct investment.

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1 Introduction

An extensive literature investigates how membership in, or even the accession process to, the World Trade Organization (WTO) or its predecessor, the General Agreement on Tariffs and Trade (GATT), has impacted country-level trade patterns (e.g., Rose 2004). A distinct literature assesses the effect of trade openness (or, liberalization of trade) on political corruption (e.g., Gatti 2004).³ However, little is known about the direct causal effect of membership in the WTO on the level of political corruption in a country. This lack of knowledge persists despite increasing recognition of the importance of institutional quality in explaining heterogeneity in economic growth and development and the concomitant rise in membership in the WTO and other international organizations (Acemoglu et al. 2001, 2005). Currently, 162 countries are WTO members, with another 22 having observer status.⁴

Several international organizations, such as the Organization for Economic Cooperation and Development (OECD), European Union (EU), Organization of American States (OAS), The Council of Europe, The World Bank (WB), and The International Monetary Fund (IMF), went through a rapid and widespread process of adoption of anti-corruption measures in the 1990s. In contrast, Abbott (2001, p. 278) notes that the WTO remained “conspicuously absent from the list.” However, beginning in 2014, the WTO addressed corruption in its rules and regulations for the first time through its Agreement on Government Procurement (GPA).⁵ The GPA was negotiated between 1997 and 2011, formally adopted in 2012, and entered into force in 2014. The

³Note, literature on trade and corruption often use the terms ‘openness to trade’ and ‘liberalization of trade’ interchangeably. See, for example, Baksi et al. (2009).

⁴See https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm.

⁵See https://www.wto.org/english/thewto_e/20y_e/gpa_brochure2015_e.pdf.

agreement seeks to increase transparency and fairness, avoid conflicts of interest, and prevent corrupt behaviors. That said, only 45 member countries are covered by the GPA.

Despite this recent and partial attempt to address institutional quality in general and corruption in particular, accession to the WTO has long been hypothesized to yield indirect benefits such as improved governance, institutional reforms, increased transparency, and reduced corruption. Along this line, Allee and Scalera (2012, p. 273) state: “[A]ccession to the WTO and other international organizations might have broader indirect effects – such as on domestic political institutions within joiners – perhaps by reducing corruption or increasing transparency.”

One such channel through which institutional improvements may occur is via *trade liberalization*, as noted above. Another channel is via so-called *policy anchoring*, whereby accession allows countries to commit to reforms that may otherwise be infeasible. In this regard, Drabek and Bacchetta (2004, p. 1096) state: “Membership in the WTO should help reduce incentives for corruption by providing countries with what are perhaps the most powerful institutional checks and balances in the international economic sphere. Accession imposes changes both in institutions and policies.”

To the extent that the WTO affects political corruption via trade liberalization, this impact should occur only *after membership*. However, some researchers are of the opinion that the process of policy anchoring takes place during the *years of accession*.⁶ To this end, Aaronson and Abouharb (2014, p. 548, 554) identify three “core values” of the WTO itself that are associated with quality governance: (i) even-handedness or non-discrimination, (ii) access to information or transparency, and (iii) administrative due process. As coun-

⁶See Aaronson and Abouharb (2014) for more details on these arguments.

tries adhere to these core values during and after accession, the authors argue that trade-related governance will improve and the effects will “gradually spill over into the polity as a whole.”

Given this background, in this paper we ask whether membership in the WTO has a *causal effect* on political corruption in countries. Answering this is not straightforward for two reasons. First, countries *self-select* into the WTO. Drabek and Bacchetta (2004) provide a good review of both theoretical and practical reasons for why a country might desire to join the WTO. Second, membership status may be *misclassified* due to the length of the accession process and the presence of nonmember participants (Tomz et al. 2007). Moreover, as mentioned above, policy anchoring may take place during the accession period, before a country actually gains the formal membership status.⁷ As a result, while formal membership status is perfectly observed, some members of the control group (i.e., non-formal members) may actually be more similar to the treatment group (i.e., formal members). As deciding which non-formal members should be placed in the treatment group is perhaps an impossible task, we instead define the treatment as formal membership but allow for possible measurement error in the treatment status.

Traditional econometric techniques such as fixed effects and instrumental variables methods are not likely to be viable solutions to these two econometric challenges for several reasons. First, neither is likely able to address non-classical measurement error in a binary covariate (Black et al. 2000). Second, WTO membership is not likely to be strictly exogenous due to reverse causation from political corruption to membership status. Drabek and Bacchetta (2004, p. 1096-1097) state: “[A] high level of institutional quality will facilitate the accession while the accession promotes good institutional

⁷See https://www.wto.org/english/thewto_e/acc_e/cbt_course_e/c4s1p1_e.htm.

quality.” Moreover, the parallel trends assumption in difference-in-differences model is not likely to hold due to anticipatory effects of membership. Finally, plausible exclusion restrictions, even in the absence of misclassification, are not available.

To circumvent these econometric challenges, we take a nonparametric partial identification approach following Kreider et al. (2012) and McCarthy et al. (2015).⁸ Thus, our objective is to *bound* the average treatment effect (ATE) of WTO membership on political corruption, instead of attaining point identification. The benefit of using a partial identification approach is to explore a range of possible estimates obtained under different sets of assumptions, instead of imposing stringent (and likely implausible) assumptions in the current context – required under panel data or instrumental variables estimation – to obtain point identification (Tamer 2010; Manski 2013; Ho and Rosen 2015).

To obtain sharp bounds on the ATE under different assumptions regarding the selection process and misclassification of membership status, we use firm-level corruption data from the World Business Environment Survey (WBES, 1999-2000) which contains information on the first-hand experiences of firm managers with bribe payments to public officials. Further, we bound conditional ATEs, allowing for the bounds to vary on the basis of several country- and firm-level characteristics.

The results are striking. First, membership to the WTO is likely to *increase* the frequency of bribes paid by firms, in contrast to the usual conjecture. Specifically, in the full sample, the ATE bounds *exclude zero* in the absence of misclassification but under otherwise reasonable assumptions. Since formal

⁸For application of a similar identification approach when assessing the impact of WTO membership on participation in multilateral environmental agreements, see Millimet and Roy (2015).

membership is observed without error, this implies that (under reasonable assumptions) formal membership *increases corruption* in expectation. Second, we cannot rule out the possibility that the ATE is zero once misclassification is allowed. Thus, allowing for some non-formal members to behave more similarly to formal members creates uncertainty regarding the direction of the impact of the WTO on political corruption. Third, the evidence in favor of an increase in bribe frequency is consistently stronger for countries having high market entry regulations for firms (in terms of cost, number of procedures, and time taken to start a business) and low net outflows of foreign direct investment (FDI). Finally, the evidence in favor of an increase in bribe frequency is stronger for government-owned firms. In sum, our analysis reveals at best a small, beneficial effect of WTO membership on reducing corruption; membership is most likely to *exacerbate corruption*, particularly among government-owned firms and countries with high market entry regulations and low FDI outflows.

The remainder of the paper is organized as follows. Section 2 briefly discusses the pertinent literature. Section 3 presents the empirical methodology and data. Section 4 discusses the results. Section 5 concludes.

2 Literature Review

The WTO itself claims that membership may “help reduce corruption and bad government.”⁹ Two mechanisms have been espoused in defense of this claim. First, membership reduces opportunities for corruption through the liberalization of trade policy. Second, accession leads to policy anchoring, making institutional reforms politically feasible. We briefly discuss the existing evidence regarding each channel.

⁹See https://www.wto.org/english/res_e/doload_e/10b_e.pdf.

2.1 Trade Liberalization

There are two mechanisms by which trade liberalization may causally affect political corruption. Gatti (2004) refers to them as the *direct policy effect* and the *foreign competition effect*. While the foreign competition effect centers on the consequences of changes in trade *volume*, the direct policy effect concerns changes in trade *barriers*. Note, the primary objective of the WTO is to reduce tariff and other non-tariff barriers between trading countries.¹⁰ We briefly consider each.

Direct Policy Effect Theoretically, trade restrictions may encourage collusion between public officials and domestic firms. Specifically, when trade is artificially restricted by the domestic government, competition increases among importers attempting to gain market access (e.g., through the acquisition of an import license). This incentivizes importers to bribe customs officials to evade quota restrictions and trade taxes (Krueger 1974).

Gatti (2004) tests this empirically using two alternative measures for trade liberalization: (i) average tariff levels and (ii) percentage of imports subject to a quota restriction. The author finds tariffs to be positively associated with corruption, even after controlling for import share. However, the author finds no significant relationship between non-tariff barriers and corruption. One possible explanation is that the quota restriction under consideration is not binding. In related work, Gatti (1999) focuses on the variation in tariffs across industries, rather than the average tariff level. Here, the author shows that if tariff rates are set at a uniform level, instead of optimal (variable) rates, then opportunities for custom officials to extract rents from importers diminish.

¹⁰See, https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm.

Larrain and Tavares (2004) find empirical support for this theory.

In sum, the extant literature on the direct policy effect leads one to conjecture that participation in the WTO, through the relaxation of trade barriers, reduces opportunities for corruption (in the allocation of quotas or tariff protections).¹¹ However, the existing evidence has not established this as a causal relationship.

Foreign Competition Effect As an economy becomes more open, the *ceteris paribus* effect is that the domestic market becomes more competitive due to the increased presence of foreign firms. This increase in trade volume reduces the level of monopolistic rents available to domestic firms and, as a consequence, may decrease their ability to offer bribes. Thus, opportunities for political corruption diminish (Ades and Di Tella 1999).

Empirical tests in Ades and Di Tella (1999) and Treisman (2000) corroborate this hypothesis. The authors use the share of imports in GDP as a measure of trade openness and find a negative relationship with corruption. In contrast, Torrez (2002) finds this negative relationship to be more ambiguous, depending on the empirical measure of corruption. The author finds a similar negative relationship using the Transparency International index, but not when using the International Country Risk Guide measure. Gatti (2004) also uses import share in GDP as a measure of trade volume and finds a

¹¹The fact that trade barriers have fallen under the WTO is not controversial. For example, Baldwin (2016, p. 95) states: “When the General Agreement on Tariffs and Trade was signed by 23 nations in 1947, the goal was to establish a rules-based world trading system and to facilitate mutually advantageous trade liberalization. As the GATT evolved over time and morphed into the World Trade Organization in 1993, both goals have largely been achieved. The WTO presides over a rule-based trading system based on norms that are almost universally accepted and respected by its 163 members. Tariffs today are below 5 percent on most trade, and zero for a very large share of imports.” Brown (2004) provides empirical evidence of the WTO’s success in enabling countries to commit to liberalized trade due to the costs of retaliation.

significant, negative association with corruption. However, the author notes this result to be highly sensitive to the inclusion of Singapore in the sample. Singapore has an impressive record on corruption and has a high measure of openness. Interestingly, Gatti (2004) also finds the direct policy effect is of much greater magnitude than the foreign competition effect. Finally, some researchers posit that the relationship between political corruption and trade liberalization may be non-monotonic; increasing corruption at the initial stage of liberalization, but eventually declining once liberalization reaches a critical threshold level (e.g., Baksi et al. 2009).

In sum, the evidence for foreign competition effect is not clear. The lack of clarity becomes magnified when one accounts for the uncertainty regarding the impact of the WTO on trade. Beginning with the seminal study of Rose (2004), concerns about the effectiveness of the organization in spurring trade have surfaced. Subsequent studies have attempted to ameliorate these concerns. For example, Subramanian and Wei (2007) argue that the WTO has increased trade flows, but only among developed member countries. Goldstein et al. (2007) argue that the WTO has increased trade once participating non-member countries are considered as part of the treatment group. These countries are not formal members by status, but hold the rights and obligations of a formal member. While Roy (2011) finds some evidence of a positive effect of the GATT on trade when accounting for participating non-members, he finds no impact of the WTO on trade once zero bilateral trade flows are included and a theoretically consistent gravity model is estimated. Finally, Allee and Scalera (2012) argue that there are heterogeneous effects of WTO membership depending on the manner in which a country gained membership. Specifically, the authors claim that member countries that went through a rigorous accession procedure benefit the most from membership.

In the end, the effect of the WTO on trade volumes is ambiguous, as is the evidence examining the impact of import volumes on political corruption.

2.2 Policy Anchoring

A former EU Trade Commissioner stated publicly in 2007, in context of Russia, that “WTO membership is also an anchor for domestic reforms.”¹² Although domestic reforms are the purview of a sovereign government, domestic policies and institutions are strongly influenced by international organizations and other powerful nations (Simmons et al. 2008). Keohane et al. (2009) argue that multilateral institutions generally possess the ability to control the special interest groups in a country and protect the rights of minorities. The quality of governance may, therefore, be improved. Along these same lines, Sandholtz and Gray (2003, p. 761) argue that countries “that are open to the rest of the world import not just goods and capital, but also ideas, information, and norms.” Establishment of policies and institutions in compliance with international standards are essential for domestic firms to be able to compete with their foreign counterparts. Thus, for a country acceding to an international organization, and particularly to the WTO, improvements in governance and a reduction in political corruption are assumed by many to be inevitable spillovers.

In a crude test of this hypothesis, Sandholtz and Gray (2003) investigate the association between perception measures of corruption and an index measuring memberships in various international organizations (e.g., GATT/WTO, IMF, United Nations, etc.). The authors obtain a negative and statistically significant association. Using composite indices for institutional quality based

¹²See http://trade.ec.europa.eu/doclib/docs/2007/march/tradoc_133867.pdf.

on a survey by the IMF (2000), Drabek and Bacchetta (2004) show that WTO membership is associated with improved governance in transition countries. Tang and Wei (2009) use the World Bank’s Governance Matters indices to show that policy commitments enforced by an external body like the WTO are associated with improvements in countries with poor governance where reforms might otherwise be infeasible.

In contrast, Aaronson and Abouharb (2014, p. 549) point out that measures of reforms and governance used in the prior literature are, perhaps, too “broad” to capture how a policy anchoring effect might actually translate “norms into behavior.” Bearing this in mind, the authors recognize three specific WTO norms – even-handedness, access to information, and due process – as relatively narrower metrics to assess the impact of the WTO on governance. Even-handedness or non-discrimination of Article III refers to treating everyone equally, both foreign and domestic market actors. Access to information or transparency of Article X ensures certainty and clarity in trade practices and policies such that they are conducted conspicuously and be an open information to all. Finally, due process of Article X certifies all market actors to have freedom to influence trade related regulations.

The authors use these metrics to explain when and how policy anchoring takes place for a given country. For this, they divide their sample of countries into four groups: (i) non-members who have never been a WTO member, (ii) completed negotiating group who have finished all rounds of negotiation, (iii) new members who have been approved to accede by the WTO but awaiting domestic approval, and (iv) long-standing members who have been a GATT member since 1948. They hypothesize that if policy anchoring takes place during the accession period, then there will be improvements in these metrics while a country is negotiating membership in the WTO. Alternatively, if coun-

tries anchor after membership, then the improvements will reflect gradually after the accession process is complete. Regardless, the authors find mixed support for policy anchoring. They do find some countries change their policies and laws both during and after accession. However, the effect is uneven across the various governance metrics and across countries.

In sum, there is modest evidence of a positive association between WTO membership and improved governance originating via policy anchoring. However, inferring any sort of causal relationship from the existing evidence is precarious at best.

3 Empirics

3.1 Methodology

To provide the first credible evidence of the causal effect of WTO membership on corruption, we focus on the partial identification of the ATE, which represents the expected impact of membership on corruption for a randomly chosen country. Given the vast number of WTO member countries, along with the number of other countries possessing observer status, the ATE is a meaningful parameter to estimate. To proceed, we define the conditional ATE of WTO membership on firm-level corruption experiences as

$$\Delta(X) = P[H(WTO^* = 1) = 1|X] - P[H(WTO^* = 0) = 1|X] \quad (1)$$

where $P[\cdot]$ denotes the probability that the argument is true, H is a binary outcome with value one if the firm is “honest” (an absence of corruption) and zero if not, WTO^* is a binary indicator defined such that one (zero) corresponds to

true WTO membership (non-membership), and $H(1) \equiv H(WTO^* = 1)$ and $H(0) \equiv H(WTO^* = 0)$ denote potential outcomes. Equation (1) represents the conditional ATE, conditional on X , if X is non-empty. In other words, if the probabilities are conditioned on observed country- and/or firm-specific characteristics, then $\Delta(X)$ represents the ATE for a randomly selected country with characteristics given by X . If X is empty, or one integrates over the distribution of X , then (1) simplifies to the (overall) ATE, denoted simply by Δ .

Point identification of Δ and $\Delta(X)$ is not straightforward for two reasons. First, for any given firm, only one of two potential outcomes is observed; the other is the missing counterfactual. With non-random selection into the WTO, identification of the missing counterfactual is not possible in the absence of stringent, and likely implausible, assumptions. Second, with misclassification, observed membership status, WTO , may differ from true status, WTO^* . Given these challenges, our objective is to bound Δ and $\Delta(X)$. While still not straightforward, Kreider et al. (2012) and McCarthy et al. (2015) document how to obtain sharp bounds under different assumptions concerning the selection and misclassification processes. Imbens-Manski (2004) confidence intervals are used to account for sampling uncertainty.

We explore the implications of the following assumptions on the bounds. Note, we omit many of the details here in the interest of brevity, instead referring the reader to these prior papers. Regarding selection into the WTO, we consider the following three assumptions:

(S1) Exogenous Selection (ES):

$$H(0), H(1) \perp WTO^* | X \in \Omega$$

where Ω denotes a particular set of values of X . However, as explained before, it is unlikely that the decision to participate in the WTO is exogenous.

(S2) (Positive) Monotone Treatment Selection (MTS):

$$\begin{aligned} P[H(1) = 1|WTO^* = 1, X \in \Omega] &\geq P[H(1) = 1|WTO^* = 0, X \in \Omega] \\ P[H(0) = 1|WTO^* = 1, X \in \Omega] &\geq P[H(0) = 1|WTO^* = 0, X \in \Omega] \end{aligned}$$

Under this assumption, potential outcomes are at least as great in expectation in the treatment group. In other words, firms in countries belonging to the WTO are more honest, on average, than firms in non-member countries irrespective of its treatment status. This assumption is plausible if one believes that WTO member countries maintain a more honest and transparent standard of doing business irrespective of actual membership. This is consistent with conjecture that countries with better governance may join international organizations, such as the WTO, to signal their quality (see, e.g., Mansfield et al. 2002; Drabek and Bacchetta 2004; Aaronson and Abouharb 2014).¹³

(S3) Monotone Instrumental Variable (MIV):

$$\begin{aligned} P[H(1) = 1|\nu = u_1, X \in \Omega] &\leq P[H(1) = 1|\nu = u, X \in \Omega] \leq P[H(1) = 1|\nu = u_2, X \in \Omega] \\ P[H(0) = 1|\nu = u_1, X \in \Omega] &\leq P[H(0) = 1|\nu = u, X \in \Omega] \leq P[H(0) = 1|\nu = u_2, X \in \Omega], \end{aligned}$$

where ν is the MIV and $u_1 < u < u_2$. MIV assumes that potential

¹³Mansfield et al. (2002) present a theoretical model showing how an international agreement works as both signaling institution and trade policies.

outcomes are (weakly) monotonically increasing in v .¹⁴ Here, we use Gross Domestic Product (GDP) per capita as the MIV because of the widespread conclusion in the extant literature that richer countries are generally less corrupt (e.g., Svensson 2005; Neeman et al. 2008; Olken and Pande 2012).¹⁵ Thus, under this assumption, firms in richer countries are likely to be more honest irrespective of actual WTO membership.

Regarding misclassification, we consider two assumptions:

(M1) Upper Bound Error Rate:

$$P(WTO \neq WTO^*) \leq Q$$

where Q is the maximum allowable misclassification rate of the WTO membership status. In the analysis, we set $Q = 0, 0.01, 0.03$, and 0.05 .

(M2) No False Positives (NFP):

$$WTO = 1 \Rightarrow WTO^* = 1$$

which implies that nonmembers are never incorrectly classified as members. As discussed in the next section, this assumption is fairly innocuous given the way we define WTO .

¹⁴MIV needs to be combined with MTS to tighten the bounds (McCarthy et al. 2015).

¹⁵Neeman et al. (2008) document a more nuanced relationship, whereby corruption and GNP per capita are negatively correlated in ‘open’ economies, but unrelated in ‘closed’ economies.

3.2 Data

The data are from multiple sources. Sources and summary statistics are provided in Table A1 in the Appendix. Corruption data come from the WBES, a survey conducted by the World Bank in 1999-2000 across 80 countries. Managers of more than 9000 firms were interviewed about their direct experiences with bribe payments (in terms of frequency) to public officials as they relate to their business. The outcome, H , equals one if firm i in country j *never* pays a bribe to a public official while “getting their work done.” H equals zero if the manager reports having paid a bribe. The treatment, WTO , equals one if the firm is located in a country that is a *formal* member of the WTO in 1999. The MIV is GDP per capita in 1999.¹⁶

Countries in the sample, classified by formal WTO membership status, are listed in Table A2 in the appendix. Recently, Tomz et al. (2007) brought to light the differences between *de jure* and *de facto* membership in the WTO. The authors discuss how WTO rules have long been applicable to both formal members as well as certain nonmembers (e.g., some provisional members, certain colonies, and some newly independent states). These countries are reported to be obligated by the rules and regulations of the WTO despite not having a formal accession. Thus, we may observe a country to be a nonmember officially, but in practice, it behaves as one. Moreover, as shown in Table A2, all countries in our control group (i.e., not formal WTO members in 1999) have either observer or formal membership status in the WTO today. Because we measure WTO membership status using formal membership, there are no instances of false positives (i.e., no countries are incorrectly classified as members). However, assumptions (M1) and (M2) allow for various amounts

¹⁶GDP per capita is converted to international dollars using purchasing power parity rates.

of false negatives (i.e., countries incorrectly classified as nonmembers) in order to explore the sensitivity of the bounds to our membership definition.¹⁷

To explore potential sources of heterogeneity, we condition the ATE on an observed covariate, X . For this, we choose either a country- or a firm-specific attribute and split the sample into sub-groups based on values of X . First, we condition on various measures of market entry regulation. As a positive association between regulations in general and corruption has been documented, one might conjecture that the impact of WTO membership may differ depending on other incentives for corruption (Djankov et al. 2002, Svensson 2005). Moreover, as it is often postulated that “corruption is the much-needed grease for the squeaking wheels of a rigid administration,” any impact of WTO membership on the propensity of a firm to engage in bribery – via the direct policy effect or foreign competition effect – may be exacerbated or attenuated when entrepreneurs face a higher cost of market entry (Bardhan 1997, p. 1322). Three proxies for entry regulation are used: (i) costs incurred, as a percent of per capita GDP, to start a business, (ii) the number of procedures that a new firm must comply with to start operating as a legal entity, and (iii) the number of days required to obtain legal status.¹⁸

Second, we condition on the level of FDI inflows and outflows. FDI flows are generally associated with the quality of institutions and corruption (Wei 2000a, b; Larrain and Tavares 2004; Al-Sadig 2009; Dang 2013). As a result, the effect of WTO membership on corruption may be exacerbated or atten-

¹⁷Note, while one could attempt to re-classify countries in the control group as members of the treatment group, we do not pursue this strategy. To do so risks introducing misclassification in both directions. Using formal WTO membership as the definition of our treatment gives a clear interpretation to our findings under the assumption of no misclassification and makes the assumption of no false positives innocuous.

¹⁸The data are from Djankov et al. (2002). The measures are for 1999 except for missing observations which are taken from 2004 World Bank Doing Business database.

uated depending on the level of FDI in which the country is engaged. Two measures of FDI are used: (i) net inflows as a percent of GDP (i.e., net inflow of new investment minus disinvestment in the reporting economy from foreign investors) and (ii) net outflows as a percent of GDP (i.e., net outflow of new investment minus disinvestment that the reporting country makes to the rest of the world).¹⁹

Third, we condition on whether the firm is government owned or not.²⁰ On the one hand, private firms are believed to be more vulnerable to demands from corrupt officials because they have lower bargaining power and less recourse (Svensson, 2003). On the other hand, managers of public firms may face different performance incentives than in private firms and therefore may be more likely to engage in bribery. Again, the effect of WTO membership on corruption may be exacerbated or attenuated depending on the ownership status of the firm. Finally, we condition on the export status of firms. Under the direct policy effect hypothesis, WTO membership is expected to have a larger mitigating effect on bribery by non-exporting firms. Hence, one might expect the behavior of exporting firms to be less affected by WTO status.

4 Results

4.1 Baseline

We present the baseline results using the full sample in Table 1. Each column represents a specific combination of assumptions about the selection process. Each row specifies a different maximum misclassification rate, Q . Recall, the

¹⁹The data are from the World Bank and are for 1999 unless missing in which data from the nearest available year are used.

²⁰Data are from the WBES.

outcome indicator, $H = 1$, means that a firm is *honest*. Therefore, a negative ATE means that WTO membership *reduces* the probability of being honest; political corruption *increases* with membership.

To start, we assume there is no measurement error ($Q = 0$). As a result, the ATE should be interpreted as the expected impact of *formal* WTO membership relative to *all countries* that are not formal members. Under the assumption of exogenous selection, the point estimate indicates that membership *increases* corruption by 0.6% on average. In addition to being very close to zero, the estimate is not statistically different from zero at the 95% confidence level. Imposing no assumptions on the selection process (i.e., the worst-case bounds), the estimated bounds are $[-0.593, 0.407]$. The bounds necessarily have a width of one and include zero. Nonetheless, without imposing any assumptions, the bounds rule out a reduction in political corruption upon attaining formal WTO membership of more than 41%.

Imposing the assumption of (positive) MTS, however, drastically reduces the upper bound. The estimated bounds, $[-0.593, -0.006]$ now exclude zero, although the 95% confidence interval still includes zero. Thus, the assumption of greater honesty (in expectation) among firms in the treatment group relative to firms in the control group, holding WTO membership fixed, has significant identifying power. This assumption, while not testable, is plausible given the fact that the treatment group entails countries that are generally more developed and existing empirical evidence shows that corruption declines with development (e.g., Svensson 2005; Neeman et al. 2008; Olken and Pande 2012).

Imposing the joint assumptions of (positive) MTS and MIV, the bounds are further tightened. The estimated bounds, $[-0.587, -0.070]$ are strictly nega-

tive; the 95% confidence interval excludes zero as well.²¹ The bounds indicate a larger potential *adverse* impact on corruption due to formal membership. Specifically, under what might consider to be fairly innocuous assumptions, WTO membership increases the probability of a firm engaging in bribery by at least 7% (the upper bound) and as much as 59%.

Given our earlier discussion of the existing rhetoric and research, our result is very surprising. Three possible explanations exist. First, the foreign competition effect discussed above may be backwards. Instead of an increase in import competition reducing the rents available, and hence bribery, firms may respond with an increase in bribery in an effort to reduce costs. If bribery does actually reduce costs, then this of course begs the question of why firms did not engage in such bribery prior to the increase in competition from imports. Second, WTO membership may alter the composition of entrepreneurs who decide to enter the market. With stricter import competition under WTO membership, perhaps only more politically savvy entrepreneurs find it profitable to enter the market. As a result, the increase in corruption may reflect a shift in the types of firm owners and managers in a country. Finally, if the policy anchoring effect exists, it may be that the largest *beneficial* effect of the WTO on corruption occurs during the accession process. Since countries in the midst of the accession process belong to the control group, our results may reflect a large decline in corruption during the accession phase followed by a reversion to pre-existing levels of corruption following formal membership.

To get at this third possibility, we now allow for misclassification of membership status. This accounts for the possibility that some non-formal member

²¹For the MIV bounds, the samples are divided into five GDP per capita cells. The MIV estimator is biased in finite samples, but consistent (Manski and Pepper 2000). We use Kreider and Pepper's (2007) nonparametric finite sample bias-corrected MIV estimator (McCarthy et al. 2015).

countries may be more similar to the treatment group due to being engaged in the accession process or having *de facto* membership in the WTO. The impact of allowing for possible misclassification – even as little as $Q = 0.01$ – is a widening of the bounds under any given set of assumptions concerning the selection process. As a result of this widening, the point estimates for the bounds now include zero in nearly every case. The only exception is when we impose the joint assumptions of (positive) MTS and MIV along with $Q = 0.01$. However, even in this case, the 95% confidence interval includes zero. Moreover, with $Q = 0.05$, we cannot rule out WTO membership *reducing* political corruption by around 10%. Thus, even with stricter assumptions about the selection process, we can now no longer rule out the WTO having *beneficial* effects on political corruption under even small amounts of misclassification.

In sum, our baseline analysis reveals three important findings. First, there is convincing evidence that formal WTO membership *increases* political corruption (in a causal sense), contrary to prior beliefs. Second, the magnitude of the effect of formal membership depends crucially on assumptions concerning selection into the WTO. However, under plausible assumptions (in our view), formal WTO membership increases the probability of a firm paying a bribe by at least three percentage points (and at most 60 percentage points). Finally, assessing the impact of the WTO on political corruption is highly dependent upon the definition of membership. Allowing for even small deviations in the definition beyond simply formal versus non-formal members alters our findings. Future research into the impacts of the WTO and other international organizations ought to be cognizant of this.

4.2 Heterogeneity

To better understand under what conditions the WTO may be more likely to influence political corruption, we bound the ATE conditional on various country- and firm-specific features. Results are presented in Tables 2-8. Figures A1-A7 in the appendix plot the bounds under the joint MTS-MIV assumptions for each sub-sample.

Entry Regulations In Tables 2-4 we split the sample into firms in countries with high and low levels of regulation governing market entry by firms. In each table, Panel I (Panel II) displays the results for the sub-sample of firms facing high (low) entry regulation. In Table 2 the measure of entry regulation is based on the cost of starting a new business. In Table 3 the number of procedures required to start a new business is used. In Table 4 the measure of entry regulation is based on the number of days it takes to start a new business. In all three tables, we find evidence suggesting a more adverse effect of the WTO on political corruption in countries with high regulation.

Focusing on the joint MTS-MIV bounds, the estimated bounds (point estimates and 95% confidence intervals) exclude zero using all three measures when misclassification is not allowed ($Q = 0$). Formal WTO membership is found to *increase* political corruption in high regulation countries by at least nine, two, and two percentage points in Tables 2-4, respectively. The 95% confidence intervals for the corresponding bounds in low regulation countries never exclude zero. The stronger evidence of an increase in corruption due to formal WTO membership in high regulation countries is consistent, first and foremost, with important interactions between formal WTO membership and the domestic institutional environment. Second, it is consistent with the

foreign competition effect leading to an increase in bribery in high regulation environments in order to evade costs and delays and be competitive. Finally, the result may be explained by high entry regulation, in combination with greater import competition, altering the selection of entrepreneurs into the market; namely, moving from more honest types to those more likely to engage in deceptive practices.

When we allow for modest misclassification ($Q > 0$), we continue to find some statistically significant evidence of an adverse impact of the WTO on political corruption in high regulation countries. Using costs to measure entry regulation (Table 2), the estimated bounds exclude zero even when $Q = 0.03$ and the 95% confidence intervals exclude zero even when $Q = 0.01$. Using the number of procedures or days to start a new business (Tables 3 and 4, respectively), the estimated bounds exclude zero when $Q = 0.01$, but the 95% confidence intervals do not. Allowing for misclassification, we also find that the maximum possible *beneficial* effect of the WTO on political corruption is higher in low regulation countries. For example, when using the number of procedures required to start a new business (Table 3), we find that the WTO causes at best an 11 (32) percentage point reduction in bribery in high (low) regulation countries.

In sum, we find evidence consistent with important interactions between WTO membership and the domestic regulatory environment as it relates to firm entry. The adverse impact of formal WTO membership found in the full sample is driven by countries with high market entry regulation. This is consistent with the positive association between entry regulation and corruption shown in Djankov et al. (2002). However, it goes a step further by showing that WTO membership is likely to exacerbate this association.

Foreign Direct Investment In Tables 5-6 we split the sample into firms in countries with high and low FDI flows. In each table, Panel I (Panel II) displays the results for the sub-sample of firms in countries with high (low) FDI flows. In Table 5 the measure of FDI is based on inflows; Table 6 is based on outflows.

Splitting the sample by FDI net inflows as a percent of GDP (Table 5), we obtain two interesting findings. First, there is little substantive difference in the bounds across the two sub-samples. In other words, there is little evidence of any salient interaction between WTO membership and FDI inflows as it concerns political corruption. Second, our joint MTS-MIV assumptions have more bite in each of the sub-samples relative to the full sample. Whereas the 95% confidence intervals included zero under misclassification ($Q \geq 0.01$), they now exclude zero in both sub-samples under modest misclassification ($Q = 0.01$). Specifically, the 95% confidence intervals are $[-0.562, -0.007]$ and $[-0.605, -0.018]$ for countries with high and low inflows, respectively.

When we split the sample by FDI net outflows as a percent of GDP (Table 6), we again obtain two interesting results. First, we are never able to sign the ATE in the sub-sample with high FDI outflows. As a result, under the assumptions considered here, we cannot conclude that formal WTO membership has any effect on political corruption. This is consistent with countries with high outflows of FDI having quality governance even in the absence of formal WTO membership.²² Second, we find strong evidence of an *adverse* effect of the WTO on political corruption in countries with low FDI outflows. With no misclassification, the 95% confidence interval is $[-0.674, -0.197]$. Thus,

²²Wei (2000b) finds that more ‘naturally open’ economies exhibit better governance, where natural openness reflects attributes like geography that promote integration into world markets. Moreover, gravity models for FDI flows shows that such flows respond to the same attributes (e.g., Millimet and Roy 2016) .

formal WTO membership causes at least a 20 percentage point increase in political corruption in countries with low FDI outflows. Moreover, even allowing for moderate misclassification ($Q = 0.05$), the estimated bounds still exclude zero (although the 95% confidence interval does not). This is consistent with poor governance in countries with low FDI outflows and this being exacerbated by WTO membership.

Firm Ownership In Table 7 we split the sample into public and private firms. Panel I (Panel II) displays the results for the sub-sample of government (non-government) owned firms. The results point to important interactions between firm type, WTO membership, and political corruption. Specifically, we find that our full sample results are driven by government-owned firms. Specifically, the 95% confidence intervals for the expected effect of formal WTO membership ($Q = 0$) is $[-0.560, -0.042]$, whereas the corresponding interval for non-government-owned firms includes zero. Moreover, the estimated bounds continue to exclude zero for government-owned firms even with moderate misclassification (although the 95% confidence interval includes zero when $Q \geq 0.03$). This result, in combination with results in countries with high entry regulation, is consistent with Djankov et al. (2002). There, the authors (p. 26) find that high entry regulation is associated with higher corruption in a sample that includes businesses led by politicians since the entry regulation produces a “double benefit.” First, it generates profits for successful market entrants (including those that are government-owned). Second, it generates opportunities for rent extraction by the government.

Our finding is also consistent with government-owned firms responding differently than private firms to the foreign competition effect. As stated previously, one possible explanation for our baseline result using the full sample

is that an increase in import competition, instead of reducing rents and hence bribery, may induce an increase in bribery in an effort to remain competitive. If bribery does actually generate profits, then this of course begs the question of why firms did not engage in such bribery prior to the increase in imports upon WTO accession. This is inconsistent with our notion of profit-maximization. However, as the full sample results appear to be driven by government-owned firms, it may be that government-owned firm managers maximize a different objective function (e.g., Choe and Yin 2000). For example, if public firms maximize revenues, perhaps the incentives to pay bribes increases with competition (e.g., with the number of bidders for a government contract).

Exporting Firms Our final source of heterogeneity is the export status of firms. In Table 8 we split the sample into exporting (Panel I) and non-exporting (Panel II) firms. Interestingly, we find little substantive difference in the bounds across the two sub-samples. In other words, there is no evidence that WTO membership differentially impact the bribery propensity of exporting and non-exporting firms.

5 Conclusion

Referring to general international integration, Sandholtz and Gray (2003, p. 767) suggest that the “more a country is involved in international organizations, the more likely its elites are to have absorbed some of the anticorruption norms, and the lower the level of corruption should be.” Espousing similar view, but referring specifically to the WTO, Aaronson and Abouharb (2014, p. 579) claim that “the WTO is, without direct intent, having some effects on governance.” Thus, there is a fairly widespread belief that participation in

the WTO helps improve overall governance and institutions among member countries; or, at least, it does not harm.

The two possible underlying mechanisms are the liberalization of trade, and its associated benefits, and policy anchoring. However, the empirical evidence regarding these is mixed and typically lacks a causal interpretation. Moreover, the *causal* impact of WTO membership on corruption is (to our knowledge) an unanswered question. We provide an answer by applying a nonparametric partial identification approach to circumvent issues of self-selection and misclassification of membership status. We obtain sharp bounds on the ATE of WTO membership on corruption under various assumptions concerning the selection process and measurement error. For this, we use firm-level corruption data from the WBES (1999-2000) that reports firm managers' direct experiences of paying bribes to public officials in the course of business operations. Further, we explore various sources of possible heterogeneity by bounding conditional ATEs using several country- and firm-specific attributes.

The results are quite striking. First, membership to the WTO is likely to *exacerbate* political corruption, in contrast to the usual rhetoric. Specifically, in the full sample, the ATE bounds *exclude zero* in the absence of misclassification but under otherwise reasonable assumptions. Because there is no misclassification of *formal* WTO membership, this implies that formal membership *increases* corruption. However, we cannot rule out the possibility that the ATE is zero once misclassification is allowed. In other words, the presence of countries acting as WTO members despite not actually being formal members precludes our ability to sign the ATE in the full sample. Second, the evidence in favor of an increase in political corruption is driven by countries having high market entry regulations for firms, countries with low net outflows of FDI, and government-owned firms. In sum, our analysis reveals at best a

small, beneficial effect of WTO membership on reducing corruption; membership is most likely to *exacerbate corruption* unless misclassification is present. Moreover, even with misclassification, the WTO is likely to exacerbate corruption in certain sub-samples. This is consistent with Keohane et al. (2009, p. 27) who state that “there are good reasons to be concerned that multilateralism can sometimes empower unaccountable elites – a tendency against which it is necessary to guard.”

To conclude, we believe our analysis to provide convincing *causal* evidence indicating that WTO membership may not improve the quality of governance as often postulated. While this is not necessarily an indictment of the WTO – it was not, after all, designed to combat domestic political corruption – it should serve as a warning to policymakers against relying on international organizations such as the WTO for improved governance. Moreover, the findings here ought to spur the development of richer, theoretical models of corruption to better understand the sources of important interactions between WTO membership, corruption, and the domestic economic environment.

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Table 1. Sharp Bounds on the ATE of WTO Membership on Corruption

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
0.00	[-0.006, -0.006] p.e. [-0.028, 0.017] CI	[-0.593, 0.407] p.e. [-0.603, 0.415] CI	[-0.593, -0.006] p.e. [-0.603, 0.017] CI	[-0.587, -0.070] p.e. [-0.599, -0.027] CI
0.01	[-0.021, 0.031] p.e. [-0.044, 0.055] CI	[-0.603, 0.417] p.e. [-0.613, 0.425] CI	[-0.603, 0.031] p.e. [-0.613, 0.055] CI	[-0.598, -0.024] p.e. [-0.607, 0.003] CI
0.03	[-0.057, 0.109] p.e. [-0.080, 0.138] CI	[-0.623, 0.437] p.e. [-0.633, 0.445] CI	[-0.623, 0.109] p.e. [-0.633, 0.138] CI	[-0.620, 0.044] p.e. [-0.627, 0.067] CI
0.05	[-0.097, 0.199] p.e. [-0.122, 0.232] CI	[-0.643, 0.457] p.e. [-0.653, 0.465] CI	[-0.643, 0.199] p.e. [-0.653, 0.232] CI	[-0.639, 0.117] p.e. [-0.646, 0.138] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 8952. See text for further details.

Table 2. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Cost of Starting a Business)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. High Regulation (above the median)				
0.00	[-0.073, -0.073] p.e. [-0.102, -0.049] CI	[-0.634, 0.366] p.e. [-0.649, 0.380] CI	[-0.634, -0.073] p.e. [-0.649, -0.049] CI	[-0.594, -0.130] p.e. [-0.619, -0.087] CI
0.01	[-0.086, -0.037] p.e. [-0.115, -0.013] CI	[-0.644, 0.376] p.e. [-0.659, 0.390] CI	[-0.644, -0.037] p.e. [-0.659, -0.013] CI	[-0.604, -0.088] p.e. [-0.629, -0.038] CI
0.03	[-0.115, 0.038] p.e. [-0.147, 0.065] CI	[-0.664, 0.396] p.e. [-0.679, 0.410] CI	[-0.664, 0.038] p.e. [-0.679, 0.065] CI	[-0.624, -0.006] p.e. [-0.649, 0.058] CI
0.05	[-0.148, 0.122] p.e. [-0.182, 0.152] CI	[-0.684, 0.416] p.e. [-0.699, 0.430] CI	[-0.684, 0.122] p.e. [-0.699, 0.152] CI	[-0.644, 0.040] p.e. [-0.669, 0.115] CI
II. Low Regulation (below the median)				
0.00	[0.040, 0.040] p.e. [0.017, 0.077] CI	[-0.559, 0.441] p.e. [-0.573, 0.456] CI	[-0.559, 0.040] p.e. [-0.573, 0.077] CI	[-0.559, 0.002] p.e. [-0.573, 0.027] CI
0.01	[0.022, 0.078] p.e. [-0.001, 0.115] CI	[-0.569, 0.451] p.e. [-0.583, 0.466] CI	[-0.569, 0.078] p.e. [-0.583, 0.115] CI	[-0.565, 0.027] p.e. [-0.583, 0.051] CI
0.03	[-0.019, 0.160] p.e. [-0.045, 0.200] CI	[-0.589, 0.471] p.e. [-0.603, 0.486] CI	[-0.589, 0.160] p.e. [-0.603, 0.200] CI	[-0.578, 0.083] p.e. [-0.595, 0.100] CI
0.05	[-0.067, 0.255] p.e. [-0.097, 0.300] CI	[-0.609, 0.491] p.e. [-0.623, 0.506] CI	[-0.609, 0.255] p.e. [-0.623, 0.300] CI	[-0.591, 0.135] p.e. [-0.608, 0.155] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 4521 (Panel I), 4291 (Panel II). See text for further details.

Table 3. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Number of Procedures to Start a Business)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. High Regulation (above the median)				
0.00	[-0.019, -0.019] p.e. [-0.041, 0.003] CI	[-0.528, 0.472] p.e. [-0.538, 0.484] CI	[-0.528, -0.019] p.e. [-0.538, 0.003] CI	[-0.507, -0.053] p.e. [-0.537, -0.021] CI
0.01	[-0.031, 0.009] p.e. [-0.053, 0.031] CI	[-0.538, 0.482] p.e. [-0.548, 0.494] CI	[-0.538, 0.009] p.e. [-0.548, 0.031] CI	[-0.517, -0.019] p.e. [-0.547, 0.007] CI
0.03	[-0.056, 0.066] p.e. [-0.079, 0.089] CI	[-0.558, 0.502] p.e. [-0.568, 0.514] CI	[-0.558, 0.066] p.e. [-0.568, 0.089] CI	[-0.537, 0.039] p.e. [-0.567, 0.064] CI
0.05	[-0.083, 0.125] p.e. [-0.105, 0.148] CI	[-0.578, 0.522] p.e. [-0.588, 0.534] CI	[-0.578, 0.125] p.e. [-0.588, 0.148] CI	[-0.557, 0.089] p.e. [-0.587, 0.112] CI
II. Low Regulation (below the median)				
0.00	[0.018, 0.018] p.e. [-0.035, 0.087] CI	[-0.673, 0.327] p.e. [-0.685, 0.340] CI	[-0.673, 0.018] p.e. [-0.685, 0.087] CI	[-0.671, -0.025] p.e. [-0.685, 0.050] CI
0.01	[-0.029, 0.144] p.e. [-0.091, 0.223] CI	[-0.683, 0.337] p.e. [-0.695, 0.350] CI	[-0.683, 0.144] p.e. [-0.695, 0.223] CI	[-0.676, 0.044] p.e. [-0.691, 0.124] CI
0.03	[-0.193, 0.312] p.e. [-0.285, 0.321] CI	[-0.703, 0.347] p.e. [-0.715, 0.358] CI	[-0.703, 0.312] p.e. [-0.715, 0.321] CI	[-0.687, 0.158] p.e. [-0.702, 0.284] CI
0.05	[-0.661, 0.312] p.e. [-0.718, 0.321] CI	[-0.723, 0.347] p.e. [-0.734, 0.358] CI	[-0.723, 0.312] p.e. [-0.734, 0.321] CI	[-0.698, 0.312] p.e. [-0.713, 0.321] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 4574 (Panel I), 4238 (Panel II). See text for further details.

Table 4. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Days Required to Start a Business)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. High Regulation (above the median)				
0.00	[-0.022, -0.022] p.e.	[-0.587, 0.413] p.e.	[-0.587, -0.022] p.e.	[-0.564, -0.052] p.e.
	[-0.052, 0.004] CI	[-0.600, 0.426] CI	[-0.600, 0.004] CI	[-0.590, -0.017] CI
0.01	[-0.037, 0.011] p.e.	[-0.597, 0.423] p.e.	[-0.597, 0.011] p.e.	[-0.571, -0.028] p.e.
	[-0.067, 0.037] CI	[-0.610, 0.436] CI	[-0.610, 0.037] CI	[-0.597, 0.011] CI
0.03	[-0.069, 0.081] p.e.	[-0.617, 0.443] p.e.	[-0.617, 0.081] p.e.	[-0.584, 0.023] p.e.
	[-0.100, 0.109] CI	[-0.630, 0.456] CI	[-0.630, 0.109] CI	[-0.609, 0.065] CI
0.05	[-0.105, 0.159] p.e.	[-0.637, 0.463] p.e.	[-0.637, 0.159] p.e.	[-0.597, 0.068] p.e.
	[-0.137, 0.188] CI	[-0.650, 0.476] CI	[-0.650, 0.188] CI	[-0.622, 0.107] CI
II. Low Regulation (below the median)				
0.00	[-0.002, -0.002] p.e.	[-0.608, 0.392] p.e.	[-0.608, -0.002] p.e.	[-0.549, -0.028] p.e.
	[-0.041, 0.028] CI	[-0.626, 0.407] CI	[-0.626, 0.028] CI	[-0.618, 0.009] CI
0.01	[-0.019, 0.038] p.e.	[-0.618, 0.402] p.e.	[-0.618, 0.038] p.e.	[-0.557, -0.002] p.e.
	[-0.058, 0.070] CI	[-0.636, 0.417] CI	[-0.636, 0.070] CI	[-0.626, 0.034] CI
0.03	[-0.057, 0.128] p.e.	[-0.638, 0.422] p.e.	[-0.638, 0.128] p.e.	[-0.574, 0.053] p.e.
	[-0.100, 0.163] CI	[-0.656, 0.437] CI	[-0.656, 0.163] CI	[-0.643, 0.088] CI
0.05	[-0.102, 0.232] p.e.	[-0.658, 0.442] p.e.	[-0.658, 0.232] p.e.	[-0.590, 0.110] p.e.
	[-0.149, 0.270] CI	[-0.676, 0.457] CI	[-0.676, 0.270] CI	[-0.659, 0.151] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 4441 (Panel I), 4371 (Panel II). See text for further details.

Table 5. Sharp Bounds on the ATE of WTO Membership on Corruption: FDI Net Inflows (as % of GDP)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. High Inflows (above the median)				
0.00	[0.039, 0.039] p.e.	[-0.560, 0.440] p.e.	[-0.560, 0.039] p.e.	[-0.536, -0.070] p.e.
	[0.011, 0.076] CI	[-0.572, 0.457] CI	[-0.572, 0.076] CI	[-0.554, -0.038] CI
0.01	[0.023, 0.074] p.e.	[-0.570, 0.450] p.e.	[-0.570, 0.074] p.e.	[-0.544, -0.046] p.e.
	[-0.005, 0.110] CI	[-0.582, 0.467] CI	[-0.582, 0.110] CI	[-0.562, -0.007] CI
0.03	[-0.013, 0.151] p.e.	[-0.590, 0.470] p.e.	[-0.590, 0.151] p.e.	[-0.560, 0.003] p.e.
	[-0.042, 0.190] CI	[-0.602, 0.487] CI	[-0.602, 0.190] CI	[-0.579, 0.052] CI
0.05	[-0.053, 0.237] p.e.	[-0.610, 0.490] p.e.	[-0.610, 0.237] p.e.	[-0.576, 0.049] p.e.
	[-0.087, 0.283] CI	[-0.622, 0.507] CI	[-0.622, 0.283] CI	[-0.595, 0.099] CI
II. Low Inflows (below the median)				
0.00	[-0.050, -0.050] p.e.	[-0.627, 0.373] p.e.	[-0.627, -0.050] p.e.	[-0.567, -0.097] p.e.
	[-0.080, -0.020] CI	[-0.641, 0.387] CI	[-0.641, -0.020] CI	[-0.598, -0.051] CI
0.01	[-0.065, -0.012] p.e.	[-0.637, 0.383] p.e.	[-0.637, -0.012] p.e.	[-0.574, -0.065] p.e.
	[-0.096, 0.019] CI	[-0.651, 0.397] CI	[-0.651, 0.019] CI	[-0.605, -0.018] CI
0.03	[-0.101, 0.069] p.e.	[-0.657, 0.403] p.e.	[-0.657, 0.069] p.e.	[-0.587, 0.005] p.e.
	[-0.134, 0.102] CI	[-0.671, 0.417] CI	[-0.671, 0.102] CI	[-0.619, 0.048] CI
0.05	[-0.141, 0.162] p.e.	[-0.677, 0.423] p.e.	[-0.677, 0.162] p.e.	[-0.601, 0.058] p.e.
	[-0.177, 0.195] CI	[-0.691, 0.437] CI	[-0.691, 0.195] CI	[-0.632, 0.097] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 4477 (Panel I), 4475 (Panel II). See text for further details.

Table 6. Sharp Bounds on the ATE of WTO Membership on Corruption: FDI Net Outflows (as % of GDP)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. High Outflows (above the median)				
0.00	[0.116, 0.116] p.e.	[-0.513, 0.487] p.e.	[-0.513, 0.116] p.e.	[-0.511, 0.073] p.e.
	[0.085, 0.154] CI	[-0.526, 0.501] CI	[-0.526, 0.154] CI	[-0.526, 0.100] CI
0.01	[0.097, 0.156] p.e.	[-0.523, 0.497] p.e.	[-0.523, 0.156] p.e.	[-0.516, 0.097] p.e.
	[0.065, 0.196] CI	[-0.536, 0.511] CI	[-0.536, 0.196] CI	[-0.536, 0.137] CI
0.03	[0.051, 0.244] p.e.	[-0.543, 0.517] p.e.	[-0.543, 0.244] p.e.	[-0.526, 0.154] p.e.
	[0.018, 0.286] CI	[-0.556, 0.531] CI	[-0.556, 0.286] CI	[-0.554, 0.193] CI
0.05	[-0.001, 0.349] p.e.	[-0.563, 0.537] p.e.	[-0.563, 0.349] p.e.	[-0.537, 0.202] p.e.
	[-0.044, 0.394] CI	[-0.576, 0.551] CI	[-0.576, 0.394] CI	[-0.571, 0.261] CI
II. Low Outflows (below the median)				
0.00	[-0.137, -0.137] p.e.	[-0.662, 0.338] p.e.	[-0.662, -0.137] p.e.	[-0.631, -0.245] p.e.
	[-0.166, -0.108] CI	[-0.675, 0.351] CI	[-0.675, -0.108] CI	[-0.674, -0.197] CI
0.01	[-0.150, -0.102] p.e.	[-0.672, 0.348] p.e.	[-0.672, -0.102] p.e.	[-0.640, -0.205] p.e.
	[-0.179, -0.074] CI	[-0.685, 0.361] CI	[-0.685, -0.074] CI	[-0.683, -0.151] CI
0.03	[-0.179, -0.030] p.e.	[-0.692, 0.368] p.e.	[-0.692, -0.030] p.e.	[-0.659, -0.105] p.e.
	[-0.210, 0.000] CI	[-0.705, 0.381] CI	[-0.705, 0.000] CI	[-0.701, -0.046] CI
0.05	[-0.213, 0.050] p.e.	[-0.712, 0.388] p.e.	[-0.712, 0.050] p.e.	[-0.677, -0.012] p.e.
	[-0.245, 0.082] CI	[-0.725, 0.401] CI	[-0.725, 0.082] CI	[-0.719, 0.014] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 4142 (Panel I), 4077 (Panel II). See text for further details.

Table 7. Sharp Bounds on the ATE of WTO Membership on Corruption: Firm Ownership (Government vs. Non-Government)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. Government Ownership				
0.00	[-0.049, -0.049] p.e.	[-0.528, 0.472] p.e.	[-0.528, -0.049] p.e.	[-0.513, -0.111] p.e.
	[-0.117, 0.007] CI	[-0.560, 0.499] CI	[-0.560, 0.007] CI	[-0.560, -0.042] CI
0.01	[-0.067, -0.027] p.e.	[-0.538, 0.482] p.e.	[-0.538, -0.027] p.e.	[-0.521, -0.091] p.e.
	[-0.136, 0.030] CI	[-0.570, 0.509] CI	[-0.570, 0.030] CI	[-0.569, -0.022] CI
0.03	[-0.107, 0.017] p.e.	[-0.558, 0.502] p.e.	[-0.558, 0.017] p.e.	[-0.537, -0.049] p.e.
	[-0.178, 0.075] CI	[-0.590, 0.529] CI	[-0.590, 0.075] CI	[-0.586, 0.021] CI
0.05	[-0.148, 0.062] p.e.	[-0.578, 0.522] p.e.	[-0.578, 0.062] p.e.	[-0.553, -0.006] p.e.
	[-0.222, 0.124] CI	[-0.610, 0.549] CI	[-0.610, 0.124] CI	[-0.602, 0.060] CI
II. Non-Government Ownership				
0.00	[0.037, 0.037] p.e.	[-0.592, 0.408] p.e.	[-0.592, 0.037] p.e.	[-0.586, -0.022] p.e.
	[0.017, 0.059] CI	[-0.600, 0.419] CI	[-0.600, 0.059] CI	[-0.600, 0.006] CI
0.01	[0.022, 0.077] p.e.	[-0.602, 0.418] p.e.	[-0.602, 0.077] p.e.	[-0.597, 0.007] p.e.
	[0.002, 0.099] CI	[-0.610, 0.429] CI	[-0.610, 0.099] CI	[-0.610, 0.040] CI
0.03	[-0.010, 0.165] p.e.	[-0.622, 0.438] p.e.	[-0.622, 0.165] p.e.	[-0.619, 0.075] p.e.
	[-0.033, 0.188] CI	[-0.630, 0.449] CI	[-0.630, 0.188] CI	[-0.630, 0.111] CI
0.05	[-0.048, 0.266] p.e.	[-0.642, 0.458] p.e.	[-0.642, 0.266] p.e.	[-0.634, 0.147] p.e.
	[-0.073, 0.294] CI	[-0.650, 0.469] CI	[-0.650, 0.294] CI	[-0.650, 0.181] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 1007 (Panel I), 7624 (Panel II). See text for further details.

Table 8. Sharp Bounds on the ATE of WTO Membership on Corruption: Exporting Firms (Exporters vs. Non-Exporters)

Q	Assumptions Regarding Selection			
	Exogenous Selection	Worst-Case	MTS	MTS & MIV
	(1)	(2)	(3)	(4)
I. Exporters				
0.00	[-0.021, -0.021] p.e. [-0.063, 0.026] CI	[-0.632, 0.368] p.e. [-0.647, 0.385] CI	[-0.632, -0.021] p.e. [-0.647, 0.026] CI	[-0.616, -0.061] p.e. [-0.639, -0.020] CI
0.01	[-0.046, 0.033] p.e. [-0.089, 0.084] CI	[-0.642, 0.378] p.e. [-0.657, 0.395] CI	[-0.642, 0.033] p.e. [-0.657, 0.084] CI	[-0.624, -0.029] p.e. [-0.647, 0.021] CI
0.03	[-0.110, 0.161] p.e. [-0.157, 0.224] CI	[-0.662, 0.398] p.e. [-0.677, 0.415] CI	[-0.662, 0.161] p.e. [-0.677, 0.224] CI	[-0.640, 0.035] p.e. [-0.663, 0.102] CI
0.05	[-0.194, 0.330] p.e. [-0.253, 0.360] CI	[-0.682, 0.418] p.e. [-0.697, 0.433] CI	[-0.682, 0.330] p.e. [-0.697, 0.360] CI	[-0.657, 0.066] p.e. [-0.679, 0.179] CI
II. Non-Exporters				
0.00	[0.014, 0.014] p.e. [-0.019, 0.043] CI	[-0.557, 0.443] p.e. [-0.573, 0.456] CI	[-0.557, 0.014] p.e. [-0.573, 0.043] CI	[-0.557, -0.055] p.e. [-0.571, -0.021] CI
0.01	[0.001, 0.046] p.e. [-0.032, 0.075] CI	[-0.567, 0.453] p.e. [-0.583, 0.466] CI	[-0.567, 0.046] p.e. [-0.583, 0.075] CI	[-0.567, -0.022] p.e. [-0.581, 0.010] CI
0.03	[-0.029, 0.113] p.e. [-0.063, 0.143] CI	[-0.587, 0.473] p.e. [-0.603, 0.486] CI	[-0.587, 0.113] p.e. [-0.603, 0.143] CI	[-0.587, 0.029] p.e. [-0.600, 0.056] CI
0.05	[-0.060, 0.185] p.e. [-0.096, 0.216] CI	[-0.607, 0.493] p.e. [-0.623, 0.506] CI	[-0.607, 0.185] p.e. [-0.623, 0.216] CI	[-0.604, 0.081] p.e. [-0.616, 0.108] CI

Notes: p.e. = point estimates; CI = confidence interval. Imbens-Manski (2004) 95% CIs obtained using 100 bootstrap repetitions. Q = maximum rate of misclassification of WTO status. Assumptions of no false positives and positive selection are imposed. Outcome equals one if a firm reports never paying a bribe, zero otherwise. MIV is GDP per capita. Number of observations = 3061 (Panel I), 5428 (Panel II). See text for further details.

Appendix

Table A1. Data Sources and Summary Statistics

Variable	Source	N	Mean	SD	Minimum	Maximum
<i>Outcome Indicator</i>						
Honesty/Absence of Corruption: Bribe paid (1 = Never)	World Business Environment Survey (WBES, 1999-2000)	8952	0.306	0.461	0	1
<i>Treatment Indicator</i>						
WTO Membership in 1999 (1 = Yes)	http://www.stanford.edu/~tomz/pubs/pubs.shtml	8952	0.735	0.441	0	1
<i>Monotone Instrumental Variable</i>						
GDP Per Capita	World Development Indicators, The World Bank (1999)	8952	7593.700	7531.715	468.426	37283.810
<i>Covariates</i>						
Costs of Starting a Business (% of income per capita), 1999	Djankov et al. (2004)	8812	0.727	1.283	0.005	5.348
Number of Procedures to Start a Business, 1999	Djankov et al. (2004)	8812	11.632	3.811	2.000	21.000
Number of Days to Start a Business, 1999	Djankov et al. (2004)	8812	58.695	35.396	2.000	260.000
FDI Net Inflows (% of GDP)	World Development Indicators, The World Bank (1999)	8952	3.953	3.804	-1.333	22.384
FDI Net Outflows (% of GDP)	World Development Indicators, The World Bank (1999)	8219	1.591	3.953	-1.390	30.329
Firm Ownership (1 = Government)	World Business Environment Survey (WBES, 1999-2000)	8631	0.117	0.321	0	1
Exporting Firm (1 = Yes)	World Business Environment Survey (WBES, 1999-2000)	8489	0.361	0.480	0	1

Notes: GDP per capita is in PPP units (current international dollars). For countries where entry regulation measures are missing for 1999, we use data from 2004 from the World Bank's Doing Business database. For countries where FDI data are missing for 1999, we use the nearest available year.

Table A2. Sample Breakdown by Formal WTO Membership Status, 1999

Country	N	Country	N	Country	N
<i>Not Formal WTO Members</i>		<i>Formal WTO Members</i>			
Albania#	152	Bangladesh	49	Namibia	89
Armenia#	119	Belize	46	Nicaragua	92
Azerbaijan*	118	Bolivia	97	Nigeria	82
Belarus*	120	Botswana	93	Pakistan	101
Bosnia*	89	Brazil	189	Panama	97
Cambodia#	324	Bulgaria	117	Peru	103
Croatia#	124	Cameroon	48	Philippines	100
Ethiopia*	87	Canada	95	Poland	202
Georgia#	114	Chile	98	Portugal	89
Kazakhstan#	114	Colombia	98	Romania	116
Lithuania#	95	Costa Rica	98	Senegal	79
Moldova#	114	Cote d'Ivoire	78	Singapore	99
Russia#	470	Czech Rep	118	Slovakia	104
Ukraine#	218	Dominican Rep	110	Slovenia	117
Uzbekistan*	116	Ecuador	96	South Africa	116
		Egypt	96	Spain	95
Total	2,374	El Salvador	102	Sweden	101
		Estonia	124	Tanzania	75
		France	79	Thailand	422
		Germany	86	Trinidad&Tobago	94
		Ghana	101	Tunisia	38
		Guatemala	102	Turkey	128
		Haiti	99	UK	97
		Honduras	79	US	93
		Hungary	112	Uganda	122
		India	204	Uruguay	82
		Indonesia	99	Venezuela	96
		Italy	91	Zambia	74
		Kenya	106	Zimbabwe	117
		Kyrgyzstan	104		
		Madagascar	105	Total	6,578
		Malawi	53		
		Malaysia	88		
		Mexico	98		

Notes: * indicates countries that currently have observer status in the WTO. # indicates countries that became formal members of the WTO after 1999.

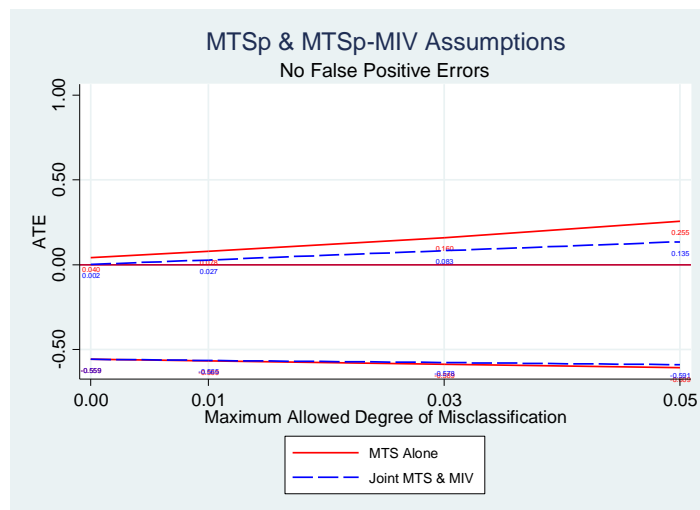
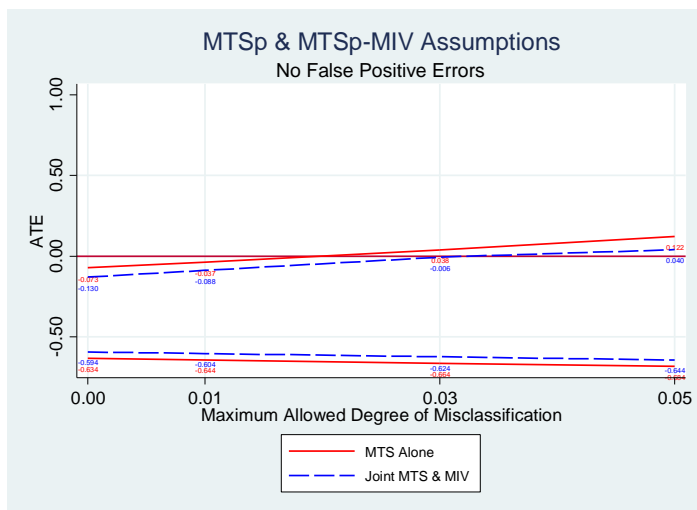


Figure A1. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Cost of Starting a Business)
Note: Left panel corresponds to high regulation (greater than equal to the median); right panel to low regulation (less than the median). Assumption of no false positives is imposed. MIV is GDP per capita.

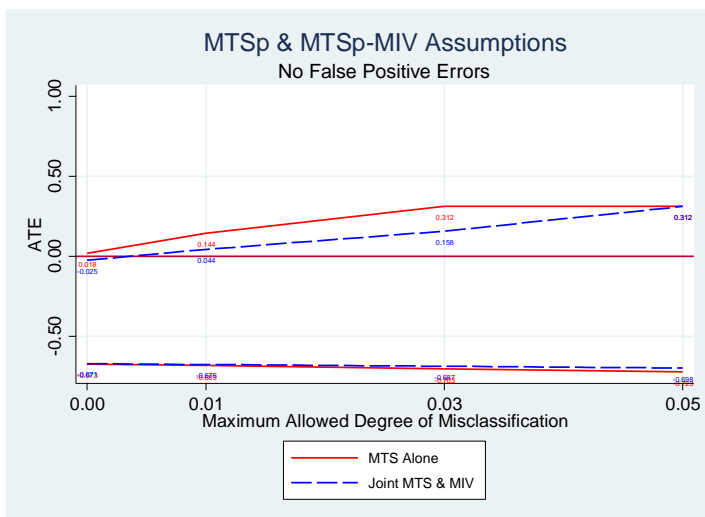
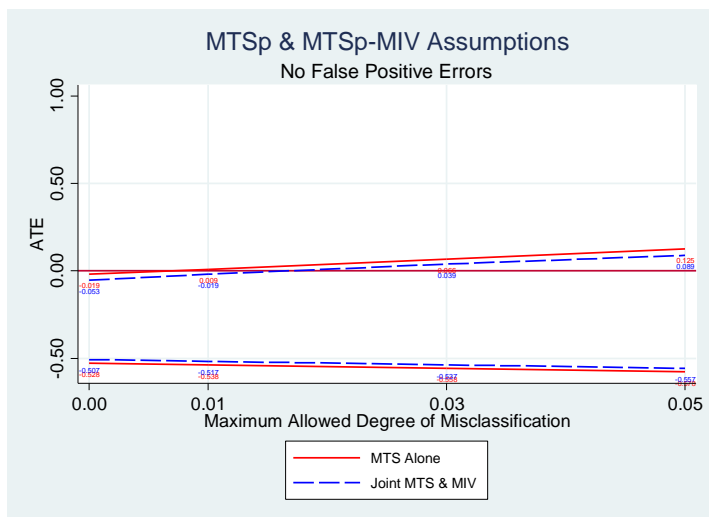


Figure A2. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Number of Procedures to Start a Business)
Note: Left panel corresponds to high regulation (greater than equal to the median); right panel to low regulation (less than the median). Assumption of no false positives is imposed. MIV is GDP per capita.

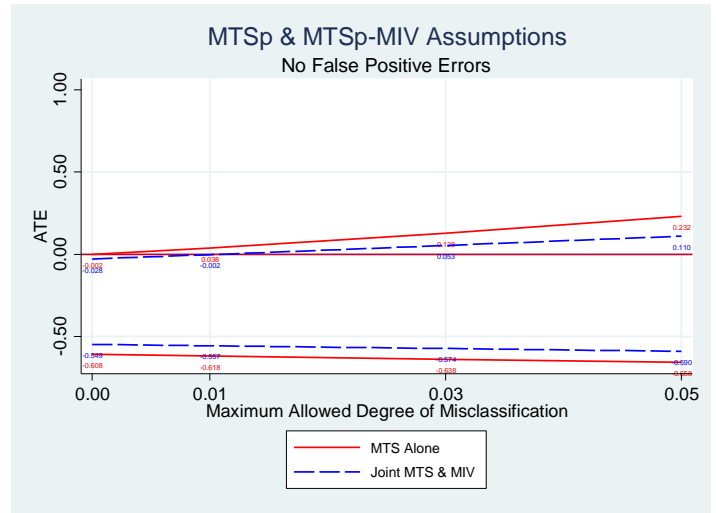
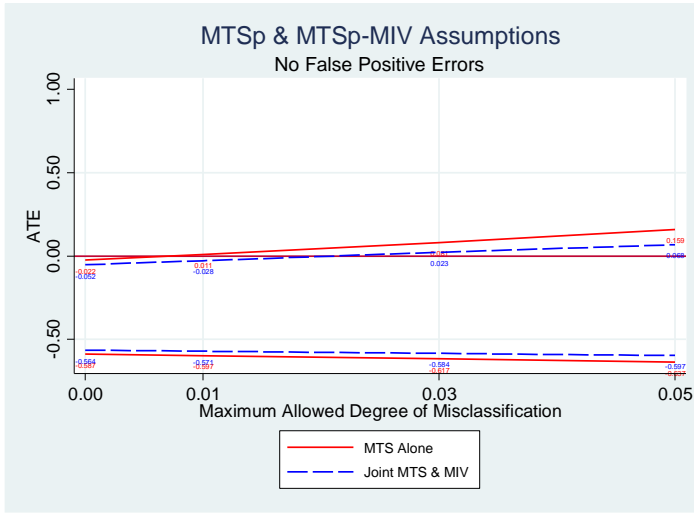


Figure A3. Sharp Bounds on the ATE of WTO Membership on Corruption: Entry Regulation (Days Required to Start a Business)

Note: Left panel corresponds to high regulation (greater than equal to the median); right panel to low regulation (less than the median). Assumption of no false positives is imposed. MIV is GDP per capita.

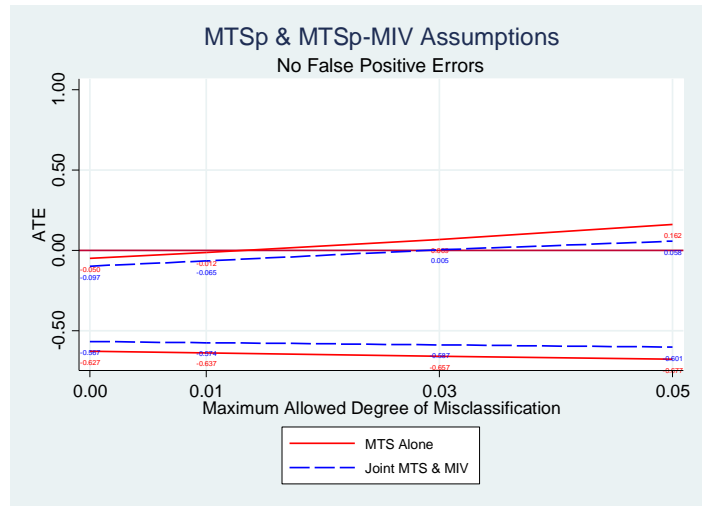
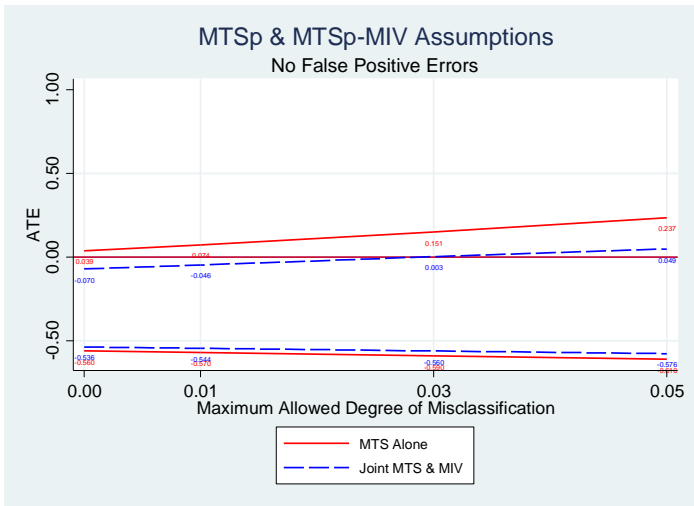


Figure A4. Sharp Bounds on the ATE of WTO Membership on Corruption: FDI Net Inflows

Note: Left panel corresponds to high net inflows (greater than equal to the median); right panel to low net inflows (less than the median). Assumption of no false positives is imposed. MIV is GDP per capita.

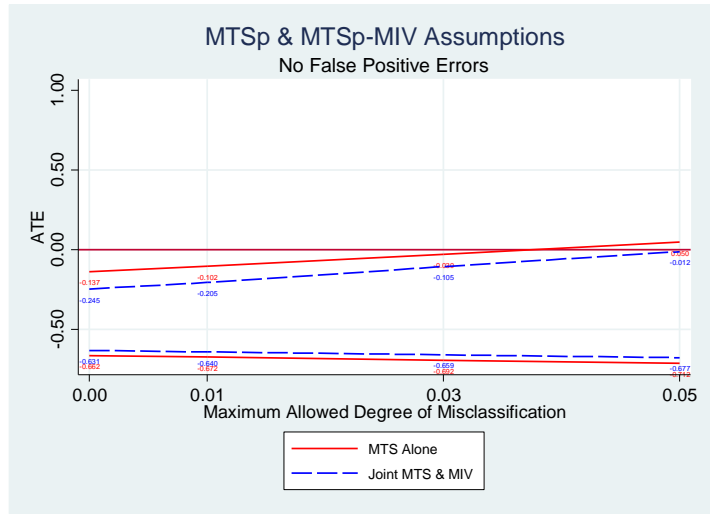
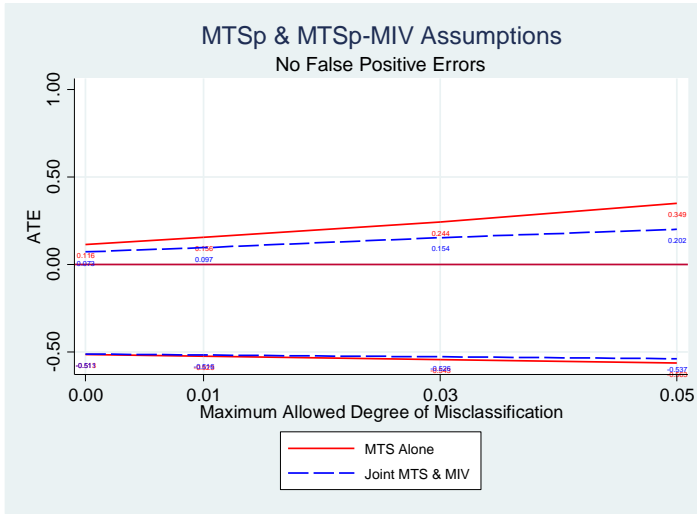


Figure A5. Sharp Bounds on the ATE of WTO Membership on Corruption: FDI Net Outflows

Note: Left panel corresponds to high net outflows (greater than equal to the median); right panel to low net outflows (less than the median). Assumption of no false positives is imposed. MIV is GDP per capita.

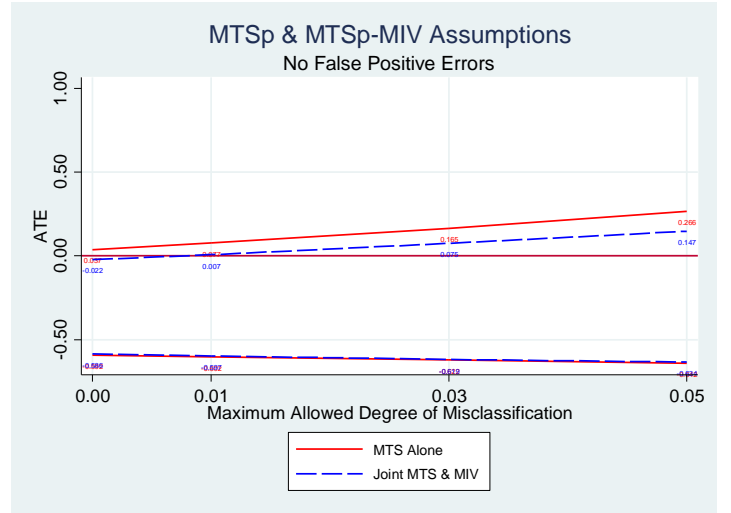
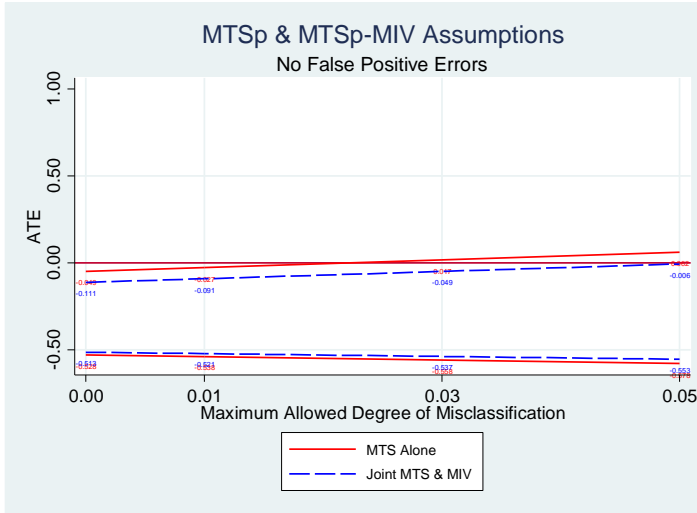


Figure A6. Sharp Bounds on the ATE of WTO Membership on Corruption: Firm Ownership

Note: Left panel corresponds to government ownership; right panel to non-government ownership. Assumption of no false positives is imposed. MIV is GDP per capita.

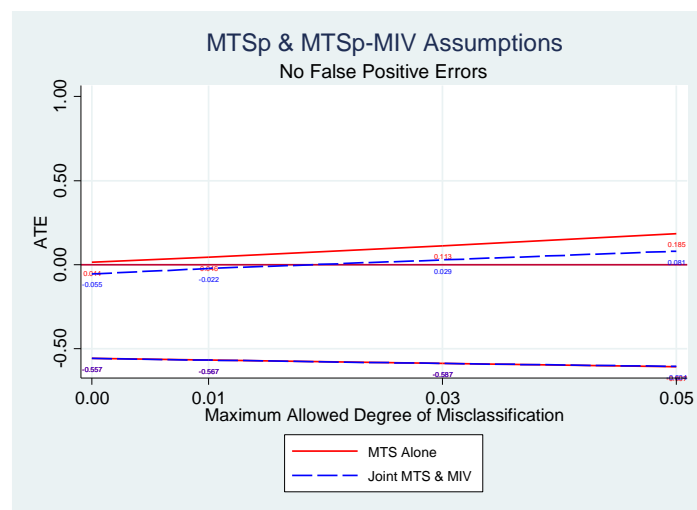
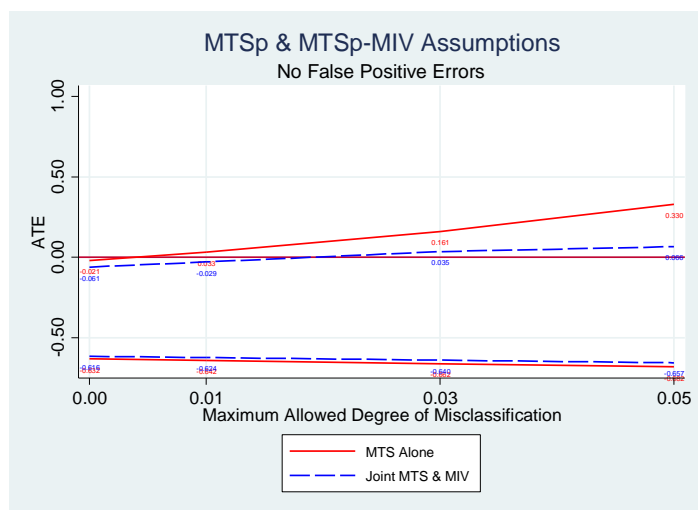


Figure A7. Sharp Bounds on the ATE of WTO Membership on Corruption: Exporting Firms

Note: Left panel corresponds to firms that export; right panel to non-exporting firms. Assumption of no false positives is imposed. MIV is of GDP per capita.