

Containing Chinese State-Owned Enterprises?

The Role of Deep Trade Agreements

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Abstract

Regional trade agreements increasingly include provisions that regulate state-owned enterprises. This paper combines new information on the content of “deep” regional trade agreements and data on Chinese firm-level exports during 2000–11 to analyze the spillover effect of rules on state-owned enterprises on the intensive and extensive margins of Chinese state-owned enterprises’ trade. Rather than containing state capitalism, regional trade agreements

regulating state-owned enterprises signed by Chinese trading partners with third countries increase exports and entry of Chinese state-owned enterprises as they gain a competitive edge in regulated markets. This spillover effect is robust to several extensions and is even stronger for agreements that include rules on subsidies and competition policy. This finding points to the need for commonly agreed multilateral rules to regulate state owned enterprises.

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Containing Chinese State-Owned Enterprises? The Role of Deep Trade Agreements

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1 Introduction

The rapid rise of China and the uniqueness of its economic structure have been largely unforeseen by those negotiating multilateral trade rules (Wu, 2016; Mavroidis and Janow, 2017). As a result, Chinese specificities –the outsized presence of the state in the Chinese economy and the management of state-owned enterprises (SOEs), with their explicit or implicit ties to the government– largely fall outside the scope of the current jurisdiction of the World Trade Organization (WTO). Not surprisingly, issues concerning SOEs and the role of state intervention in China have emerged as points of tension in the WTO system in recent years (Bown and Hillman, 2019; Lang, 2019). And how to reform multilateral rules to address Chinese specificities is a matter of ongoing discussion among WTO experts (Mavroidis and Sapir, 2019).

At the same time, many countries have increasingly regulated SOEs, and state intervention more broadly, within regional trade agreements (RTAs). While there are important differences across agreements, 193 of the 283 RTAs in force in 2018 had some form of regulation of SOEs (Rubini and Wang, 2020). Some scholars view the development of rules within RTAs as a path to deal with the challenges created by the rise of China (Bhala, 2017; Wu, 2016). This idea emerged most clearly throughout the negotiations of the Trans-Pacific Partnership (TPP). As one scholar put it: in the eyes of the negotiators, “TPP serves as a ‘building block’ for developing new trade rules –China would then need to choose whether to embrace these rules eventually or risk displacement from the new preferential trade arrangements” (Wu, 2016). While TPP did not come into existence, its successor, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) retained rules on SOEs.

Despite a rich policy debate, the role of RTAs in defining new rules on SOEs and their effect on the Chinese economic structure have not been the subject of formal and empirical scrutiny. If WTO rules are unable to deal with Chinese specificities, are RTAs an alternative way to resolve those trade concerns? Addressing this question presupposes an understanding of a more proximate issue. How do RTA rules on state-owned enterprises enforced in third markets affect Chinese SOEs? In this paper, we combine new detailed data on the content of trade agreements with Chinese firm-level exports for the period 2000-2011 to analyze the direct and indirect impact of SOE rules on the intensive and extensive margins of Chinese SOEs’ trade.

Regional trade agreements regulating SOEs may have direct and indirect effect on Chinese exports. The content of an agreement including China as a member directly affects Chinese trade through a change in border and beyond the border measures faced by China’s firms. In a globalized world, RTAs signed between third countries may also indirectly affect Chinese exports as they change the preference margin and the regulatory environment faced by Chinese firms. RTAs where China is a member rarely include binding provisions on SOEs. Indeed, the recently signed Regional Comprehensive Economic Partnership (RCEP), of which China is a party, does not foresee any regulation of state-owned enterprises. Most of the trade agreements regulating SOEs are signed between third countries, potentially generating

spillovers for Chinese exports.¹ These agreements – in various degrees – require SOEs to act in accordance with commercial considerations, regulate ownership, and prohibit discrimination, subsidization and anti-competitive practices (Rubini and Wang, 2020).

While third-country effects of preferential tariffs are well understood, the impact of other provisions in trade agreements on non-members are less obvious.² In this paper, we argue that the regulation of SOEs in RTAs signed between third countries may affect both the extensive and the intensive margin of Chinese SOEs’ exports.

Provisions regulating state-owned enterprises aim at decreasing firm-level distortions in member countries. These distortions result from a large variety of departures from standard competitive markets such as subsidized credits or direct government support to SOEs. In a heterogeneous firms framework à la Melitz (2003), in which firm-level distortions affect production costs (Hsieh and Klenow, 2009; Hsieh and Song, 2015), firms maximize profits as a function of their productivity, their inputs combination and those firm-level distortions. Following the enforcement of provisions regulating SOEs, the reduction of firm-level distortions leads to lower profits for enterprises previously benefiting from government support in members’ market (at least in the short run). This reduction brings a decline in domestic sales (all else being equal) and, in some extreme cases, results in negative profits and exit.

Following the decline in domestic sales combined with a constant domestic demand, the profit threshold above which foreign (non-regulated) firms are able to export to these markets decreases.³ This may trigger Chinese exports relatively more compared to the rest of the world for different reasons. First, the size of China potentially translates into a large number of Chinese firms lying just below the export threshold. Those firms may then be the first to enter the SOE regulated destination following an RTA between third countries. Second, the large number of Chinese SOEs may increase Chinese exports relatively more compared to the rest of the world in specific markets where domestic and foreign SOEs tend to compete. Finally, if SOEs operate in strategic sectors, the regulation of SOEs in destination markets may trigger a coordinated policy response designed to expand exports in those markets. The capacity to coordinate such policies may be relatively higher for China compared to the rest of the world.

Within Chinese firms, the decrease in the productivity threshold to export stimulates the entry of new and less productive firms into these markets. As the productivity of Chinese

¹As we will discuss in the next section, many of the trade agreements regulating SOEs were signed post 2000 and are between developed and developing countries. Examples include EU-South Africa (2000), Japan-Indonesia (2008), USA-Panama (2012).

²RTAs typically reduce trade costs between members, but their impact on trade costs with non-members is determined by the precise nature of the provisions contained in the agreements. Mattoo et al. (2017) build on an intuition by Baldwin (2014) and point out that deep trade agreements lead to more trade creation and less trade diversion than shallow agreements. Some provisions are purely discriminatory, while some others (e.g. subsidies, competition) do not discriminate between members and non-members of an RTA. Thus, some provisions reduce trade costs between members and increase trade costs to non-members, while others can reduce trade costs for both members and non-members.

³The extent of this effect will in part depend on whether in members’ markets there are domestic private firms that can expand their sales after the regulation of domestic SOEs.

SOEs is on average 40 percent lower than the private sector (Dewenter and Malatesta, 2001; Hsieh and Klenow, 2009), entry of new firms in member markets could benefit relatively more SOEs than private firms in China (extensive margin) as these firms are more likely to lie below the export threshold. SOE provisions in third-country RTAs can also impact the overall exports of Chinese SOEs (intensive margin). To the extent that SOEs tend to compete in similar sectors across countries, the regulation of state-owned enterprises in members' markets would give a competitive edge to Chinese SOEs, thus stimulating their exports.

To investigate the effects of third-country RTAs on the export performance of Chinese SOEs, we use new information on the content of “deep” trade agreements and data on Chinese firm-level exports for the period 2000-2011. The database on deep trade agreements maps the content of 279 RTAs signed between 1958 and 2018 (Mattoo et al., 2020). Among other policy areas, the database provides detailed information on the rules regulating SOEs in regional trade agreements. The firm-level Chinese customs data contain information about the export value from a given firm to the destination market between 2000 and 2011. Importantly for our purposes, the data include a variable capturing the legal registration of the firm as state-owned or private.

To provide some motivation Figure 1 takes a preliminary look at the data. Panel 1(a) shows the time trend of export flows between members of trade agreements for the universe of RTAs covered in our database. The two lines differentiate between trade agreements including and excluding enforceable rules regulating SOEs.⁴ As shown in the figure, trade between members signing an agreement with enforceable provisions on SOEs displays a similar time trend compared to members signing an agreement without enforceable provisions on SOEs. Figure 1(b) shows the time trend of Chinese exports to members' markets of all trade agreements covered in our data (except those signed by China). After the entry into force of the agreement, Chinese exports increased more to countries that signed agreements with enforceable SOE provisions relative to those with RTAs that did not regulate state-owned enterprises. This differential effect is the object of our analysis.

Our empirical strategy at the country-level relies on a structural gravity model that allows to identify the effect of specific provisions in RTAs – those regulating SOEs – on trade flows. Specifically, our goal is to assess the spillover effect of RTAs signed by destination markets through the rules regulating state-owned enterprises, while controlling for the direct impact of trade agreements. As a first step, we analyze the impact of third-country RTAs on aggregate exports from China to investigate whether Chinese exports respond differently from other exporters to the inclusion of SOE provisions in third-country RTAs. We then focus on Chinese firm-level data and investigate the extent to which these effects are driven by changes in participation and exports of Chinese SOEs compared to their private counterparts. In doing so, our empirical strategy controls for time-varying confounding factors differing across firms or across destination markets.

⁴Enforceable rules include those rules for which the language of the agreement is sufficiently precise from a formal legal point of view and where the agreement foresees a dispute settlement mechanism to resolve disagreement.

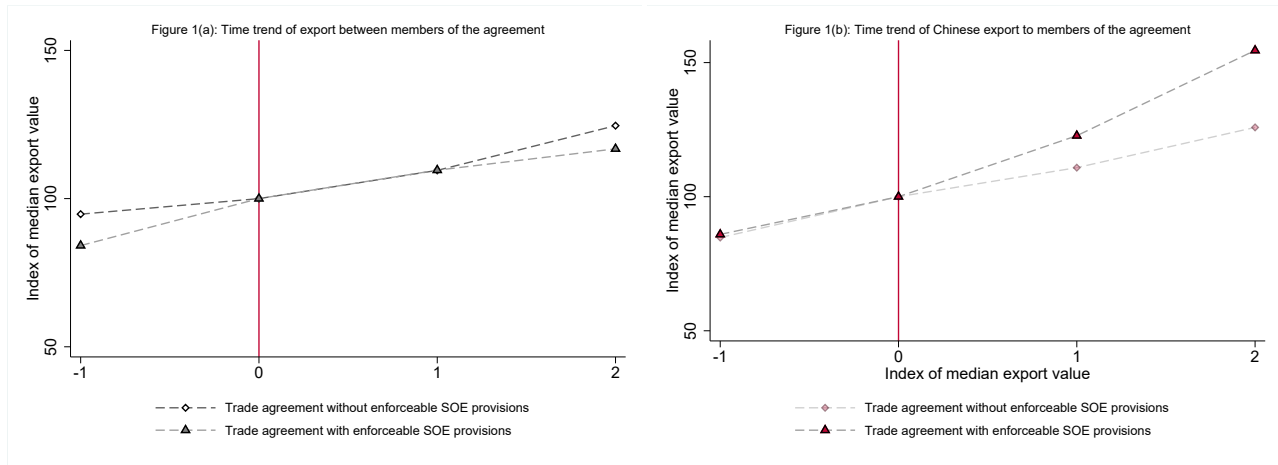


Figure 1: Time trends of exports between RTA members and third countries
Sources: Authors' calculation using Hofmann et al. (2017)

We find that stricter SOE regulation between RTA members increases Chinese exports to these markets as compared to exports from the rest of the world. This impact is particularly strong when the trade agreement contains enforceable provisions regulating the ownership regime, subsidies and the anti-competitive behavior of SOEs. As an illustration, we find that stringent rules on SOEs in the EU-Colombia/Peru agreement are associated to an increase in exports from China by 1 percent as compared to the rest of the world, while no such effect is found for the EU-Korea agreement which does not regulate SOEs. Turning to our firm-level empirical strategy, we further find that the surge in Chinese exports is driven by an increase in the participation and exports of Chinese SOEs as compared to private firms. Including the most stringent regulation of SOEs in a trade agreement signed between third countries increases Chinese SOE participation in those markets by 2.4 percent and their export value by 4.5 percent relative to private firms.

We then investigate a number of additional issues. First, we study how this spillover effect of SOE provisions varies when the agreement regulates other aspects of state intervention. We find that these effects are even stronger when we consider other provisions in RTAs, such as subsidies and competition policy, which complement SOE rules. Second, we analyze what sectors drive the spillover effect. While the rise in Chinese SOEs' participation is evenly distributed across sectors, we find that at the intensive margin, sectors such as textiles and electronics and machinery drive the increase in exports. Finally, we decompose the contribution of the extensive and intensive margins to total changes in exports. We find that the increase in Chinese exports due to SOE regulations in RTAs is mainly driven by an increase in SOE entry in members' markets.

Our results have relevant policy implications. Rather than containing Chinese state-owned enterprises, rules on SOEs in RTAs signed by Chinese trading partners with third countries boost Chinese exports relative to the rest of the world and benefit Chinese SOEs relative to private firms. If the goal of rules regulating state-owned enterprises in trade agreements is to

promote reforms in non-member countries, they risk achieving the opposite outcome as their spillover effect strengthens the export performance of SOEs by making it easier for them to penetrate members' markets. Another consequence of this spillover effect is that it may lead members of an RTA enforcing SOE provisions to step up the use of trade remedies such as anti-dumping and countervailing duties to target non-members' state-owned enterprises. Finally, from a normative perspective, the presence of this spillover effect points to the need for commonly agreed multilateral rules to regulate state-owned enterprises.

This paper contributes to two strands of the literature. First, a series of studies analyze the evolution and performance of Chinese SOEs and the effectiveness of strategies to reform the state sector in China (Hsieh and Klenow, 2009; Song et al., 2011; Lardy, 2014; Berkowitz et al., 2017). This literature has mostly focused on the domestic reforms aiming at improving the efficiency of SOEs, such as privatization and consolidation of SOEs. Differently from this line of work, by focusing on trade agreements, this paper investigates the role of external mechanisms for reform.⁵ Second, this paper contributes to the empirical literature on the effects of trade agreements (Limão, 2016) and particularly to the growing literature on deep trade agreements which highlights the importance of disciplines that go beyond tariffs (Mattoo et al., 2017; Osnago et al., 2016; Orefice and Rocha, 2013). Our work relates most closely to the literature studying the effect of RTAs on third countries (Fugazza and Nicita, 2013; Dai et al., 2014; Lee et al., 2019; Fontagne et al., 2020). Differently from other studies, this paper analyzes a specific spillover effect created by the rules regulating state intervention.

The rest of the paper is organized as follows. Section 2 describes the data and presents some stylized facts. Section 3 presents the empirical strategy and the results at country level, while Section 4 focuses on the firm-level analysis. Section 5 provides extensions and a series of robustness checks. Concluding remarks follow.

2 Data and descriptive statistics

The analysis of the impact of trade agreements on the export performance of Chinese SOEs relies on data on the content of RTAs and data on Chinese firm-level exports. The data on RTAs provide information on the content of 279 trade agreements –i.e. the universe of RTAs in force and notified to the WTO up to 2018 (Mattoo et al., 2020). More specifically, the data focus on the 18 most common policy areas regulated by trade agreements (such as investment, competition, intellectual property rights protection etc.)⁶ and map individual provisions for each policy area. The specific provisions detail objectives, liberalizing commitments and obligations, and procedures, transparency and enforcement rules for each area

⁵An exception is the recent work by Baccini et al. (2019) that investigates the role of the entry of Vietnam in the World Trade Organization on the performance (i.e. selection and productivity) of Vietnamese SOEs relative to their private counterparts.

⁶The comprehensive list of chapters includes Anti-dumping, Competition policy, Countervailing duties, Environment, Export taxes, Investment, Intellectual property rights, Labor market, Migration, Movement of capital, Public procurement, Rules of origins, Services, Sanitary and Phytosanitary, State-owned enterprises, Subsidies, Technical barriers to trade and Trade facilitation.

through questions formulated to provide yes/no answers.⁷

The data show that trade agreements are deepening over time. Along with the average number of policy areas covered by RTAs (Hofmann et al., 2017), the average number of provisions included in RTAs is also growing over time (Figure 2). This reflects an increase in the liberalizing commitments undertaken by countries along with more stringent rules particularly on enforcement (Mattoo et al., 2020). This upward trend also applies to RTAs regulating the behavior of SOEs. While only 1 of 7 RTAs entered into force in 1995 included more than 15 SOE provisions, 6 of 12 RTAs appear to go deeper than this threshold in 2015 (Figure 3). If the number of trade agreements regulating SOEs is globally on the rise, the contribution of China appears to be very modest. Indeed, China signed few trade agreements (16 in total) that rarely include regulations on SOEs.⁸

The goal of SOE regulations in trade agreements is generally to prohibit or to mandate a certain type of behavior in order to guarantee a level playing field (Rubini and Wang, 2020). Those include discrimination, trade distortions, anti-competitive practices. Table 1 reports a selected list of SOE provisions that are typically included in regional trade agreements. While the GATT/WTO agreement has some basic discipline in this area, the scope of RTAs on state-owned enterprises often goes beyond the rules in the multilateral system. To ensure that the rules are respected, the legal language in which they are written can be more precise and binding and the RTA can mandate dispute settlement to settle controversies between the parties of the agreement. As an illustration, Table 1 presents the frequency to which each provision in the database is coded as going beyond the scope of the WTO regulation (WTO+) and the frequency to which each provision is considered as enforceable (Enf.). As an example, the provision “Does the agreement regulate ownership or property regimes, or liberalization process?” goes beyond the scope of WTO regulation in 42 percent of RTAs in which this provision is included and is enforceable in 21.7 percent of RTAs.

⁷The data can be accessed at <http://datatopics.worldbank.org/dta/index.html>.

⁸Exceptions include trade agreements with ASEAN (2005), Singapore (2009), Iceland (2014), Switzerland (2014) and the republic of Korea (2015).

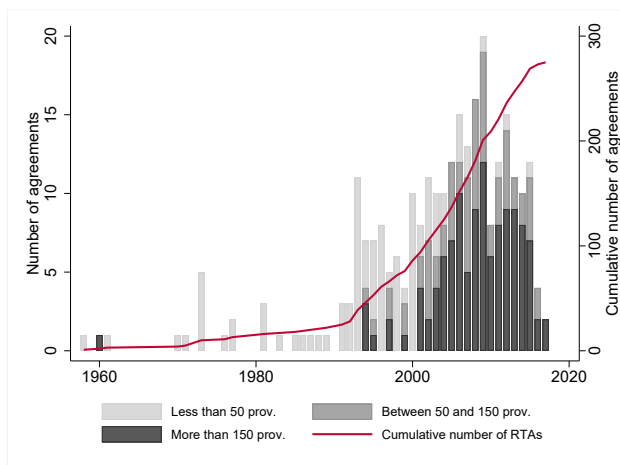


Figure 2: Global depth of trade agreements, over time

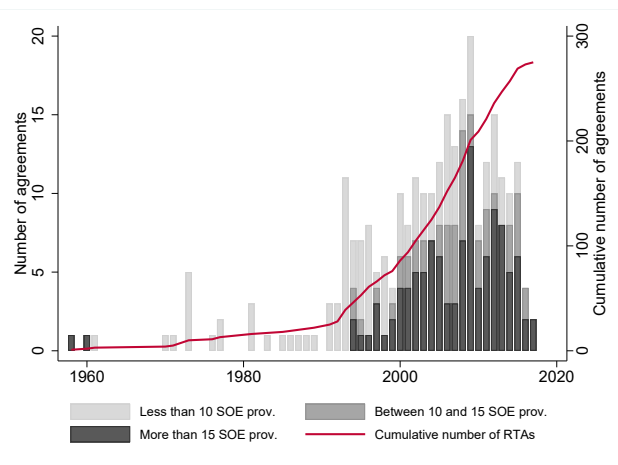


Figure 3: SOE depth of trade agreements, over time

Table 1: WTO+ and enforceable SOE provisions

<i>WTO+</i>	<i>Enf.</i>	<i>SOE provisions description</i>
14.2%	0.3%	Does the agreement expressly regulate/exclude state enterprises in financial services?
88.8%	0.2%	Does the agreement expressly regulate/exclude state enterprises pursuing public services?
28.5%	0%	Does the agreement expressly regulate/exclude soe in strategic sectors (e.g. energy, IT/telecom, transport)?
7.14%	0.7%	Does the agreement include any public procurement provision for state enterprises?
42%	21.7%	Does the agreement regulate ownership or property regimes, or liberalization processes?
4.8%	39.5%	Does the agreement prohibit discrimination by state enterprises?
0%	19.2%	Does the agreement require state enterprises to act in accordance with commercial considerations?
0.06%	39.8%	Does the agreement regulate subsidization to state enterprises?
87.5%	33%	Does the agreement prohibit anti-competitive behaviour of state enterprises?
50%	6.4%	Does the agreement require state enterprises not to distort trade?
33.3%	0.7%	Does the agreement indicate the geographical market where the objectionable conduct or the effect takes place?
83.3%	8.5%	Does the agreement provide for exceptions specific to state enterprises?
94%	7.4%	Does the agreement requires transparency of ownership, governance and financial information?
100%	5.6%	Does the agreement include corporate governance requirements (about 'structure' or 'behaviour')?
5.7%	25.6%	Does the agreement provide for any dispute settlement mechanism to deal with state enterprises?
50%	0%	Does the agreement provide for any other special and differential treatment with respect to state enterprises?

In our analysis we use different approaches to measure the depth of SOE regulation in an RTA and to assess the specific contribution of the provisions regulating the behavior of state-owned firms.⁹ First, we calculate the total number of enforceable and non-enforceable provisions covering SOEs in a specific agreement. This approach, by giving the same weight to all provisions, does not take into account the fact that certain provisions matter more to regulate SOEs behaviors, as they for instance are enforceable or go beyond what is regulated in the multilateral agreement signed at the WTO. Second, we restrict the depth of SOE regulation to SOE provisions that are enforceable. Third, we count the number of provisions that are enforceable and that go beyond the WTO agreements. As a fourth approach, we

⁹Annex A provides the details regarding the construction of the depth variables.

follow [Rubini and Wang \(2020\)](#) and construct an index that focuses on a sub-sample of 4 substantial provisions that are considered key to ensure the regulation of SOEs behaviors.¹⁰ This index is a simple count of key provisions included in an given agreement. Summary statistics of these variables are presented in [Annex A](#).

In order to analyze trade flows at the aggregate level, we merge the information on the content of RTAs with the BACI data from CEPII ([Gaulier and Zignago, 2010](#)). We aggregate BACI data at the exporter-importer-time level and extract the exported value between 1995 and 2015.¹¹ We then merge the data on the content of regional trade agreements with detailed information on Chinese exports. Specifically, exploiting Chinese custom data for the period 2000-2011, we extract information about the export value from a given firm (f), to destination market (j) in year (t). A key variable of interest for our work concerns the legal registration of the firm. In the customs database, firms are required to register as SOEs if the capital share held by the state is higher (or equal) to 70 percent, all others are classified as private firms. As state control may be implied by a capital share well below 70 percent, relying on this variable leads to a restrictive definition of the universe of Chinese SOEs.

A first look at the data on firms' exports reveals two preliminary facts. First, the share of Chinese export value originating from state-owned enterprises has been falling over time, but less than their number, leading to an increasing size of the average Chinese SOE ([Figure 4](#)). This is consistent with the wave of privatizations and SOE reforms in China discussed in the literature ([Hsieh and Song, 2015](#); [Freund and Sidhu, 2017](#)). In fact, in 2019 more than 80 percent of the 120 Chinese firms ranked in Fortune Global 500 are state-owned.¹² Second, the declining trend in the share of Chinese SOE exports has been mainly driven by a surge in the value exported by Chinese private firms rather than a decline of Chinese SOEs' exports. The export value originating from Chinese state-owned firms grew by 80 percent between 2000 and 2011 ([Figure 5](#)).

¹⁰Key SOE provisions are listed in [Annex B](#).

¹¹This database presents the advantage of reconciling importer and exporter declarations through a harmonization procedure.

¹²Data can be accessed at <https://fortune.com/global500/2019/>.

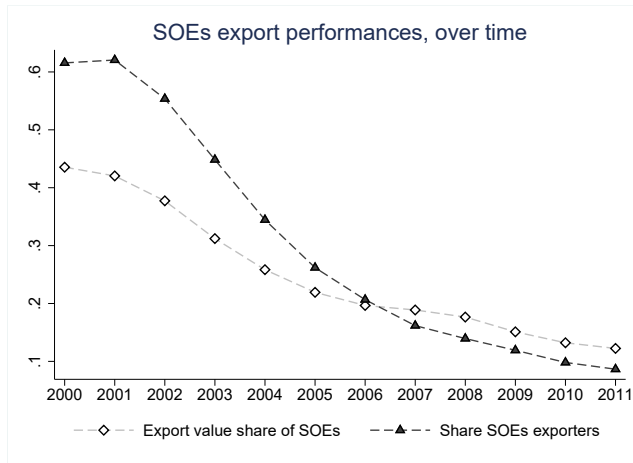


Figure 4: Export share of SOEs, over time

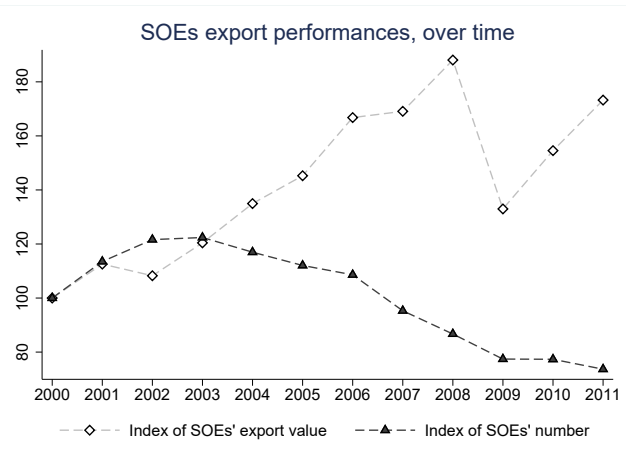


Figure 5: Export value of SOEs, over time

3 Impact of SOE provisions in trade agreements on aggregate trade flows

3.1 Econometric strategy

As a first step in our empirical analysis, we study how SOE provisions in trade agreements affect aggregate trade flows using the BACI data from CEPII (Gaulier and Zignago, 2010). Specifically, we analyze the impact of these provisions in RTAs and their spillover effect for a sample of 188 exporting and importing countries during the time period 1995-2015 through a gravity framework using the following specification:

$$\begin{aligned}
 y_{i,j,t} = & \exp(\alpha_{i,t} + \alpha_{j,t} + \alpha_{i,j} + \beta_1 \times RTA \text{ Dummy}_{i,j,t} + \beta_2 \times \text{Bilateral Depth of RTA}_{i,j,t} \\
 & + \beta_3 \times \text{Bilateral Depth of SOE Provisions}_{i,j,t} + [\beta_4 \times \text{Multilateral Number of RTA}_{-i,j,t} \\
 & + \beta_5 \times \text{Multilateral Depth of RTA}_{-i,j,t} + \beta_6 \times \text{Multilateral Depth of SOE Provisions}_{-i,j,t}] \times \text{China}_{i,t}) + \epsilon_{i,j,t}
 \end{aligned} \quad (1)$$

where y_{ijt} is the value of bilateral exports between reporter i and partner j at time t .¹³ As standard in the gravity literature, we control for underlying time-varying differences between exporters with origin-time specific fixed effects ($\alpha_{i,t}$), time-varying differences between importers with destination-time specific fixed effects ($\alpha_{j,t}$) and special relationships linking countries with an exporter-importer specific fixed effect ($\alpha_{i,j}$).¹⁴

¹³We aggregate BACI data at the exporter-importer-time level and extract the exported value between 1995 and 2015.

¹⁴Importer-exporter fixed effects attenuate the concerns regarding the endogeneity of trade agreements by controlling for countries' predispositions to form an agreement (Baier and Bergstrand, 2007).

In order to control for the direct impact of trade agreements on bilateral trade flows, we include in the regressions two variables capturing the existence and the overall depth of an agreement between two countries in a specific year. Specifically, we include: (i) a dummy variable equal to 1 if there is an RTA in force between origin i and destination j at time t ($RTA\ Dummy_{i,j,t}$); (ii) the number of total provisions (excluding provisions on SOEs) included in the RTA signed between origin i and destination j at time t ($Bilateral\ Depth\ of\ RTA_{i,j,t}$).¹⁵ Our variable of interest, $Bilateral\ Depth\ of\ SOE\ Provisions_{i,j,t}$, isolates the direct impact of enforcing SOE provisions on bilateral trade flows between origin i and destination j at time t . This variable is computed using the 4 different measures of SOE depth presented in the previous section.

Investigating the spillover effect of RTAs is challenging in a gravity framework as the required fixed effect structure, and more specifically, the destination-time fixed effect used to control for the multilateral resistance term, absorb the average spillover impact of signing RTAs for third countries. We overcome this problem by assessing the spillover effects of RTAs for Chinese exports relative to the exports of the rest of the world. To do this we introduce an interaction term between a dummy variable equal to 1 if the exporting country is China ($China_{it}$) and a set of variables that respectively control for the total number, overall depth and SOE content of agreements signed by third countries. Specifically, the dummy capturing China as exporter is interacted with (i) the cumulated number of RTAs in force between destination j with respect to all other potential trade partners (except exporter i) at time t ($Multilateral\ Number\ of\ RTA_{-i,j,t}$); (ii) the cumulated number of provisions (excluding provisions on SOEs) included by destination j with respect to all its potential trade partners (except exporter i) at time t ($Multilateral\ Depth\ of\ RTA_{-i,j,t}$); and (iii) a measure of multilateral depth of SOE which we alternatively proxy by the cumulated number of SOE provisions, the cumulated number of enforceable SOE provisions, the cumulated number of WTO+ SOE provisions and the cumulated number of key SOE provisions in RTAs signed by destination j with respect to all its potential trade partners (except exporter i) at time t ($Multilateral\ Depth\ of\ SOE\ Provisions_{-i,j,t}$). While the first two interaction terms control for the potential trade diversion of RTAs signed between third countries on Chinese exports as compared to exports from the rest of the world, the third interaction term isolates the spillover effect of enforcing SOE provisions in third countries on Chinese exports as compared to exports from the rest of the world.

3.2 Results

The results for the estimation of equation (1) using a Poisson Pseudo Maximum Likelihood (PPML) estimator (Correia et al., 2020) are presented in Table 2. The coefficient on the bilateral depth of RTAs (Bilateral Depth of RTA) confirms the trade creating effect of deep trade agreements (Mattoo et al., 2017). Trade agreements lower bilateral tariffs, thus decreasing trade costs between the exporter and the importer. Deep trade agreements regulate

¹⁵We measure the overall depth of a given RTA based on the number of provisions included in the agreement across all the policy areas. While this is a rough measure of overall depth, the underlying idea is that a larger number of provisions reflects the extent of the liberalizing and enforcement obligations that members are committing to.

policy areas beyond tariffs further contributing to the reduction of bilateral trade costs, leading to an increase in bilateral trade. The results in column (1) suggests that exports between two countries increase by 23 percent when they sign the deepest agreement or agreements including the maximum number of provisions (604 provisions). This coefficient is in line with recent studies measuring the trade impact of RTAs' depth exploiting other data (Mattoo et al., 2017).

Table 2 also reports the impact of SOE rules in RTAs using the different measures of SOE depth: the total number of provisions included in the SOE chapter (column 1), the total number of enforceable SOE provisions (column 2), the total number of SOE provisions that are both enforceable and that go beyond the WTO multilateral agreement (column 3), and an index including SOE key provisions (column 4). Following Mattoo et al. (2017), all the continuous variables are normalized between 0 and 1 for ease of interpretation. The lack of significance of these coefficients suggest that the depth of SOE provisions does not affect bilateral trade flows. This result might derive from the fact that this effect depends on SOEs' presence, which is heterogeneous across countries. Moreover, this effect can be positive, if for instance SOEs prevent entry of foreign competitors in the domestic market, or negative, if a reduction of government support to SOEs leads to a reduced ability to export.

Turning to the spillover effect of RTAs, we find that the multilateral depth of trade agreements (excluding SOE provisions) does not affect differently China compared to the rest of the world. The coefficient on the interaction term capturing the differential impact of enforcing SOE provisions between third countries on Chinese exports relative to the rest of the world is positive and significant across specifications. This suggests that Chinese export values are rising more than the ones of the rest of the world following the enforcement of SOE provisions between Chinese trade partners and third countries.¹⁶

There may be different reasons why SOE rules in third-country RTAs have a disproportionately large effect on Chinese exports. To the extent that foreign SOEs compete with domestic SOEs in certain sectors, we may expect foreign non-regulated SOEs to increase their exports following the enforcement of SOE provisions in the destination country. The large number of SOEs in China (as compared to the rest of the world) would then drive the increase of Chinese exports compared to exports from the rest of the world.¹⁷ ¹⁸ As discussed in the Introduction, other reasons may relate to the size of China, which may have more firms ready to enter the SOE regulated destination following an RTA between third countries, or the fact

¹⁶In order to have an idea of the absolute effects (rather than relative), Annex C estimates the impact of signing SOE provisions with third countries on Chinese exports by controlling for demand through destination specific GDP instead of destination-time specific fixed effect. The results show a positive and significant coefficient for the multilateral depth of SOE provisions.

¹⁷Annex D estimates the coefficient of multilateral depth of enforceable SOE provisions across countries and shows that China appears as having a large coefficient compared to other countries. The annex reports the results for countries having a large population (i.e. above 25 million) for clarity.

¹⁸Another potential explanation is that domestic SOEs are less competitive and begin to import cheaper inputs coming from China. If this is the only explanation, we should see a positive impact only for intermediate products. Annexes E and F show that this impact is robust for Chinese exports of intermediates and non-intermediates products.

Table 2: Country-level impact of SOE provisions.

	X_{ijt} All	X_{ijt} Enf.	X_{ijt} Wto_{enf}^+	X_{ijt} Key_{enf}
Bilateral RTA (dummy)	-0.0399 (0.0209)	-0.0387* (0.0169)	-0.0389* (0.0170)	-0.0353 (0.0202)
Bilateral depth of RTA	0.204*** (0.0331)	0.234*** (0.0420)	0.233*** (0.0420)	0.210*** (0.0301)
Bilateral depth of SOE	0.00793 (0.0456)	-0.0294 (0.0417)	-0.0300 (0.0422)	-0.00317 (0.0272)
CHN × Multilateral RTA (sum)	-0.510 (0.273)	0.0395 (0.255)	0.115 (0.261)	-0.147 (0.241)
CHN × Multilateral depth of RTA	-0.0939 (0.179)	-0.256 (0.239)	-0.373 (0.250)	-0.266 (0.204)
CHN × Multilateral depth of SOE	0.864*** (0.211)	0.541*** (0.105)	0.636*** (0.116)	0.949*** (0.0933)
fixed-effects	it jt ij	it jt ij	it jt ij	it jt ij
se	robust	robust	robust	robust
N	651870	651870	651870	651870

Note: We estimate the direct (3 first variables) and indirect (3 last variables) impact of the content of RTAs on export value through PPML estimator for 188 countries between 1995-2015. We include exporter-time, importer-time and exporter-importer fixed effects in each estimations. The standard errors are robust. Column (1) includes all the SOE provisions, column (2) focuses on enforceable SOE provisions, column (3) focuses on enforceable and WTO+ SOE provisions and column (4) focuses on the 4 key enforceable SOE provisions.

that the Chinese system of state support may be better suited to coordinated policy actions designed to expand exports in those markets.

To provide a quantification of the impact of the content of RTAs we focus on two agreements: European Union and Peru/Colombia, entered into force in 2013, and European Union and the Republic of Korea, entered into force in 2011. Both agreements have the same level of depth but differ in their treatment of SOE provisions: We compare the impact of two trade agreements embodying the same depth but differing in their treatment of SOE provisions. According to the estimation in column (2) from Table 2, the direct impact of the agreements has been to increase bilateral exports between EU and Peru/Colombia by 9.3 percent and between EU and Korea by 9.5 percent.¹⁹ How did Chinese exports react to those agreements? While the evolution of Chinese exports to EU and Korea do not differ from exports coming from other countries following the EU-Korea agreement, Chinese exports to EU, Peru and Colombia increased by 1 percent compared to exports coming from the rest of the world.²⁰ In other words, the spillover effect of regulating SOEs between RTA's members on third countries' exports appears to significantly differ between China and the rest of the world. The next section investigates the extent to which this additional impact on Chinese exports is driven by an improvement of Chinese SOEs' export performance.

4 Impact of SOE provisions in trade agreements: Firm-level analysis

4.1 Empirical strategy

To further investigate the impact of SOE provisions and their spillover effect, we exploit firm-level export data from China. In particular, we analyze the differential impact of the regulation of state-owned enterprises in trade agreements on Chinese SOEs' exports relative to private firms. The empirical specification becomes:

$$\begin{aligned}
 y_{f,j,t} = & \alpha_{f,j} + \alpha_{f,t} + \alpha_{j,t} + \beta_1 \times RTA\ Dummy_{j,t} \times Firm\ Status_f \\
 & + \beta_2 \times Bilateral\ Depth\ of\ RTA_{j,t} \times Firm\ Status_f + \beta_3 \times Bilateral\ Depth\ of\ SOE_{j,t} \times Firm\ Status_f \quad (2) \\
 & + \beta_4 \times Multilateral\ Number\ of\ RTA_{j,t} \times Firm\ Status_f + \beta_5 \times Multilateral\ Depth\ of\ RTA_{j,t} \times Firm\ Status_f \\
 & + \beta_6 \times Multilateral\ Depth\ of\ SOE_{j,t} \times Firm\ Status_f + \epsilon_{f,j,t}
 \end{aligned}$$

where $y_{f,j,t}$ is a dependent variable that captures both the intensive and extensive margin of Chinese exports and is measured, respectively, by (i) a continuous variable capturing the positive exports of Chinese firm f to country j at time t or (ii) a dichotomous variable equal to 1 whenever a specific firm is exporting to destination j at time t and zero otherwise.

¹⁹Precise computation of the trade impact of RTAs is detailed in Annex G

²⁰Precise computation of the spillover impact of RTAs is detailed in Annex H.

To examine the differential impact of SOE provisions in RTAs and their spillover effects on Chinese exports of SOEs versus private firms, we interact each variables of interest with a dummy variable ($Firm\ Status_f$) equal to 1 if the firm f is state-owned and 0 otherwise. Note that the variables of interest, as in equation (1), capture the direct (i.e. RTAs in which China is a member) and the indirect effect (i.e. RTAs in which China is excluded as a member) of SOE rules in RTAs while controlling for the presence and the depth of trade agreements between members and among third countries. We also modify the fixed effect structure by using an extensive vector of (i) firm-destination specific fixed effects identifying the effects with the panel dimension of the data, (ii) firm-time specific fixed effects identifying the impact over various destination markets, and (iii) destination-time specific fixed effect controlling for time-varying demand shocks.²¹

In order to have a manageable sample size, we restrict the analysis to the 40th largest markets for Chinese firms representing 90 percent of their total export value over the period of study.

4.2 Results

Table 3 presents the firm-level estimations of equation (2) exploiting Chinese customs data between 2000 and 2011. The first four columns focus on the impact of RTAs on the export participation of Chinese firms (the extensive margin), while the last four columns display the impact of RTAs on the level of exports (the intensive margin). We find evidence that SOE rules in RTAs signed by China decrease exports of Chinese SOEs relative to private firms (columns 1 to 4). However, the level of exports by Chinese SOEs already serving the RTA members' markets are not differently affected by SOE rules as compared to private firms (columns 5 to 8). In other words, the direct impact of SOE rules seems to affect more the decision to serve a market rather than the level of exports.

Most of SOE rules in RTAs involve agreements between third countries (excluding China). We are then mainly interested on the impact of these rules in third countries on Chinese firm-level exports. We find evidence that the enforcement of SOE rules in third-country RTAs increases participation of Chinese SOEs (column 1 to 4) as well as the level of exports (column 5 to 8) relative to private firms. Indeed, the coefficient β_6 is positive and significant for the extensive and intensive margins of trade and robust across all the specifications: when the depth of SOE provisions is restricted to enforceable SOE provisions (columns 2 and 6), enforceable SOE provisions that are not already covered by the multilateral WTO agreement (columns 3 and 7) and key SOE provisions as defined in Section 3 (columns 4 and 8). The spillovers of SOE regulation between third countries are driven by Chinese SOEs compared to Chinese private firms in all the specifications. According to the 1st and 5th columns of the table, passing from 0 to 35 SOE provisions (i.e. the maximum number of SOE provisions in RTAs in our database) signed between third countries increase Chinese SOE participation by

²¹A concern about the high correlation between the depth of SOE provisions and the depth of the agreement is alleviated by our fixed effect structure. Accounting for those fixed effects reduces the correlation between the two variables to 0.14.

Table 3: Firm-level impact of SOE provisions.

	<i>Participation</i> All	<i>Participation</i> Enf.	<i>Participation</i> Wto_{enf}^+	<i>Participation</i> Key_{enf}	$\ln(X)$ All	$\ln(X)$ Enf.	$\ln(X)$ Wto_{enf}^+	$\ln(X)$ Key_{enf}
soe × Bilateral RTA (dummy)	-0.0663*** (0.00207)	-0.0699*** (0.00211)	-0.0697*** (0.00211)	-0.0835*** (0.00225)	-0.222*** (0.0254)	-0.218*** (0.0258)	-0.218*** (0.0258)	-0.222*** (0.0274)
soe × Bilateral depth of RTA	0.149*** (0.00494)	0.169*** (0.00509)	0.169*** (0.00509)	0.216*** (0.00562)	0.299*** (0.0628)	0.322*** (0.0643)	0.320*** (0.0643)	0.324*** (0.0700)
soe × Bilateral depth of SOE	-0.116*** (0.00294)	-0.0748*** (0.00315)	-0.0750*** (0.00315)	-0.122*** (0.00407)	-0.0355 (0.0361)	0.0351 (0.0385)	0.0358 (0.0385)	0.0718 (0.0503)
soe × Multilateral RTA (sum)	-0.690*** (0.0108)	-0.0319*** (0.00734)	-0.0282*** (0.00739)	-0.0814*** (0.00728)	-1.406*** (0.127)	-0.239* (0.0945)	-0.222* (0.0951)	-0.348*** (0.0938)
soe × Multilateral depth of RTA	-0.249*** (0.00737)	-0.112*** (0.00834)	-0.118*** (0.00856)	-0.0931*** (0.00748)	-0.177 (0.0971)	-0.0272 (0.109)	-0.0481 (0.112)	0.145 (0.0982)
soe × Multilateral depth of SOE	0.998*** (0.0131)	0.0957*** (0.00642)	0.101*** (0.00665)	0.133*** (0.00611)	1.866*** (0.151)	0.438*** (0.0819)	0.447*** (0.0847)	0.296*** (0.0751)
fixed-effects	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt
std err	robust	robust	robust	robust	robust	robust	robust	robust
N	41648388	41648388	41648388	41648388	8508124	8508124	8508124	8508124
r2	0.625	0.625	0.625	0.625	0.795	0.795	0.795	0.795

Note: We estimate the direct (3 first variables) and indirect (3 last variables) impact of the content of RTAs on Chinese firm-level participation (columns 1-4) and export value (columns 5-8) through OLS estimator for their 40 largest markets between 2000-2011. We include firm-importer, firm-time and importer-time fixed effects in each estimations. The standard errors are robust. Columns (1) and (5) includes all the SOE provisions, columns (2) and (6) focus on enforceable SOE provisions, columns (3) and (7) focus on enforceable SOE provisions and columns (4) and (8) focus on the 4 key enforceable SOE provisions.

2.4 percent²² and their export value by 4.5 percent²³ relative to private firms (all else equal).²⁴

These findings are consistent with the idea that SOE rules in RTAs between third countries (excluding China) decrease the competitiveness of domestic SOEs thus making it easier for outsiders to enter the market. As discussed in the Introduction, this effect may benefit relatively more Chinese SOEs, both on the extensive and the intensive margins. Because Chinese SOEs are on average less productive than Chinese private firms, the first may be more likely to enter those newly regulated markets as the productivity threshold to export declines. To the extent that SOEs in third markets are competing with Chinese SOEs in certain sectors, the impact at the extensive margin can be complemented by an increase in exports of Chinese SOEs on the intensive margin.

The coefficients on the depth of trade agreements signed by China (β_2) and by third countries excluding China (β_5) also provide useful insights. The export performance of Chinese SOEs (relative to private firms) is positively correlated to the number of provisions (excluding SOE provisions) included in RTAs signed by China. This could reflect that the interests of SOEs are overly represented in RTAs signed by China. On the other hand, the depth of trade agreement signed between third countries reduces the participation of Chinese SOEs in those markets compared to private firms. This could reflect the fact that RTAs signed between third countries make it harder for Chinese firms to enter, leading the least productive firms to exit. Because Chinese SOEs are less productive than Chinese private firms on average, they are less likely to serve those markets after an RTA enters into force.

5 Extensions and robustness checks

In this section we provide several extensions and robustness checks. First, we investigate what sectors are driving the firm-level results in the previous section. Second, we extend the analysis to consider the provisions related to subsidies and competition policy in RTAs. Third, we study how the impact of third-country rules on SOEs affect the extensive margin relative to the intensive margin of Chinese SOEs' exports. Finally, we analyze the robustness of our results through several placebo tests.

5.1 Sectoral analysis

As a first extension, we investigate the distribution of the impact of SOE rules in third-country RTAs (i.e. the spillover effect) on the performance of Chinese SOEs across different sectors. The goal is to verify if some product categories are driving the results presented in

²² $\frac{.35}{1459} \times 0.998 = 0.024$, with 1,459 the maximum number of multilateral SOE provisions and 0.998 the estimated coefficient.

²³ $\frac{.35}{1459} \times 1.866 = 0.045$, with 1,459 the maximum number of multilateral SOE provisions and 1.866 the estimated coefficient.

²⁴The concern that unobserved components of the export transactions for each firm across all its destination markets could be correlated remains. We address this concern by estimating our micro-level benchmark specification and report standard errors that account for clustering at the firm level. Results are reported in Annex I and do not affect our benchmark results.

the previous section or whether the impact affects all the sectors in a similar way.

We analyze the sectoral distribution of the spillover effect by running our benchmark regression (columns 2 and 6 of Table 3) for each aggregated sector. We then plot the estimated coefficients and the corresponding confidence intervals of the main variable of interest (multilateral SOE depth) for the extensive margin (Figure 6) and the intensive margin (Figure 7). We find that Chinese SOEs seem to significantly increase their participation (compared to Chinese private firms) across all sectors as a result of SOE provisions in third-country RTAs (Figure 6). The increase in export value coming from established SOEs appears to be concentrated only in a handful of sectors (Figure 7). This is consistent with the finding in Section 5.4 that the extensive margin is the main driver of the spillover effect of SOE rules in third-country RTAs. In terms of sectoral heterogeneity, results show that sectors like machinery/electronics, textile and footwear are the ones where the impact at the intensive margin are positive and significant, possibly reflecting the fact that in these sectors Chinese SOEs' presence in foreign markets is already widespread.

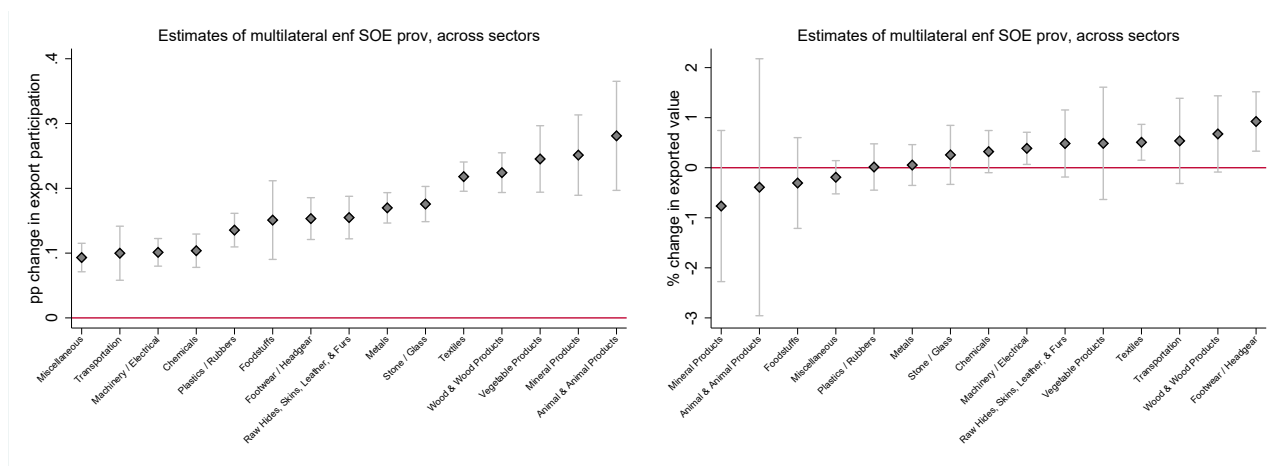


Figure 6: Sector-level estimates of multilateral enforceable SOE provisions - Extensive margin

Figure 7: Sector-level estimates of multilateral enforceable SOE provisions - Intensive margin

5.2 Subsidy and competition policy

Among the policies frequently regulated in deep trade agreements, subsidy and competition policy rules often directly or indirectly impact on the behavior of state-owned firms. Indeed, both subsidies and competition chapters may contain specific provisions on state-owned enterprises. Even if they do not, rules in these areas –such as limits on government subsidies– may impact primarily SOEs.²⁵ For this reason, we extend our empirical strategy to consider

²⁵To motivate the focus on subsidies and competition policy, we run the regressions (columns 1 and 5, Table 3) for all policy areas covered by the deep trade agreements database. Results show that –as

the provisions related to subsidies and competition signed between third countries.²⁶ We are interested in estimating the direct and indirect impact of SOE rules in RTAs controlling for the enforcement of subsidy and competition regulation. We compute two variables. The bilateral depth of subsidy and competition variable is a dummy variable equal to 1 if subsidy and competition policy are covered by the RTA, 0 otherwise. The multilateral depth of subsidy and competition policy is a count of the total number of RTAs covering subsidy and competition policy signed by a given destination with respect to all its partners (except the exporter).

We present the aggregate and firm-level estimates in Tables 4 and 5, respectively. The subsidy and competition policy rules between third countries appear as additional factors explaining the increase in Chinese exports compared to the rest of the world following the signature of an RTA between third countries (Table 4). Note that the estimated coefficient of the spillover effect of SOE rules is still positive and significant (Table 4). Furthermore, the spillover of subsidy and competition rules in third-country RTAs improves the performance of Chinese SOEs compared to Chinese private firms, while not affecting the results for the spillover effect of SOE rules (Table 5). These findings suggest that the regulation of state support in trade agreements, not only the rules on SOEs, may have an impact on exports of Chinese state-owned enterprises.

expected— the spillover effect associated to SOE rules has larger point estimates. Provisions related to subsidies and competition policy also stand out, consistently with intuition. Other policy areas appear to provide relevant spillovers. Namely, deeper commitments on rules of origin and countervailing duties in third-country agreements boost exports of Chinese SOEs relative to private firms in members' markets, while the opposite is true for trade facilitation provisions. The figures in Annex J have the details.

²⁶We cannot investigate the direct impact of subsidy and competition provisions at the firm-level as China does not have any agreement including those provisions. Examples of subsidy and competition provisions extracted from our database are respectively listed in Annex B.

Table 4: Country-level impact of SOE, subsidy and competition provisions

	X_{ijt} All	X_{ijt} Enf.	X_{ijt} Wto_{enf}^+	X_{ijt} Key_{enf}
Bilateral RTA (dummy)	-0.0405* (0.0206)	-0.0378* (0.0172)	-0.0380* (0.0172)	-0.0330 (0.0201)
Bilateral depth of RTA	0.177*** (0.0325)	0.201*** (0.0408)	0.201*** (0.0408)	0.181*** (0.0293)
Bilateral depth of SOE	-0.0107 (0.0446)	-0.0282 (0.0414)	-0.0287 (0.0420)	-0.0120 (0.0271)
Bilateral depth of Sub/Comp	0.0615*** (0.0170)	0.0436** (0.0168)	0.0427* (0.0168)	0.0455** (0.0170)
CHN \times Multilateral RTA (sum)	-0.564* (0.254)	-0.0453 (0.244)	0.0254 (0.251)	-0.167 (0.228)
CHN \times Multilateral depth of RTA	-0.284 (0.186)	-0.497* (0.250)	-0.578* (0.257)	-0.436* (0.217)
CHN \times Multilateral depth of SOE	0.656** (0.231)	0.489*** (0.105)	0.566*** (0.116)	0.869*** (0.0986)
CHN \times Multilateral depth of Sub/Comp	0.421*** (0.113)	0.373*** (0.103)	0.353*** (0.103)	0.261* (0.107)
fixed-effects	it jt ij	it jt ij	it jt ij	it jt ij
se	robust	robust	robust	robust
N	580797	580797	580797	580797

Note: We estimate the direct (4 first variables) and indirect (4 last variables) impact of the content of RTAs on export value through PPML estimator for 188 countries between 1995-2015. We include exporter-time, importer-time and exporter-importer fixed effects in each estimations. The standard errors are robust. Column (1) includes all the SOE provisions, column (2) focuses on enforceable SOE provisions, column (3) focuses on enforceable and WTO+ SOE provisions and column (4) focuses on the 4 key enforceable SOE provisions. Each estimation controls for the inclusion of subsidy and competition provisions in RTAs.

Table 5: Firm-level impact of SOE, subsidy and competition provisions

	<i>Participation</i>				$\ln(X)$		$\ln(X)$	
	All	Enf.	Wto_{enf}^+	Key_{enf}	All	Enf.	Wto_{enf}^+	Key_{enf}
soe × Bilateral RTA (dummy)	-0.0382*** (0.00168)	-0.0360*** (0.00169)	-0.0360*** (0.00169)	-0.0421*** (0.00176)	-0.182*** (0.0201)	-0.170*** (0.0202)	-0.170*** (0.0202)	-0.169*** (0.0210)
soe × Bilateral depth of RTA	0.114*** (0.00420)	0.120*** (0.00432)	0.120*** (0.00432)	0.151*** (0.00471)	0.243*** (0.0532)	0.250*** (0.0544)	0.249*** (0.0544)	0.241*** (0.0586)
soe × Bilateral depth of SOE	-0.0849*** (0.00290)	-0.0349*** (0.00307)	-0.0342*** (0.00307)	-0.0711*** (0.00388)	-0.0108 (0.0352)	0.0779* (0.0372)	0.0790* (0.0372)	0.130** (0.0477)
soe × Multilateral RTA (sum)	-0.636*** (0.0108)	-0.103*** (0.00701)	-0.103*** (0.00706)	-0.121*** (0.00689)	-1.381*** (0.125)	-0.270** (0.0897)	-0.257** (0.0904)	-0.351*** (0.0886)
soe × Multilateral depth of RTA	-0.310*** (0.00675)	-0.228*** (0.00761)	-0.226*** (0.00776)	-0.220*** (0.00691)	-0.229** (0.0875)	-0.192 (0.0992)	-0.200* (0.101)	-0.0402 (0.0900)
soe × Multilateral depth of SOE	0.830*** (0.0140)	0.0169* (0.00679)	0.0121 (0.00709)	0.0383*** (0.00648)	1.788*** (0.160)	0.379*** (0.0854)	0.378*** (0.0888)	0.199* (0.0786)
soe × Multilateral depth of Sub/Comp	0.139*** (0.00389)	0.203*** (0.00371)	0.204*** (0.00374)	0.197*** (0.00374)	0.0936* (0.0463)	0.210*** (0.0436)	0.208*** (0.0438)	0.223*** (0.0440)
fixed-effects	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt	fj ft jt
se	robust	robust	robust	robust	robust	robust	robust	robust
N	40922880	40922880	40922880	40922880	8390390	8390390	8390390	8390390
r2	0.626	0.626	0.626	0.626	0.796	0.796	0.796	0.796

*Note:*We estimate the direct (3 first variables) and indirect (4 last variables) impact of the content of RTAs on Chinese firm-level participation (columns 1-4) and export value (columns 5-8) through OLS estimator for their 40 largest markets between 2000-2011. We include firm-importer, firm-time and importer-time fixed effects in each estimations. The standard errors are robust. Columns (1) and (5) includes all the SOE provisions, columns (2) and (6) focus on enforceable SOE provisions, columns (3) and (7) focus on enforceable SOE provisions and columns (4) and (8) focus on the 4 key enforceable SOE provisions. Each estimation controls for the inclusion of subsidy and competition provisions in RTAs.

5.3 Placebo tests

A possible concern is that the main results in Sections 3 and 4 may be driven by unobserved factors other than the depth and content of trade agreements. To address this concern, we compute a placebo test in which we randomly assign the content of trade agreements and re-estimate our benchmark estimation.

We keep unchanged the global structure of the content of RTAs signed over time. This allows to keep track of the growing depth of RTAs over time. We then randomize the country-pairs signing those trade agreements and merge their corresponding trade flows. In other words, if EU and Peru signed an agreement containing 341 provisions in 2011, we keep the number of provisions and the year in which the RTA was signed but assign it to two random countries (US and Chile for example) with their corresponding bilateral trade flows. Once the new data is computed, we run our benchmark estimation.²⁷ This process is repeated 1,000 times. The underlying idea is that, if our results are not related to the content of trade agreements and reflect some other unobserved factor, we should see a similar impact as in the benchmark

²⁷We focus on the impact at the intensive margin since this procedure requires a lot of computational power.

estimations. Accordingly, we expect the estimation from the placebo test to be not significantly different from zero.

Results for the placebo test are reported in Figures 8 and 9 and support the view that our benchmark regression captures the impact of the RTAs' content and does not result from omitted variables. Specifically, Figure 8 reports the density of our main coefficient of interest, while Figure 9 displays the densities of all the estimated coefficients. Note that, as expected, the estimated coefficients of all the variables included in our benchmark regression are centered around zero.

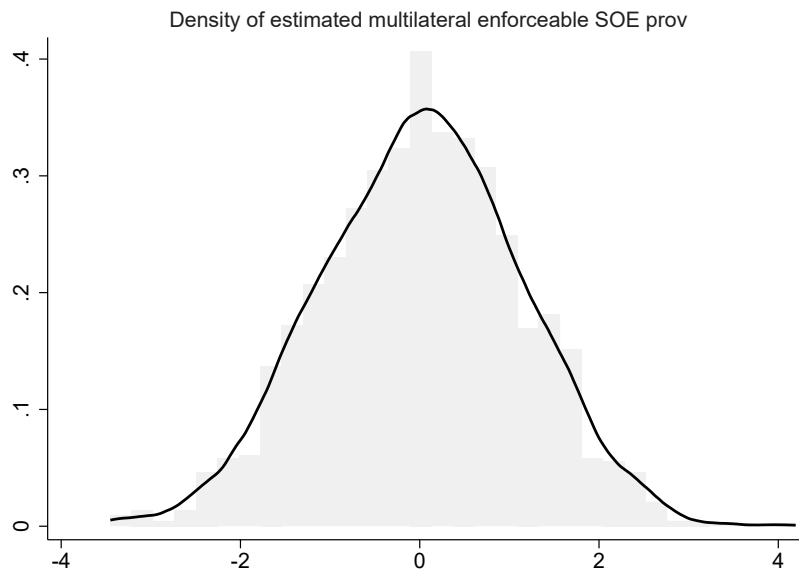


Figure 8: Placebo test - estimates of multilateral enforceable SOE provisions

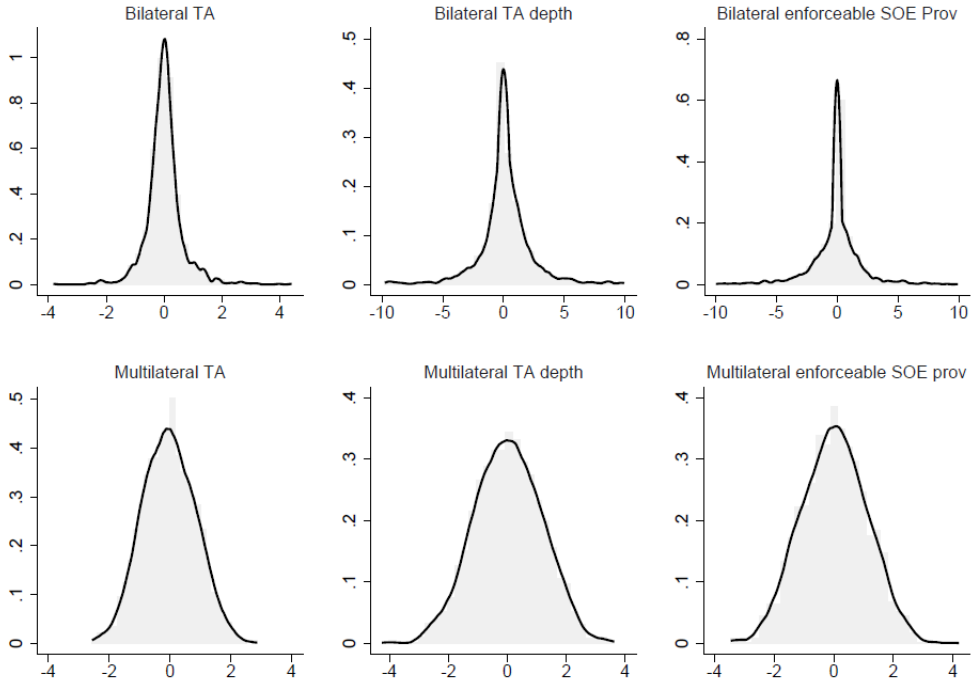


Figure 9: Placebo test - estimates of all variables

5.4 Disentangling the impact of SOE provisions on exports of incumbent and new exporters

As a result of an RTA regulating SOEs between third countries, the increase in exports of Chinese SOEs (relative to private firms) can alternatively be due to an increase in participation of Chinese SOEs (i.e. new exporters), an increase of exports of already established Chinese SOEs (i.e. incumbents), or both. In this subsection, we quantify the contribution of new exporters relative to incumbents by computing the change in aggregate exports coming from incumbent firms and new exporters resulting from the enforcement of SOE rules in third markets. Following [Fontagné and Orefice \(2018\)](#), we define incumbent firms as active firms in a specific market over the entire period (intensive margin) and new exporters as firms that enter or exit a specific market over the period. We then estimate the direct and indirect impact of SOE rules in a gravity-type setting in which we alternatively explain the aggregate export value of incumbents and new exporters for each destination-year ([Berman et al., 2012](#); [Fontagné and Orefice, 2018](#)). Because we only explain Chinese exports, a destination-time fixed effect would absorb all the variation we have in the data. We therefore remove the jt fixed effect and control for the time-varying GDP of each country instead. Specifically, we estimate the following equation:

$$y_{jt} = \alpha_j + \alpha_t + \beta_1^{Inc/Entry} \times RTA\ Dummy_{jt} + \beta_2^{Inc/Entry} \times Bilateral\ Depth\ of\ RTA_{jt}$$

$$\begin{aligned}
& +\beta_3^{Inc/Entry} \times \text{Bilateral Depth of SOE Provisions}_{jt} + \beta_4^{Inc/Entry} \times \text{Multilateral Number of RTA}_{jt} \quad (3) \\
& +\beta_5^{Inc/Entry} \times \text{Multilateral Depth of RTA}_{jt} + \beta_6^{Inc/Entry} \times \text{Multilateral Depth of SOE Provisions}_{jt} + \epsilon_{jt}
\end{aligned}$$

The main coefficients of interest capturing the spillover of SOE rules in RTAs for incumbents and new exporters are respectively β_6^{Inc} and β_6^{Entry} , while all other variables are as defined in the previous sections. Those estimates are then combined with the share of total exports coming from incumbents ($V_{Share}^{Inc} = \frac{V^{Inc}}{V^{Total}}$) and new exporters ($V_{Share}^{Entry} = \frac{V^{Entry}}{V^{Total}}$). Accordingly, the aggregate change in exports coming from new exporters and incumbents are respectively $\beta_6^{Entry} \times V_{Share}^{Entry}$ and $\beta_6^{Inc} \times V_{Share}^{Inc}$.

Table 6 presents the results of estimating equation (3) with enforceable SOE provisions. The estimated coefficients of interest are positive and significant for incumbents and new exporters but appear to have a larger magnitude for the latter. Furthermore, the share of total exports coming from new exporters is dominant (Table 7). The contribution of the extensive margin channel thus overcomes the contribution of the intensive margin. More specifically, 87.5 percent²⁸ of the increase in Chinese export following the enforcement of SOE rules in third-country RTAs can be attributed to entry of Chinese firms more than a rise in the export level of already established Chinese firms.

²⁸ $\frac{1.331 \times 0.799}{(1.331 \times 0.799 + 0.751 \times 0.201)} \times 100 = 87.5$, with 1.331 the estimated coefficient of multilateral depth of enforceable SOE provisions for new exporters, 0.751 the estimated coefficient of multilateral depth of enforceable SOE provisions for incumbents, 0.799 the share of total exports coming from new exporters and 0.201 the share of total exports coming from incumbents.

Table 6: Decomposition of the impact of SOE provisions on incumbents and new entry

	X_{jt}	X_{jt}	X_{jt}	X_{jt}	X_{jt}	X_{jt}	X_{jt}	X_{jt}
	All	All	Enf.	Enf.	Wto_{enf}^+	Wto_{enf}^+	Key_{enf}	Key_{enf}
	Inc	Entry	Inc	Entry	Inc	Entry	Inc	Entry
GDP (in log)	0.908*** (0.149)	1.178*** (0.137)	1.033*** (0.133)	1.362*** (0.135)	1.037*** (0.133)	1.373*** (0.135)	1.049*** (0.137)	1.413*** (0.141)
Bilateral TA (dummy)	-0.0403 (0.0503)	-0.448*** (0.115)	-0.0257 (0.0530)	-0.399*** (0.120)	-0.0274 (0.0531)	-0.401*** (0.120)	-0.0803 (0.0528)	-0.547*** (0.113)
Bilateral depth of TA	0.200 (0.170)	0.245 (0.289)	0.179 (0.166)	0.239 (0.291)	0.178 (0.166)	0.239 (0.291)	0.363* (0.148)	0.846*** (0.193)
Bilateral depth of SOE	-0.200 (0.105)	0.00720 (0.139)	-0.186 (0.105)	0.0102 (0.140)	-0.179 (0.105)	0.0158 (0.140)	-0.288* (0.118)	-0.361* (0.145)
Multilateral TA (sum)	-0.111 (0.406)	-1.236** (0.446)	0.515 (0.423)	0.157 (0.392)	0.515 (0.437)	0.250 (0.403)	0.242 (0.423)	-0.118 (0.421)
Multilateral depth of TA	-1.010* (0.436)	-0.852* (0.379)	-0.845 (0.505)	-0.640 (0.402)	-0.804 (0.519)	-0.717 (0.416)	-0.350 (0.454)	-0.212 (0.400)
Multilateral depth of SOE	1.459*** (0.397)	2.707*** (0.447)	0.751* (0.307)	1.331*** (0.260)	0.683* (0.302)	1.325*** (0.262)	0.298 (0.215)	0.920*** (0.162)
fixed-effects	j t	j t	j t	j t	j t	j t	j t	j t
cluster	Robust	Robust	Robust	Robust	Robust	Robust	Robust	Robust
N	1692	2074	1692	2074	1692	2074	1692	2074

Note: We estimate the direct (variables 2-4) and indirect (3 last variables) impact of the content of RTAs on Chinese export value through OLS estimator for their 40 largest markets between 2000-2011. We differentiate the exports of incumbent firms (columns 1, 3, 5, 7) from new exporters (columns 2, 4, 6, 8). We include the log of destination GDP, importer and time fixed effects in each estimations. The standard errors are robust. Columns (1)-(2) includes all the SOE provisions, columns (3)-(4) focus on enforceable SOE provisions, columns (5)-(6) focus on enforceable WTO+ SOE provisions and columns (7)-(8) focus on the 4 key enforceable SOE provisions.

Table 7: Aggregate implications

	$\beta^{Int/Ext}$	Value share	Aggregate response	Aggregate response (in %)
Intensive	0.751*	0.201	0.151	12.5%
Extensive	1.331***	0.799	1.06	87.5%
Total			1.211	

6 Conclusion

This paper studies how rules on state-owned enterprises signed by members of an RTA of which China is not a signatory can have an impact on Chinese SOEs' exports. We combine new information on the content of trade agreements with the universe of Chinese firm-level customs data between 2000 and 2011. Accounting for the direct trade impact of RTAs, we find that more stringent SOE rules in third-country RTAs increase the exports of China to those markets compared to the exports of the rest of the world. We further provide evidence that this impact is driven by the increase in participation (extensive margin) and in export value (intensive margin) of Chinese SOEs to the newly regulated markets. We find that this spillover effect is economically significant and robust to several extensions. This finding shows that an unintended consequence of strong regulations of SOEs in regional trade agreements is to benefit exports of SOEs by non-members and points to the need for commonly agreed multilateral rules to regulate state-owned enterprises.

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Annexes:

A Construction of depth variables

We combine two different types of data to construct the indexes of depth. The first one is the Deep Trade Agreement Database (i.e. see [Mattoo et al. \(2020\)](#)), produced by the World Bank. It covers all the provisions included in 283 trade agreements, with detailed information on different chapters (Technical Barrier to Trade, Sanitary and Phytosanitary measures, State-Owned Enterprises, Subsidies, Environment, Services, Competition policy, etc.). While most of the individual provisions are coded as yes/no questions, some are coded as multiple choice. In order to construct consistent indexes of depth, we then restrict our indexes of depth to provisions that are binary.²⁹ In a second step, we attribute time-varying bilateral country pairs to every trade agreement. Note that to capture the evolving nature of the European Union, each provision signed between the EU and a third country is automatically included in intra-EU bilateral pairs. Finally, each bilateral country pair relationship is extended for all the periods in which it is in force. Note that a country pair having several trade agreements increases the number of provisions in force over time only if these agreements include different provisions. From this database, we can then construct the number of SOE provisions in force between exporting country i and importing country j at time t (i.e. Bilateral depth of SOE), the total number of provisions excluding the one related to SOEs in force between exporting country i and importing country j at time t (i.e. Bilateral depth of RTA), the number of SOE provisions in force between importing country j and all its trade partners except country i at time t (i.e. Multilateral depth of SOE) and the total number of provisions excluding the one related to SOEs in force between importing country j and all its trade partners except country i at time t (i.e. Multilateral depth of RTA).

The second one is a specific database constructed by [Rubini and Wang \(2020\)](#) coding each provision related to SOEs. The database provides detailed information on the enforceability and whether each SOE provision goes beyond the commitments signed at the WTO. SOE provisions are enforceable when the language is considered binding with state-to-state dispute settlement or private dispute settlement or both. We merge the two data sets and construct the bilateral and multilateral indexes of depth for enforceable SOE provisions, enforceable & WTO+ SOE provisions and enforceable key SOE provisions.

²⁹Note that all SOE provisions are binary.

B Key SOE, subsidy and competition provisions in RTAs

SOE provisions:

- Does the agreement regulate ownership or property regimes, or liberalization processes?
 - Does the agreement prohibit discrimination by state enterprises?
 - Does the agreement regulate subsidization to state enterprises?
 - Does the agreement prohibit anti-competitive behaviour of state enterprises?
-

Subsidy provisions:

- Does the agreement prohibit or regulate export subsidies?
 - Does the agreement prohibit or regulate subsidies distorting trade or competition?
 - Does the agreement include any national treatment obligation (goods) for subsidies?
 - Does the agreement provide for a dispute settlement mechanism to deal with subsidy issues?
 - Does the agreement provide for any institution to deal with transparency or enforcement?
 - Does the agreement regulate the imposition of countervailing duties?
-

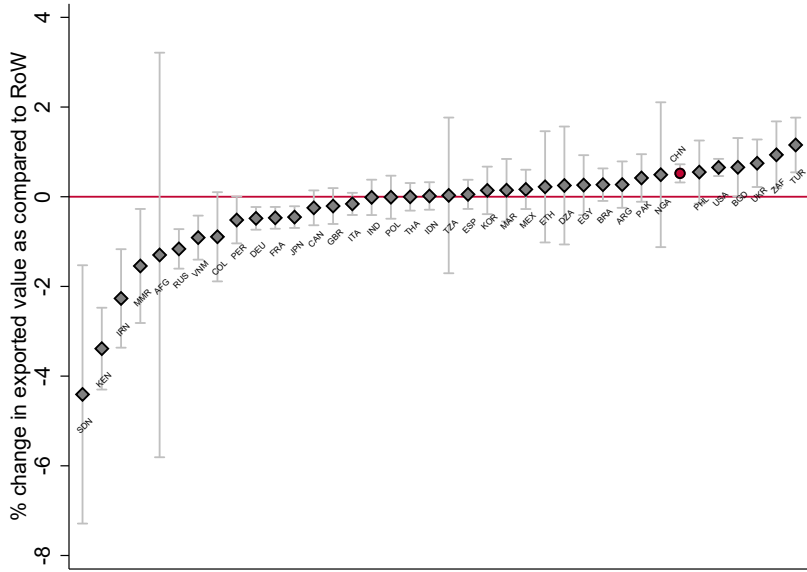
Competition provisions:

- Does the agreement prohibit/regulate cartels/concerted practices?
 - Does the agreement prohibit/regulate abuse of market dominance?
 - Does the agreement regulate undertakings with exclusive rights?
 - Does the agreement regulate monopolies?
 - Does the agreement regulate anti-competitive behaviour of SOEs?
 - Does the agreement regulate state aid?
 - Does the agreement regulate mergers and acquisitions?
-
-

C Country-level impact of SOE provisions

	X_{ijt} All	X_{ijt} Enf.	X_{ijt} Wto_{enf}^+	X_{ijt} Key_{enf}
$\ln(GDP_{jt})$	1.053*** (0.0430)	1.083*** (0.0426)	1.082*** (0.0427)	1.092*** (0.0426)
Bilateral RTA (dummy)	-0.431*** (0.0925)	-0.421*** (0.0876)	-0.442*** (0.0790)	-0.489*** (0.0893)
Bilateral depth of RTA	-0.311 (0.727)	-0.288 (0.657)	-0.183 (0.606)	0.782 (0.689)
Bilateral depth of SOE	0.761*** (0.229)	1.246*** (0.315)	1.391*** (0.344)	0.398 (0.237)
Multilateral RTA (sum)	-1.022** (0.355)	-0.448 (0.322)	-0.336 (0.327)	-0.648* (0.321)
Multilateral depth of RTA	0.0397 (0.250)	0.122 (0.325)	0.0244 (0.332)	0.124 (0.289)
Multilateral depth of SOE	1.147*** (0.287)	0.511*** (0.134)	0.540*** (0.135)	0.925*** (0.144)
fixed-effects	it ij	it ij	it ij	it ij
se	robust	robust	robust	robust
N	3897	3897	3897	3897

D SOE regulation spillovers across countries



E Country-level impact of SOE provisions on export of intermediate products

	Export value of intermediate products			
	All	Enf.	Wto_{enf}^+	Key_{enf}
Bilateral RTA (dummy)	-0.0306 (0.0157)	-0.0364* (0.0159)	-0.0353* (0.0161)	-0.0279 (0.0162)
Bilateral depth of RTA	0.331*** (0.0405)	0.246*** (0.0479)	0.240*** (0.0478)	0.298*** (0.0358)
Bilateral depth of SOE	-0.0752 (0.0410)	0.0307 (0.0466)	0.0391 (0.0474)	-0.0529* (0.0254)
CHN × Multilateral RTA (sum)	-0.0443 (0.202)	0.240 (0.201)	0.252 (0.205)	0.195 (0.188)
CHN × Multilateral depth of RTA	-0.343 (0.186)	-0.373 (0.207)	-0.381 (0.213)	-0.466* (0.182)
CHN × Multilateral depth of SOE	0.459* (0.201)	0.206* (0.0984)	0.213* (0.106)	0.507*** (0.0956)
fixed-effects	it jt ij	it jt ij	it jt ij	it jt ij
se	robust	robust	robust	robust
N	598304	598304	598304	598304

F Country-level impact of SOE provisions on export of non-intermediate products

	Export value of non-intermediate products			
	All	Enf.	Wto_{enf}^+	Key_{enf}
Bilateral RTA (dummy)	-0.173*** (0.0303)	-0.147*** (0.0245)	-0.150*** (0.0246)	-0.185*** (0.0286)
Bilateral depth of RTA	0.114* (0.0489)	0.315*** (0.0579)	0.337*** (0.0582)	0.203*** (0.0449)
Bilateral depth of SOE	0.231*** (0.0654)	-0.0504 (0.0470)	-0.0771 (0.0483)	0.169*** (0.0342)
CHN × Multilateral RTA (sum)	-0.901*** (0.265)	-0.378 (0.236)	-0.253 (0.241)	-0.794*** (0.238)
CHN × Multilateral depth of RTA	0.967*** (0.220)	0.308 (0.264)	0.0704 (0.274)	0.363 (0.211)
CHN × Multilateral depth of SOE	0.544* (0.260)	0.832*** (0.157)	1.014*** (0.164)	1.414*** (0.164)
fixed-effects	it jt ij	it jt ij	it jt ij	it jt ij
se	robust	robust	robust	robust
N	589349	589349	589349	589349

G Quantification of the trade impact of RTAs

Direct impact: trade impact between members

- EU-COL/PER agreement (2013)
- 341 provisions
- 12 enforceable SOE provisions

$$1 \times (-0.0387) + 341 \times \frac{1}{604} \times 0.234 + 12 \times \frac{1}{17} \times 0 = 9.3\%$$

- EU-KOR agreement (2011)
- 345 provisions
- 0 enforceable SOE provisions

$$1 \times (-0.0387) + 345 \times \frac{1}{604} \times 0.234 + 0 \times \frac{1}{17} \times 0 = 9.5\%$$

H Quantification of the spillover impact of RTAs

Indirect impact: Chinese exports to members

- EU-COL/PER agreement (2013)
- 341 provisions
- 12 enforceable SOE provisions

$$1 \times \frac{1}{84} \times 0 + 341 \times \frac{1}{26783} \times 0 + 12 \times \frac{1}{654} \times 0.541 = 1\%$$

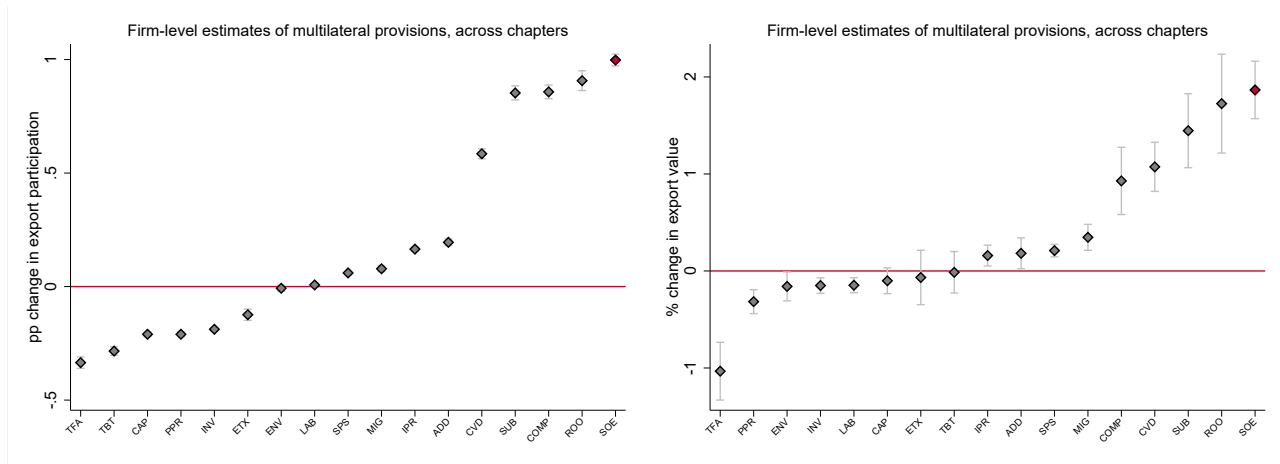
- EU-KOR agreement (2011)
- 345 provisions
- 0 enforceable SOE provisions

$$1 \times \frac{1}{84} \times 0 + 345 \times \frac{1}{26783} \times 0 + 0 \times \frac{1}{654} \times 0.541 = 0\%$$

I Firm-level impact of SOE provisions with clustered standard errors

	<i>Participation</i> Enf.	$\ln(X_{fjt})$ Enf.
soe \times Bilateral TA (dummy)	-0.0667*** (0.00250)	-0.219*** (0.0303)
soe \times Bilateral depth of TA	0.168*** (0.00639)	0.331*** (0.0761)
soe \times Bilateral depth of SOE	-0.0746*** (0.00417)	0.0287 (0.0471)
soe \times Multilateral TA (sum)	-0.0197* (0.00921)	-0.233* (0.112)
soe \times Multilateral depth of TA	-0.120*** (0.0103)	-0.0305 (0.124)
soe \times Multilateral depth of SOE	0.110*** (0.00792)	0.445*** (0.0951)
fixed-effects	fj ft jt	fj ft jt
cluster	f	f
N	40922880	8390390
r2	0.626	0.796

J Firm-level impact of other chapters' spillovers



Firm-level impact of other chapters' spillovers - *Extensive* margin

Firm-level impact of other chapters' spillovers - *Intensive* margin