

Barriers To Public Procurement: A Review and Recent Patterns In The EU^a

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Abstract

The international dimension of public procurement has gained in importance in the last decade and has attracted the attention of economist and policy makers. A number of trade agreements were signed with the intention to remove barriers to procurement markets and favour entry of foreign firms and products. However, empirical evidence shows that, despite the existence of trade agreements, discrimination towards foreign firms still applies in a number of countries around the world. In this paper, we discuss the methodologies used in the economic literature for the identification of overt and covert barriers to public tenders and some empirical evidence from the EU, TED database. We stress the importance of collecting high quality data for meliorating the ability of international traders to detect procurement barriers.

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1. Introduction

Trade of goods and services has been widely liberalised during the last decades throughout the world. Despite the proliferation of international trade agreements, government purchases are not benefitting of similar levels of openness. Public procurement is a politically sensitive lever in the governments' hands, often used for rising political consensus rather than achieving value for money for public purchases.

The expenditure in public procurement represents a large part of every country's GDP; it is around 17% for the European Union and 13% in USA¹, while the size of worldwide contestable procurement market accounts for 7.1% of the global GDP.² Given the large amount of money at stake, governments have often exercised their power by favouring national firms, raising barriers against foreign firms, either overtly or covertly, depending on whether government intervention on procurement rules for limiting entry of foreign firms was manifest or not.

Procurement barriers in international trade are recently attracting increasing attention by economists and policy makers, who wish to understand how they limit the free movement of firms and products across countries. However, measuring procurement barriers and their impact on international trade is challenging, especially for covert barriers, as then governments' actions or policies aimed at disfavouring the entry of foreign firms into local procurements are not explicit.

In this paper, we discuss overt and covert procurement barriers to international trade and the methodologies used in the literature for measuring their impact. We also present some descriptive statistics on cross boarder procurement in the EU.

The paper is organized as follows: In Section 2, we highlight the importance of trade agreements in lowering procurement barriers and the successes and challenges that countries face in their implementation. In Section 3, we present and discuss the most relevant barriers to cross-border procurement, both the overt and the covert ones. In Section 4, we review the main methodologies used for detecting procurement barriers, whilst in Section 5 we provide some descriptive statistics on cross border procurement within the EU. Section 6 concludes.

¹See OECD stats at <http://stats.oecd.org/>.

² OECD (2002).

2. International Trade Agreements in Public Procurement

The benefits of liberalised procurement markets are similar to those universally recognized of classical trades of goods and services. The gains from offshoring strategies can take the form of higher productivity, more incentives to innovate, faster economic growth and the like (Mann, 2003; OECD, 2003; Amiti and Wei, 2006b; Olsen, 2006). Similarly, more open public procurement markets foster competitiveness by reducing purchasing costs, encouraging innovation and entrepreneurship. Free cross-border procurements broadens governments' skills and knowledge by exposing governments to international best practices and experiences.³

A number of authors have discussed the consequences of procurement barriers on international competition, trade flows and market structure. See for example Baldwin, (1970), Baldwin and Richardson, (1972), Miyagiwa, (1991); Bruhlart and Trionfetti (2001, 2004) and Trionfetti, (1997, 2000, 2001). One element is crucial in determining whether or not the policy will affect international specialisation and trade: the market structure of the economic sector in question. If government demand is sufficiently large, a discriminatory policy will affect international specialisation and will most likely reduce the volume of trade (see Trionfetti, 2000 for review)

Liberalized procurement may however also involve efficiency losses. Mc Afee and McMillan (1989) show that discrimination in favour of local firms may be optimal, if these firms have a cost disadvantage compared to foreign firms and only a limited number of firms (local and foreign) bid for the contract. Discrimination in favour of local firms may then help to enhance competitive pressure at tender stage, reducing governments' procurement costs. Furthermore, in the presence of symmetric cost functions between local and foreign suppliers, Branco (1994) shows that discrimination may be optimal because foreign firms' utilities do not enter into domestic welfare.⁴

Liberalized procurement as well as liberalized trade have social costs. Influential studies have shown that trade liberalisation is associated with substantial adjustment costs for workers in

³ See ADB, Trade and Procurement: effective public purchasing and market access, 2013.

⁴ There are other reasons why governments may be interested in discriminating foreign suppliers. According to Laffont and Tirole (1991), in case of intangible products or goods and services that require monitoring costs for avoiding opportunistic behaviour of suppliers, the government may find it optimal to pay quasi rents to local contractors with the threat of losing subsequent supplies in order to ensure better performance. Breton and Salmon (1995) show that geographic proximity may induce governments to discriminate against foreign suppliers. This may happen when the existence of asymmetric information between the contracting authority and the supplier may induce the former to prefer local suppliers in order to save on monitoring costs.

import-competing jobs. These costs take the form of higher risk of job displacement, longer unemployment spells, costly reallocation to different jobs, and lower earnings growth (e.g. Autor et al. 2013, 2014, 2016). In Colantone, Crinò and Ogliari (2015), import competition is found to substantially raise mental distress, through worsened labour market conditions and increased stress on the job. Quantitatively, moving a representative worker from the industry at the first quartile of the import competition shock to the industry at the third quartile would worsen her mental distress by 5%. These findings provide evidence of an important hidden cost of globalization also in procurement.

Despite these considerations, protectionism in practice is often just the result of regulatory capture by interest groups, willing to give their support to the government in exchange for higher tariffs and weaker external competition (Ngaelen and Mougeot, 1998). Discrimination of foreign suppliers also arise also because states are too short-sighted to see the potential benefit from liberalized procurement (Vagstad, 1995).

However, while governments wish to discriminate against foreign suppliers to support national firms or for political opportunism, they also wish to ensure that local suppliers have access to foreign procurement markets. As argued by Rickard and Kono (2013), governments usually face Prisoner Dilemma's preferences: they want discriminate against foreign suppliers in the local market, and an open market in foreign markets, but they prefer mutual liberalization to mutual protectionism. This obviously creates a room for the mutual development and enforcement of international procurement agreements.

The most important provision related to public procurement is the Government Procurement Agreement (GPA), a multilateral agreement under the aegis of WTO, which involves 18 parties and 46 WTO members, originally signed in 1981. The aim of GPA is to: "mutually open government procurement markets among its parties" and to favour and promote "open, fair and transparent conditions of competition be ensured in government procurement". The removal of such barriers may have the potential to generate mutual benefits in terms of both procurement efficiency and commercial opportunities.

In order to pursue this scope, the GPA provides principles and procedural requirements, which have to be applied by all participants in specified categories of procurement activities. The more important issues addressed within the framework of GPA are related to national treatment, non-discrimination, transparency regarding all the information related to the pre and post-award

phase, the presence of mechanisms permitting a post-award review and the application of the WTO Dispute Settlement Understanding.

As argued by Craven (2015), since GPA is a multilateral agreement between developed countries, its implementation has not faced the same difficulties encountered by other international agreements, such as the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS) and Trade-Related Aspects of Intellectual Property Rights (TRIPS). This is due to the role played by both EU in the creation of the agreement, which, for a large extent, is inspired by the principles already inserted into the EU system, like non-discrimination, transparency and fairness of public purchasing procedures.

However, the effectiveness of GPA is still limited. The percentage of contracts directly awarded to non-national firms in countries belonging to the GPA agreement is small. With regard to the only EU area, in 2009 only a 3-4% of the value of the contracts above the GPA thresholds were awarded to other GPA signatories. Further, a survey conducted by the European Union on the perception that the firms had of the effects of local preferences found that more than 46% believe that that weight was still highly significant (Brulhart and Trionfetti, 2004).

Similarly, the part of national procurement market effectively available for foreign competitors in Japan and Switzerland was found to be far lower than it should have (Shingal, 2011) suggesting that the GPA has not been fully successful in fighting procurement barriers. Furthermore, procurement discrimination has been found to be greater in countries who were reluctant to accept GPA provisions, especially developing ones (Branco, 1994). China is an interesting example. Efforts made in 2011 to include it as part of GPA have failed and the country maintains the status of Observer from February 21st, 2002. In July, the 6th review of China's trade policies and practices has been completed by the WTO, with the purpose of reviewing elements concerning the negotiations.⁵ While there have been improvements on many aspects, such as the thresholds and the proposed coverage, still other elements need to be corrected. China still does not give up on its request to reserve the right to withdraw individual procurements on national policy grounds and to apply offsets and other transitional measures (Heilman, 2015).

Even some OECD countries like Australia and Turkey have refused any commitment on international procurement standards, arguing that their procurement markets are based on

⁵ See Heilman Grier, (2015).

commercial criteria and any involvement in GPA agreements would result in excessive compliance costs (EU report, 2012)-⁶ Further, despite the Agreement explicitly demands the signatories to submit a certain amount of documents and information, related to all the awards of the “above-threshold” contracts, to the Committee on Government Procurement, just around a half of them has submitted some kind of statistics (Shingal, 2011). The remaining part has not submitted information at all.

3. Forms of discrimination in international public procurement markets

Barriers to trade in public procurement markets may be essentially of two types: overt and covert. The overt barriers arise when governments explicitly impede the participation to local tenders of foreign firms through the use of specific rules or laws. Covert barriers instead arise when governments try to hinder the participation of foreign suppliers through hidden action even though the existence of international trade agreements would in principle eliminate formal impediments to cross-border procurements.

We list below the most common forms of overt barriers to trade:

- **Tariffs:** in this case, governments charge fees on all the imports of goods or services of foreign firms. In public procurement, this ends up in having a distorted level playing field, with foreign firms that are in some circumstances unable to be competitive against local firms because of tariffs. The obvious consequences of tariffs in public procurement is the lower participation of foreign firms to local procurements, with potential negative effects on the quality and the efficiency of public purchases.
- **Set-aside programmes:** under such programmes, governments induces procurement agencies or contracting authorities to place a share of their purchases with smaller businesses, with the intention to fostering the development of SMEs that would not be otherwise able to compete against larger companies⁷. This provision is thought to pose

⁶ European Parliament, Directorate General for External Policies of the Union, “Public Procurement in International Trade”, 2012.

⁷ Set-aside programmes are thought to trade-off cost efficiency with increased SME involvement in the procurement process. In a recent paper, Nakabayashi J. (2013) empirically studies the set-aside programmes adopted by the Japanese government, where approximately half of the procurement budget is set-aside for SMEs. Results show that, without such government intervention, 40 percent of SMEs would have exited the procurement markets. The empirical analysis also shows that the increased procurement costs have been largely overcompensated by the resulting higher competition due to SME entry.

limits to cross-border procurement as larger foreign firms are naturally excluded from those tenders where these provisions are included and smaller foreign firms do not have the financial endowment and managerial capacity to successfully participate to such tenders.

An important example of set aside programmes is the US Small Business Act of 1953, which automatically exclude larger firms from the participation to tenders from \$3000 to \$100,000. In addition, the Act is exempted from application of the WTO GPA under General Note 1 to the US Appendix I.

In 1999, the US launched another programme, the HUBzone, which was aimed at providing contracting benefits to small businesses located in less developed business areas of the country. The goal of this programme was to channel a portion of at least 1% of the country government procurement to small firms located in HUB zones.

- **Buy-national provisions:** another form of distortion of international public procurement markets is the so-called buy-national or buy local provision. According to these provisions, governments impose restrictions on public purchases that must be supplied by national firms.

Again, the United States is an important example of how these programmes are implemented. According to the Buy American Act, dated 1933, the US government restricts the purchase of only local supplies for use within the US and requires, in some circumstances, the use of only domestic construction materials in contracts for construction in the US.⁸

However, buy-national provisions are widespread throughout the world and their proliferation had increased during the recent financial crisis. The Chinese government, in 2009, adopted similar measures to local procurement markets, while an Australian region approved a buy-local provision in conflict with the openness of the Federal Government with regards to the international procurement policies.⁹ Similar experiences have been observed in Turkey, Brazil, Ukraine and Indonesia.

⁸ Lowinger T. (1976) analyses the effect of “Buy American” policy on US imports and finds that this restriction to public procurement function led to significant impact in curtailing foreign supplies.

⁹ See European Commission, Trade, Market access database, Barrier fiches result; retrieved at: http://madb.europa.eu/madb/barriers_details.htm?barrier_id=960059&version=4 (06/06/2016).

Contrary to the discriminatory actions based on firms' dimension, which have the purpose to foster the development of SMEs, buy-national programmes have no other objectives than the restriction of the market to local firms.

- **Price preferences for local suppliers:** in this case, the awarding scheme of local procurements is distorted towards local firms, which have a competitive advantage with respect to non-local ones.¹⁰ This provision takes the form of a discriminatory criterion for evaluating bids, providing some fixed price advantage to local firms.¹¹
- **Direct contracts to local suppliers:** in some circumstances, the government prefers not to accept bids for a certain good or service, and award the contract directly to a local supplier.

International trade agreements are in general designed with the ultimate purpose to reduce such forms of barriers. However, the overt barriers are not the only forms of discrimination within international public procurement markets. Covert barriers, say the forms of discrimination that are not caused by explicit laws or regulations, are very common and, given their hidden nature, are difficult to detect. Governments may try to overcome international agreements' obligation by inserting clauses or rules within tender documentation in order to limit the participation of foreign firms. Examples of covert barriers are:

- **Obligation to supply products with only local inputs:** this is probably the most used form of covert barrier in public procurement. In this case, the government seeks to limit the entry of foreign firms by imposing that basic supplies are from the local market. Although this does not in principle inhibit foreign firms to include local products in their offer, this obligation creates obvious asymmetries among bidders that may alter the willingness to participate by non-local firms.
- **Obligation to have subsidiaries in the country to bid:** in some circumstances, governments impose restrictions to foreign firms, obliging them to own in-country subsidiaries for being able to participate to local tenders. This of course imposes an organizational cost on foreign firms that may find it difficult or economically not convenient to have a proper subsidiary in the country.

¹⁰ In the context of price preferences towards SME rather than foreign firms, Marion J. (2007) shows that price preferences are likely to reduce procurement cost at a little efficiency detriment, holding firms' participation constant.

¹¹ See also Rojas (2003).

- **Language barriers:** as reported in the Ramboll study (2011) for the EU, language barriers are perceived as the most prominent obstacle to cross-border procurement. According to the survey results, language barriers are among the largest barrier for almost 50.3% of respondents. Bidding documentation not in a common international language may highly affect the ability of foreign bidders to understand the tender requirements, which is an important deterrent to participation.
- **Bureaucracy:** the disproportionately large amount of documents to fulfil makes the participation to public tenders quite difficult. In some circumstances, the documentation requested for being accepted to public procurements include specific certifications or permits that are difficult to obtain by foreign suppliers. This may increase the documentation burden charged on foreign firms up to a level that the participation to public tenders becomes not profitable.

4. Detecting procurement barriers in international trade

The identification and estimation of the impact of procurement barriers in international trade has attracted the attention of a number of academics and policymakers in the last two decades. Three main approaches can be used for estimating the extent of public procurement market barriers in international trade.

The first approach considers data at tender/contract level and is based on the estimation of the difference in probability that a given procurement contract is awarded to a local or a foreign supplier. This approach provides a precise estimation of the extent of discrimination since it may account for more detailed data on the nature of the contract, the identity of bidders and ad-hoc regulation that may highly influence the ability of foreign suppliers to win a contract, even without discrimination.

The second approach is based on the differences between imports for private investment and imports for public spending. The underlying idea is that a potential difference between the private and public import propensity is a signal that undue discrimination is occurring. If the share of imports over the total public spending amount is lower than the share of imports over the total private investment, it means that local procurement markets are discriminating foreign supplies in favour of local ones.

The third approach is based on the qualitative evaluation of procurement environment, which includes the assessment of procurement regulation and of standardized contract specification in order to assess the level of openness of procurement tenders to foreign suppliers.

We review these approaches in more details below.

4.1. The probability approach

Under the probability approach, data at contract level is used to estimate the probability that a foreign and a local firm wins a tender. The potential difference in these probabilities provides a measure of the international discrimination in procurement markets.

In particular, a probit regression can quantify the probability that a tender is awarded by a local or a foreign firm; a significantly higher probability that a local firm wins a tender may provide a preliminary indication of the presence of discrimination. Then one can disentangle the different effects, not necessarily related to voluntary discrimination, which may affect such probabilities. These effects may include country specific elements, like ad-hoc regulation, market structure, competition levels, or tender characteristics, like contract dimensions or rules, which may jointly have a role in impeding foreign firms to participate and win. Other factors include the tender characteristics (restricted or unrestricted), and the characteristics of the procurement authority (national, regional etc.)

In particular, the Ramboll study (2011) is the first study that has attempted to analyse such probability by taking advantage of the European TED database. The model used considers three main sets of explanatory variables. The first one considers the specifics of the contracts, namely it controls whether the purchase of a work, supplies or services have a role in determining the probability of awarding a contract to a foreign supplier. The second set contains variables related to the country where the procurement is performed and the third set includes tender characteristics. The third effect includes tender characteristics, including the number of bids and the existence of subcontracting relationship between the winning supplier and a subcontractor.

Their results show that procurements that lie under the Utilities directive¹², given its capacity to open up procurement markets, is positively linked with the probability of awarding a contract to

¹² 2004/17/EC.

foreign suppliers. Supplies and services are both more inclined to be awarded to foreign suppliers than procurement of works. Results also confirm the importance of the common EU area in facilitating cross-border procurement and the abatement of language barriers, which are found to be a serious concern for cross-border procurement. As expected, procurements issued by local government agencies are more likely to be awarded to local suppliers, an indication that local purchases highly discriminate against foreign firms. Negotiated procedures are instead more likely to be awarded to foreign suppliers. An interpretation for this result is that negotiated procedures are in general associated with complex procurements, which may justify the higher openness towards foreign suppliers.

A more recent study by Kutlina-Dimitrova and Lakatos (2014) follows the same approach introducing also some additional macroeconomic factors from the World Bank Development indicators, as well as product market regulation indicators from the OECD. The paper estimates the likelihood a local contract is awarded to a foreign firm by using TED data over the period 2008-2012. Three variables, which are included in the regression model, are expected to have an effect on the probability of awarding cross-border. The variable “scope of public enterprises” provides a measure of pervasiveness of the state in private businesses. This variable should capture the fact that a higher involvement of the state across business sectors would lead to a lower participation of foreign firms in government activities. The variable “regulatory protection of incumbents” is an indicator that measures the legal frameworks adopted by governments in impeding the entry of new players in procurement processes, like the legal barriers to entry, the antitrust exceptions and the barriers in network sectors. The last variable called “barriers to foreign FDI” is an indicator of the legal barriers to foreign country inflows of investment, which provides a measure of the governments’ preference towards foreign business involvement into local public activities.

Notice how, while the last variables are direct measures of overt barriers to international procurement, the first variable, the scope of public enterprises, is intended to provide a measure of covert barriers, since the pervasiveness of the state in the private sector only indirectly may have an effect on the capacity of foreign firms to award local contracts.

Their results show that all these three additional variables are negatively linked to cross border procurement, confirming that both these covert and overt barriers play a major role in limiting the extent of foreign business participation into local procurements. In addition, the regression

model includes year fixed effects to account for potential relationship between the year in which the contract is awarded and the likelihood of observing cross-border procurement. Results show that cross border is less likely in the period 2009-2012 with respect to the 2008. The authors argue that this result may be due to the effect of the recent financial crisis on the governments' preferences on cross border procurement and, more specifically, to tighter budget constraints that may lead governments to prefer awarding contracts to local companies.

This probability approach is very intuitive and relatively simple to use. However, it suffers from some limitations. As argued by Cernat and Kutlina-Dimitrova (2015), the size of public procurement purchases from foreign suppliers through simple System of National Accounts (SNA) can be highly underestimated as it does not account for the share of local purchases that should be considered as having an international dimension. In a nutshell, this would require an estimation of all the public purchases that local governments mistakenly record as from local enterprises but that they should be imputed to foreign ones. This is the case of foreign firms that use intermediary firms to sell goods or services to local firms, or the case where the goods purchased by local governments are the results of complex global value chains so that only a minimum amount of its value should be correctly imputed to the local seller.

Both these two cases are not included in standard databases at contract level so that a correct estimation of the extent of cross border procurement requires additional information and possibly data. To provide a broader picture of public procurement markets, it is important to identify all the channels and elements characterizing an international negotiation on public procurement, taking into account the ways in which goods and services are traded across countries.

This would require the estimation of all the procurements that are awarded not only directly but also indirectly to foreign firms. To deal with this issue, one needs to consider two effects that are not included in standard SNA statistics:

- Value-added indirect international procurement
- *Commercial presence* cross-border procurement

The first dimension would require the consideration of all the value-added components of local purchases that are imputable to foreign firms. To define the aggregate dimension of international procurement markets, this dimension requires the calculation of all the share of revenues,

related to a public purchase, which should be ultimately recognized to foreign firms. This method recognizes the prominent importance of global supply chains in modern economies and provides a more comprehensive estimation of the international dimension of procurement markets. We shall come back to this dimension below.

The second dimension requires the estimation of the procurement contracts that are awarded to local intermediaries or subsidiaries of foreign firms. We shall come back to this dimension below.

Those two dimensions are difficult to estimate. Ideally, a methodology that is aimed at quantifying the share of government procurement markets going to third countries' firms, should be able to complement government current account data with more detailed and specific measures of cross-border procurements. The use of appropriate input-output tables and sample data at contract level would be thus needed for recovering information on the other two dimensions of international cross-border procurement.¹³

4.1.1. Value-added component of international procurement markets

The value-added dimension of public procurement markets is an important one for international traders. It may shed light on the hidden interaction between foreign and local suppliers and may provide a more comprehensive picture of the international procurement values at stake.

This dimension could be estimated through appropriate input-output tables using a variety of techniques and quantify the extent of value-added dimension of public procurement by using the standard Leontief-inverses, as detailed in OECD-WTO (2012). This approach would require constructing a global input-output table, that accounts for the largest possible national input-output tables and combine bilateral trade data on goods and services. Input-output tables may contain information on final expenditure of private agents and final expenditure of the government (see Brulhart and Trionfetti, 2004), as well as information at sectorial level. However,

¹³ The widest input-output database is GTAP. The OECD dataset is of high quality but covers a limited number of countries. For specific country studies, it is in general highly suggested the use of individual country input-output table when available and when the quality is reliable. Typically, the input-output tables collected directly from the statistical offices of a country are more detailed than GTAP but, of course, cannot be used for international comparison since they typically neither use international sectoral classifications nor homogenised accounting rules.

it should be noted that the use of input-output tables, although useful and informative, might make international comparison complicated, as it would be naturally limited to the number of reliable input-output tables one can find.

4.1.2. “Commercial presence” dimension: contract level data

In addition to bidding directly, foreign firms can take part to a public procurement tender through non-direct channels. The main non-direct channels are: a) Corporate ownership; b) wholesalers/intermediaries; c) consortia and subcontracting. We discuss below some preliminary methods that could in principle be employed to estimate the relevance of each channel, and the data availability problems and data collection strategies that these may involve.

Corporate ownership

A firm might be legally registered in one country and be controlled by a foreign institution. The typical case is that of a domestic subsidiary of a multinational firm. To deal with this case one needs information on the corporate ownership structure of firms that were awarded a contract. If data of this type were available for all countries, and for a sufficiently large random sample of suppliers, one could then classify firms according to the typical division used in the literature on multinational corporations: (i) stand-alone, (ii) subsidiaries of foreign corporations, (iii) multinational corporations, participated by foreign entity (possibly, distinguishing different thresholds of foreign owned capital). This allows to estimate the extent of commercial cross-border procurement linked to foreign ownership of local suppliers.

Wholesalers and intermediaries

A second non direct channel of trade in public procurement occurs when goods or services of foreign firm A are provided through the intermediation of firm B. This can occur because firm B is an intermediary/wholesaler¹⁴ or because firm A is an official participant to a tender within a consortium of firms. To identify whether a firm is an intermediary/wholesaler, one could try to distinguish firms according to their sectoral classification (using information from both contract data and firm characteristics databases) and single out firms in the wholesale trade sector, at

¹⁴ This channel of export is receiving increasing attention in the academic and policy debate, although its analysis is complicated by the data scarcity. In a recent paper, Bernard, Jensen, Redding and Schott (2010) offer a first exploration of the role of wholesaler for US trade.

least for an appropriately selected, representative, sample of procurements. Producers of goods and services are less likely to be a pure intermediary in a contract. The share of the contract values awarded to wholesalers/intermediaries would be an indicator of whether or not this is an important channel to investigate further. If only a small fraction goes through this channel, it is marginal and could be neglected. If instead it turns out to account for a significant fraction of procurements (and it is expected to find relevant differences across goods/services), further investigation could determine the origin of the goods/services provided by the wholesalers. It would seem reasonable then to start from the assumption that on average a large wholesaler's sales of a specific good is related to the domestic/foreign composition of sales at the national level. But if the phenomenon is empirically relevant, one might further investigate the issue through a direct questionnaire submitted to the contracting firms (see next point).

Consortia and subcontracting

This is arguably the most challenging issue to assess non-direct trade flows linked to commercial presence in public procurement. Currently, the only way to quantify this channel appears to be to run a direct survey to assess the relevance of consortia and subcontracting for trade in public procurement. The idea would be to contact a sample of firms that were awarded a contract and investigate the extent of subcontracting for that specific contract. The questionnaire would be very simple: first, a yes/no to the use of consortia or subcontracting for the specific contract, and only in the case of "yes" some additional questions on the nationality and role of foreign firms involved. One might add a specific section for wholesalers, if deemed important (see the previous point). The questionnaire could be run via email and a web-based interface.

The analysis at contract level is based on the availability and tractability of information about most of the contracts procured in the country for a sufficiently large span of time. An accurate analysis of contract-level data can be obtained in presence of homogenous and consistent databases (availability), electronically manageable (tractability). As argued by OECD (2002), underreporting and mistakes in the data collection process may seriously hinder quality and reliability of the database, with obvious negative consequences on related analysis and results.

Estimation of the procurement market can be aided by the selection of a sample of contracts, according to their economic relevance and the sector they belong to, even though a preference should be given to the contracts (or types of contracts) included in manageable and

comprehensive databases. A cut-off point, in terms of contract value, can be determined for the exclusion of financially negligible contracts.

Contract data should contain information on contract values, along with information on standard tender characteristics and participants. The awarding price represents the value of the contract stipulated by the contracting authority and the selected firm. The sum of the awarding prices for any contract in the sample gives the size of the sampled procurement market.

The aggregate value of contracts in the sample provides the basis for the estimation of the whole procurement market value, as long as the sample is representative of the entire procurement market. This approach can be useful also to estimate sub-central procurement markets, in case some information on the relative public expenditure at sub-central level, with respect to public expenditure at central level, is available. It would be also useful for obtaining reliable information on the public procurement spending of State-owned enterprises (SOEs), which is generally not included in government accounts data. Indeed, because of their size SOEs would need careful consideration when estimating public procurement markets.

It could be possible to quantify cross-border procurement via commercial presence by looking at the nationality of firms winning local tenders and at the presence of domestic intermediaries in the country in question. The presence of international joint ventures and/or alliances could also be considered. The estimation of the size of value-added indirect international procurement at contract-level is a challenging task. To address this issue, one should attempt to match data on firms' import levels to estimate the relevance of foreign inputs on the size of public procurement markets.¹⁵

¹⁵ A questionnaire sent to managers of central and local public procurement agencies (if any) and/or the most important public contracting authorities could be helpful in defining the reliability of estimates of aggregate data for some sample sectors.

BOX 1. The probability approach

Estimating the existence of overt and covert discriminatory policies

In presence of data at contract-level, it would be possible to measure the existence of market barriers by estimating the probability that a foreign firm wins a contract. A binary model can be built up so as to get these measures. The equations to be estimated should link the event of a foreign firms awarding a contract with measures of potential discrimination, as argued in Section 4.2. A panel framework could be used where the single observations are the thus the single contract. Estimation equations should include control variables that may have an effect in explaining the probability that a contract is more likely to be awarded to a foreign supplier rather than a local one.

This approach has been used by Ramboll (2011) to document the determinants of cross-border procurement. However, this methodology is unable to account for individual characteristics of firms that may have an impact on determining the extent of cross border procurement. For instance, the award of a contract by a local firm can be explained by its superiority with respect to foreign competitors due to better technologies, geographical location or other idiosyncratic characteristics that cannot be captured by a model with observation at contract level.

The basic equation used by Ramboll (2011) is as follows:

$$\Pr(\text{foreign firm wins contract } i \text{ at time } t) = \alpha + \gamma X_{it} + \delta Z_{it} + \theta W_{it} + \varepsilon_{it}$$

Where t indexes the year in which the auction takes place, the matrices X , Z and W are respectively the specifics of the contract, the country variables and tender characteristics, including the number of bids and the existence of subcontracting relationship between the winning supplier and a subcontractor.

4.2. The second approach: The Import elasticity approach

Most used methods are the ones that exploit the relationship between countries' imports, public and private demand. In its simplest form, discrimination against foreign suppliers in local procurement markets exists if the private sector's import propensity is higher than the public sector's import propensity. This in fact would suggest that, *ceteris paribus*, the government is, on average, importing less from abroad than what the private sector does. In particular, if an increase in the ratio of public sector expenditures on private sector expenditure reduce (resp. increase) total imports, then it means the government is discriminating against (are opening the market towards) foreign firms.

For example, by analysing data on public and private sector demand, Lowinger (1976), Trionfetti (2000) and Brulhart and Trionfetti(2004)¹⁶ find that the private sector's demand is invariably greater than the public one, implicitly confirming that the public sector discriminates against foreign suppliers. In particular, Brulhart and Trionfetti (2004). The relatively easiness in the implementation of these models, especially in comparison to models based on contract level data, make them particularly attractive for applied research on trade. However, it should be recognized that these model work poorly in the analysis of specific sector (e.g. the defence sector) where the government is the sole purchaser. In this case, the lack of variability among public and private imports in these specific sectors makes sectorial comparison problematic and may alter the coefficients' estimates (Laird and Yeats, 1990).

In addition, the models based on public and private propensity to imports can only be applied to relatively "wealthy" countries, since usual international databases do not cover such detailed data (imports for both public and private sector) for developing or poor countries. As a result, these models provide just a small picture of the procurement discrimination among countries and are supported by only a limited number of observation (typically at annual or biannual level).

For overcoming this problem, Rickard and Kono (2013) use elasticities of import to public spending to isolate the effect of potential bias to international procurement dimension. By using aggregate data on imports and the size of procurement markets (which are in general easily obtainable from classical input-output tables¹⁷), these authors are able to estimate the "home bias" for a larger number of countries and using a higher number of observations, which in turn increase the robustness of the estimates.

By taking advantage of this innovative technique, Rickard and Kono (2013) develops a gravity equation to check whether international agreements (such as GPAs) play a role in affecting discrimination (See box 1). Using data from 112 countries covering the period 1990-2007 and

¹⁶ Lowinger (1976) uses government procurement data covering the US and western Europe markets, while Brulhart and Trionfetti (2004) refers to data from Eurostat Input-Output tables for 11 European countries in the period 1970-1985 in five year intervals.

¹⁷ The models based on public and private spending propensity or import elasticity usually use elaborated data from the System of National Accounts (SNA) to provide measures on the size of public procurement markets. Those methods disaggregate public spending measurements at national level (financial consumption expenditure and intermediate consumption) and subsequently subtract those cost items, typically cost for employees and defence costs, which are not related to standard public procurement activity. Current accounts data may be easily retrieved from OECD and IMF statistics databases; where the latter is especially useful for data on third country. See OECD (2002) for an exhaustive review of SNA methods for estimating the size of public procurement markets.

137,407 observations, their results show that international trade agreements have failed their objective to reduce discrimination in cross-border procurement., as they found that no effect of trade agreements on relationship between public and private imports.

A gravity model of trade (Rickard and Kono 2012)

The research questions the authors address in this paper is based on the evaluation of effectiveness of international trade agreements in reducing discrimination against foreign suppliers in procurement markets. They use a gravity model that accounts for the determinants of imports among countries as function of the size of procurement markets, the existence of international trade agreements and other standard control variables that may have a role in explaining the levels of imports. The dependent variable used in the paper is $\ln(\text{Imports}_{ijt})$, that is the log of country “i” imports from country “j” at time “t”, in constant terms 2000 United States dollars. The main independent variable is $\ln(\text{Procurement}_{it})$, which is the log of the size of the country l’s procurement market at time t.

The basic equation is as follows:

$$\begin{aligned} \ln(\text{Imports}_{ijt}) = & \beta_0 + \beta_1 \ln(\text{Procurement}_{it}) + \beta_2 \ln(\text{Imports}_{ijt-1}) + \beta_3 \text{GPA}_{ijt} + \beta_4 \text{PPA}_{ijt} \\ & + \beta_5 \ln(\text{Procurement}_{it}) \times \text{GPA}_{ijt} + \beta_6 \ln(\text{Procurement}_{it}) \times \text{PPA}_{ijt} \\ & + \beta_7 \ln(\text{GDP}_{it} \times \text{GDP}_{jt}) + \beta_8 \ln(\text{Population}_{it} \times \text{Population}_{jt}) \\ & + \beta_9 \text{Trade Taxes}_{it} + \beta_{10} \text{WTO}_{ijt} + \beta_{11} \text{Joint Democracy}_{ijt} + \beta_{12} \text{PTA}_{ijt} \\ & + \beta_{13-28} \text{Year} + \varepsilon_{ijt} \end{aligned}$$

Where the coefficient of interest is β_1 , which measures the elasticity of imports to the size of public procurement market and thus provides information on the possible discrimination in procurement markets. This coefficient is expected to be zero if there is no discrimination, as then the changes in the levels of procurement spending in country i do not alter the import-export relationship between the country i and j.

The lagged variable of Imports is used for controlling potential hysteresis problems that may affect trade measures. Variables GPA and PPA are dummy variables that takes the value of one if there exist respectively GPA and PPA agreements between the country l and j at time t. The use of both those variables is justified by the fact that GPA have risen concerns about their ability to reduce discrimination in procurement markets. This has induced the international community to sign more specific agreements (preferential trade agreements, PTA). Within PTAs, the authors specify the variable PPAs, preferential procurement agreements, the indicates the existence of more procurement specific agreement between countries l and j. Interaction variables $\ln(\text{Procurement}) \times \text{GPA}$ and $\ln(\text{Procurement}) \times \text{PPA}$ are the main novelty of this analysis, since they are able to estimate the ability of trade agreements in reducing discrimination. If this is the case, the related coefficient should be positively signed while the coefficient related to the Procurement market (β_1) should be reduced to zero, which means that trade agreements are able to restore a positive relationship between public spending and imports.

Other coefficients are control variables that are common in gravity models. Population and GDP variables are used for controlling trade flows that are due to differences in countries’ population levels and business activity.

Trade taxes variable indicates the country i 's tax rate over the GDP and measures the tax influence on trade flows, WTO is a dummy variable that indicates the jointly membership in the WTO, that may highly affect trade levels among countries. The variable joint democracy, which is again a dummy variable that measures whether countries i and j are both democracies, is aimed at identifying whether joint democracy is able to promote international trade (Mansfield et al., 2000).

Results demonstrate that international trade agreements fail in lowering discrimination in public procurement markets. In particular, the coefficient associated to the size of public procurement markets (β_1) is negatively signed and statistically significant, suggesting that an increase in countries' public spending is actually related to a reduction of trade from foreign countries. Even more importantly, the coefficients associated to the dyads between procurement and the dummies related to the international agreements, namely β_5 and β_6 , are null, which implies that the existence of trade agreements has no effect in alleviating the discrimination against foreign suppliers.

4.3. Qualitative assessment of discrimination in procurement markets

A qualitative assessment of procurement regulation, as well as of procurement outcomes, may help the international trader to assess whether some discrimination occurs in local public procurement market. A qualitative approach may be useful when data are scarce, difficult to manage or to collect, or not reliable. Under this approach, the international trader should verify whether some overt or covert discrimination in a certain procurement market is imposing undue constraints to foreign firms' participation. Overt barriers can be detected by looking at:

- **The procurement regulation**, checking whether procurement laws restrict the possibility that foreign firms may freely participate to local tenders. In particular, legislation on public purchasing may impose restrictions on firms that do not own subsidiaries in the local country or have partnerships with local firms. Procurement regulation may restrict the awards of local contracts to foreign firms, or impose limits to the nationality of workers that can be employed for implementing local procurements, or oblige foreign companies to undergo higher financial or technical pre-requisites. This, of course, alters the playing level field and makes the participation of foreign firms much more difficult.

- **Geographical, physical and political barriers.** Although regulation plays a prominent role in the definition of so-called overt barriers, even physical conditions, the geographical locations where contracts should be performed or the political conditions are important determinants of procurement discrimination. The international trader should assess the level of openness of procurement markets by looking at the geographical limitations a certain country imposes on foreign firms, like huge distances between the place where contracts should be run or the bad flight or rail connections even between countries on the border. This is particularly true for smaller contracts that could be successfully awarded by foreign SME if these physical barriers would not be in place. Although geographical barriers are difficult to overcome, governments or contracting authorities may exert an effort in facilitating the access of foreign firms to local procurement markets by recognizing transportations of costs or creating a fertile ground for the formation of ad-hoc partnerships between foreign SMEs and local firms.

Covert barriers are obviously much more difficult to detect. A qualitative assessment of procurement markets could not leave aside a solid evaluation of procurement outcomes, which means a check of occurrences in which foreign firms award local contracts or simply their participation into local procurement arena. An assessment of covert barriers should thus include:

- An **evaluation of procurement documentation.** As already described in Section 3, the language used in the tender documentation may be a serious harm to foreign firms' participation. A comprehensive assessment of procurement documentation may reveal whether the contracting authority regularly implements practices that may be an obstacle to the participation of foreign firms to local tenders.
- **Evidence of corruption** in the local procurement environment. This should shed some light on possible irregular links between the public and the private sector in the local procurement market. If this is the case, and corruption is found to be a local phenomenon (i.e., not perpetuated by foreign firms), corruption is a strong signal that the level playing field is not ensured.

The qualitative assessment of procurement barriers may be resumed through appropriate tables where each potential barriers to international participation into local tenders is included. At each barrier may be associated a weight that represents the overall importance of each barrier to the alteration of international competition. The international trader may thus give a score to each

barrier as personal evaluation of the openness of public procurement markets. Thus, the weighted average of such scores should provide a measure of the degree of openness of the entire procurement market. This would be particularly useful for international comparisons between two or more procurement markets.¹⁸

5. Recent Patterns in Europe

The EU effort in making the EU procurement market open to international trade has not received similar responses from other WTO members, even from those that are part of the GPA. Some EU Member States and the European Commission have reported that the EU markets are more open than their main competitors (mainly, the US, India, China, Brazil), invoking a similar effort in that direction by those states that have been reluctant in improving their international procurement policies.¹⁹ However, as reported by Messerlin and Miroudot (2012), the EU procurement market is not as open as it is often thought. According to their analyses, the European procurement market shows less import penetration than countries like Canada, China, Japan and US. Despite the doubts on the overall world picture on import penetration levels and discrepancies in their calculation, there is large consensus among GPA members that more effort should be made for collecting better data and developing more advanced methodologies in order to have a concrete estimation of the extent of cross-border procurement.

In the following section some descriptive statistics on the patterns of European direct-cross border procurement will be shortly illustrated. The dataset used for this analysis is a subset for the period 2013 – 2015 of the Tenders Electronic Daily (TED) – Public Procurement Notices, published by the European Commission Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. It covers the European Economic Area, Switzerland and the Former Yugoslav Republic of Macedonia and the major part of it refers to tenders above procurement

¹⁸ The qualitative assessment may be undertaken by considering a bunch of ten or more contracts followed by a concrete examination of the procurement regulation. The choice of contracts could not be arbitrary, but should reflect, as much as it is possible, the distribution of procurement spending across different purchases types. A wider set of goods and services considered in the qualitative assessment may enable the international trader to have a more comprehensive idea of which types of barriers are in place in the local procurement market. It would be important to consider contracts of different values to capture the possibility that some particular covert barriers are limited to smaller contracts. When the international trader is interested in obtaining information on the existing barriers in a particular industry, the qualitative analysis can be restricted only to contracts pertaining to such type of procurements.

¹⁹ European Parliament, Directorate-General for External policies of the Union, *ibidem*.

thresholds. Almost 20% of the contracts per year have been removed from the dataset, due to missing or incomplete information.

The first thing that it should be noted is that both the number of total awards and of direct cross-border awards is increasing in the period 2013-2015. With respect to 2013 the total awards are, in 2015, the 8.42% more, compared with the 16.11% increase in the number of cross border awards.

The peak of cross border awards is reached in 2015 with 10,756 contracts, while the highest share is the one of 2014, corresponding to the 2.32%.

Compared to the findings of Z. Kutilina-Dimitrova and C. Lakatos (2014), which show an average of 1.4% share of direct cross-border awards for the period 2008 – 2012, these results illustrate higher percentages for all the years (see Table 1). In addition, the lowest share of this three-year period is even higher than the highest of the previous five.

The differences could be due to some differences in the dataset used, as the TED dataset have been officially updated in summer 2016 by the European Commission, or to the time period. During the five years analysed by Kutilina-Dimitrova and Lakatos, the average number of awards was around 230,000. In 2013, 2014 and 2015 we can see, instead, always more than 500,000 contracts yearly.

Table 1 – Total Awards and Cross-Border shares, years 2013-2015

Year	Total Awards	Cross Border	Share	Missing Values	Share2
2013	500,247.00	9,264.00	1.85%	95,059	19.00%
2014	522,349.00	9,688.00	2.32%	105,045	20.11%
2015	542,372.00	10,756.00	1.96%	106,404	19.62%

As this dataset does not only refer to the intra-European exchanges, but also to the external cross-border awards, it was appropriate to analyse these two categories of contracts (under GPA and not under GPA), to see if there was any difference in their patterns. The findings reported in Table 2 show that share of contracts awarded externally under the GPA is higher than the one of those who do not fall inside the GPA's jurisdiction for every year. In addition, the number of

contract under the GPA is increasing more strongly than the one of the contract that remains outside.

Table 2 – Contracts under GPA and Cross-Border shares

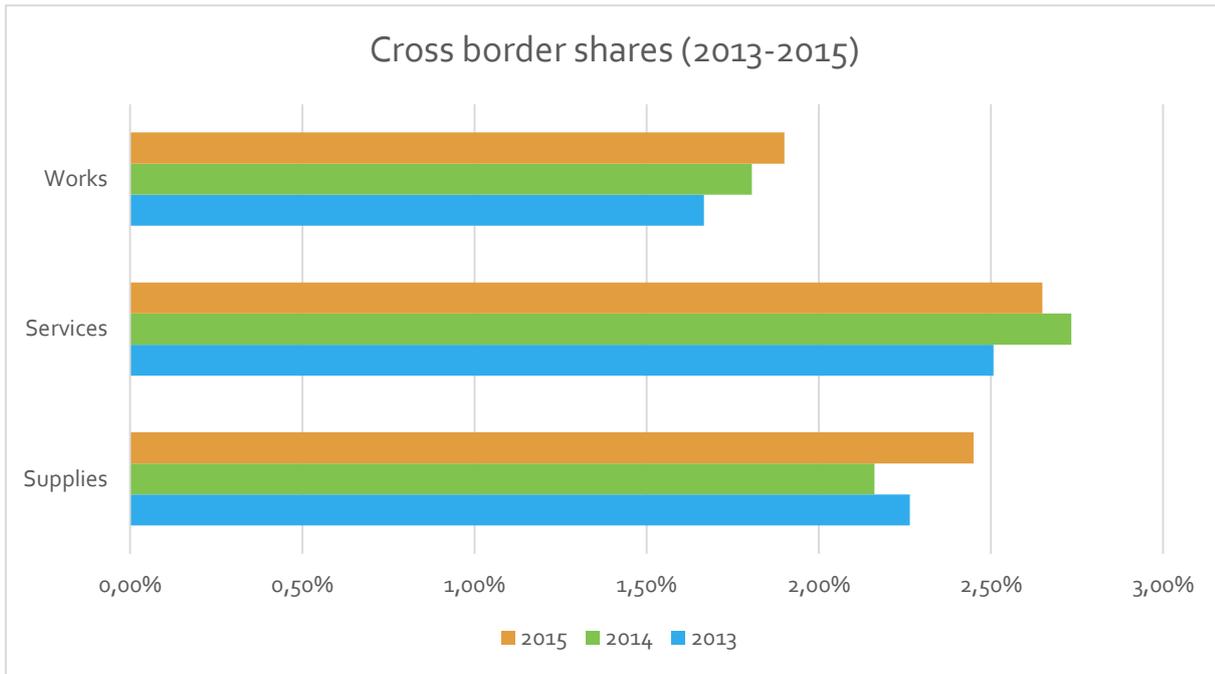
Year	Total GPA	Cross Border	Share	Total NO GPA	Cross Border2	Share2
2013	183,480.00	4,792.00	2.61%	165,138.00	3,127.00	1.89%
2014	193,386.00	4,816.00	2.49%	165,984.00	3,307.00	1.99%
2015	199,292.00	5,651.00	2.84%	169,436.00	3,482.00	2.06%

The TED dataset presents three categories of purchases: Supplies, Services and Works. In Kutilina-Dimitrova and Lakatos (2014), the number of award per year shows a higher share for the Supplies, followed by Services and, lastly, by Works. The situation for 2013-2015 seems to be somehow different. As illustrated in Table 3 and Chart 1, the Services present the highest total and annual share of cross-border awards, closely followed by Supplies and leaving the Works quite far behind. The fact that the number of Works awarded cross-border is the lowest could be probably linked with higher logistics and transportation costs that foreign firms need to bear in order to serve the local market.

Table 3 – Type of Purchase and Cross-Border shares

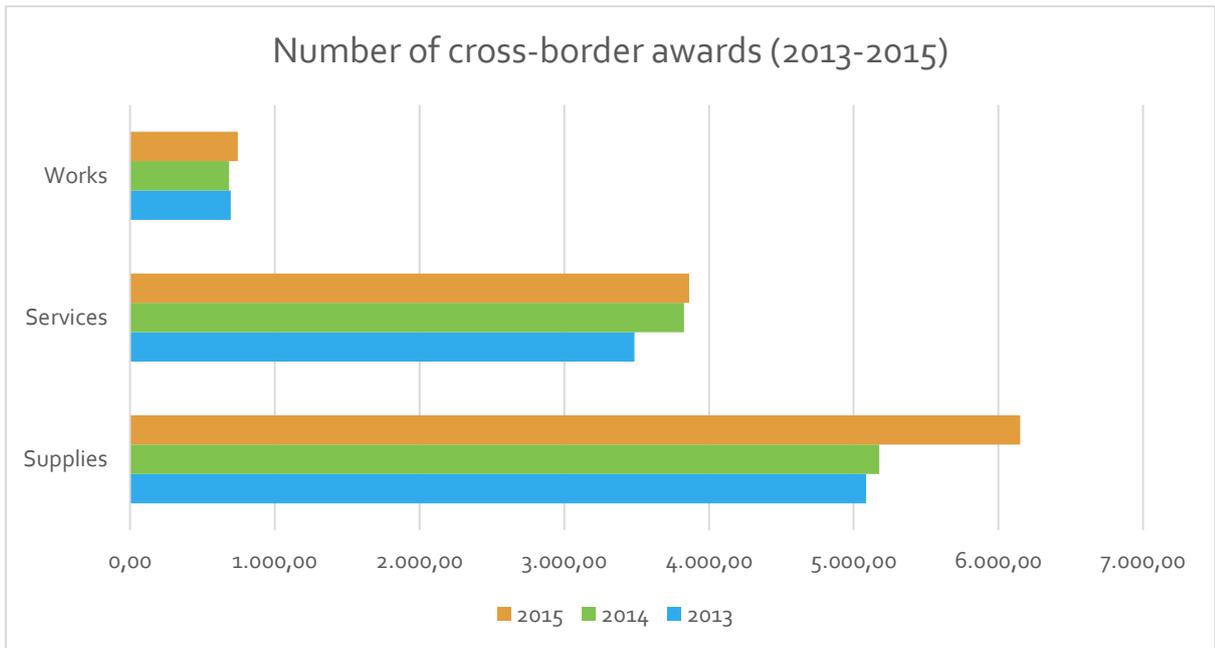
Type (2013-2015)	Total	Domestic	Cross Border	Share
Supplies	715,475.00	699,061.00	16,414.00	2.29%
Services	424,502.00	413,328.00	11,174.00	2.63%
Works	118,483.00	116,363.00	2,120.00	1.79%
Total	1,258,460.00	1,228,752.00	29,708.00	2.36%

Chart 1 – Type of Purchases and Cross-Border Shares years 2013-2015



Looking at the number and not at the shares, we can observe that the contracts for works are still the least awarded cross-border, while the contracts for supplies are now the most commonly won by foreigners (Chart 2). Furthermore, the number of cross border-awards show an increasing pattern, with a peak in 2015 for every category of purchases.

Chart 2 – Type of Purchases and Number of Cross-Border awards 2013-2015



Looking now at the patterns for different levels of Procurement authority, Table 4 shows that those doing worse are Local Authorities and Regional or Local Agencies/Offices, which represent a consistent part of the total (258,152 awards, almost 20%) respectively with a cross-border share of 1.20% and 1.12%. This suggests that the authorities with a local dimension are more likely to award locally. Keeping out the EU Institutions or Agencies and Other International Organizations, which were not included in the original analysis by Kutlina-Dimitrova and Lakatos, and obviously show results off the chart, the best result is the one of the Utilities Entities, followed by National and Federal Agencies and Offices and Central Government. These results are consistent with those carried out in Kutlina-Dimitrovna and Lakatos' work: in fact, their top three is composed by the same categories. This could indicate that representing a higher level of procurement, with a bigger dimension, can have an influence in the probability of cross border awards due to the scale of the purchases and to the greater possibilities that can be experienced for cost reduction and efficiency improvements.

Table 4 – Type of Purchase and Level of Procurement

Level of Procurement (2013-2015)	Total	Domestic	Cross Border	Share
Central Government	105,024.00	101,822.00	3,202	3.05%
Local Authorities	234,776.00	231,955.00	2,821	1.20%
Utilities Entities	78,991.00	75,363.00	3,628	4.59%
EU Institution/Agency	6,334.00	2,636.00	3,698	58.38%
Other International Organization	265.00	231.00	34	12.83%
Body Governed by Public Law	404,350.00	397,110.00	7,240	1.79%
Other	259,993.00	254,780.00	5,213	2.01%
National or Federal Agency/Office	20,142.00	19,383.00	759	3.77%
Regional or Local Agency/Office	23,376.00	23,115.00	261	1.12%
Not Specified	125,209.00	122,357.00	2,852	2.28%
Total	1,258,460.00	1,228,752.00	29,708	2.36%

Table 5 provides some insights in terms of the kind of procedures used in the countries under analysis and which are those who present the highest shares of cross-border awards. In the original paper the procedures that present the highest share of foreign awards are negotiated without competition and competitive dialogue, followed by negotiated with competition, but it should also be noted that the number of contracts awarded following a competitive dialogue procedure is very low (411 per year, compared with the 207,651 of the Open Procedure). The results for the years 2013 – 2015 show similar patterns: Competitive Dialogue and Negotiated without competition are still in the top three, while Negotiated with competition slips to the fourth place since, since the third one is taken by Accelerated Negotiated. In both cases Open procedure, which is the most commonly used, is the one showing the lowest share of cross border awards and at the same time, the highest number.

This evidence suggests that foreign firms are less likely to win when procedures which foresee a large number of bidders and contracts for services, supplies and works that are not particularly complex. Instead, when the relevance and the intricacy of the matter is such as to require the use of more sophisticated instruments, like those of the Negotiated procedures and the Competitive dialogue, the probabilities that a foreign firm will be interested in participating and strong enough to win rise.

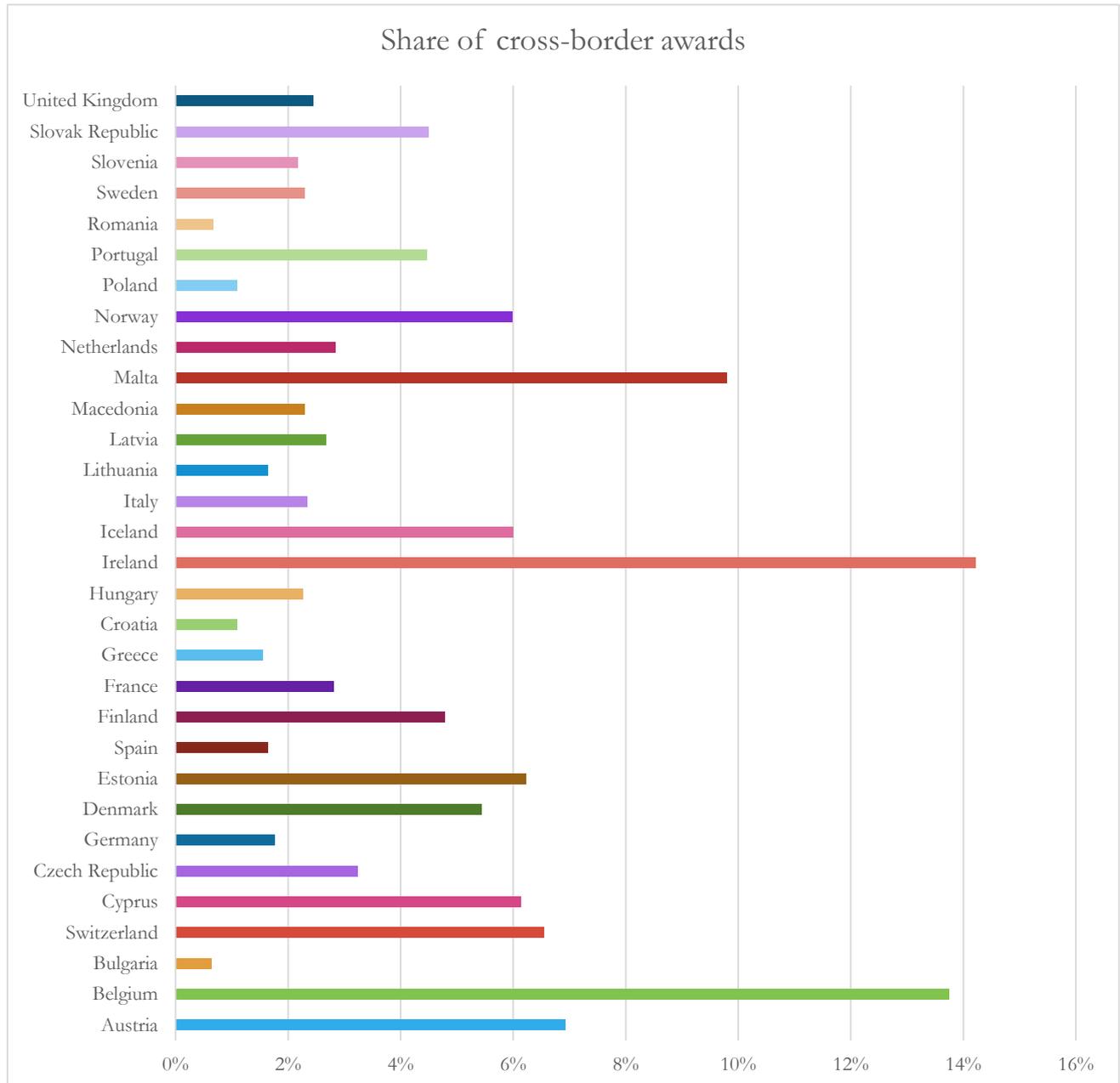
Table 5 – Type of Procurement Procedure

Procurement Procedure (2013-2015)	Total	Cross-Border	Domestic	Share
Accelerated Negotiated	1,341	73	1268	5.44%
Accelerated Restricted	4,590	201	4389	4.38%
Award without publication	41,027	914	40113	2.23%
Competitive Dialogue	1,717	128	1589	7.45%
Negotiated with competition	47,144	2542	44602	5.39%
Negotiated without competition	32,962	2421	30541	7.34%
Open procedure	1,067,748	21558	1046190	2.02%
Restricted procedure	58,280	1770	56510	3.04%
Total	1,254,809	29607		2.36%

Lastly the patterns of different countries under exam in this dataset are presented below in Table 6 and Chart 3. If not considering the results for Liechtenstein (60% of cross-border awards over only 5 total awards), the three best countries are Luxembourg (35.45% over a total of 2,110 awards), Ireland (14.23% over 6,558) and Belgium (13.75% over 19,632). Ireland and Luxembourg are the countries showing the highest share also in the original study by Kutlina-Dimitrova and Lakatos.

In addition, we have many other countries far above the 2.36% average: Austria, Switzerland, Cyprus, Estonia, Denmark, Iceland, Malta and Norway are all above the 5% of direct cross-border awards. What they all have in common, as suggested in the Ramboll report, is the fact that all of them have a population below 10 million (except for Belgium, which has 11 millions), and half of them is even below 5 million. This could indicate a negative relationship between population and number of cross-border awards.

Chart 3 – Awarding Country and Cross-Border Shares years 2013 – 2015 (without Luxemburg and Liechtenstein)



6. Conclusions

International trade agreements are playing a major role in liberalising the free exchange of firms and products among countries with countless benefits for consumers. Despite the growing proliferation of such agreements, government purchases are not benefitting of similar levels of openness. Governments may exercise their power for distorting purchases in order to limit the entry of foreign firms. This is due to the fact that public procurement is in general subjected to opaque procedures and subjective decisions. Empirical evidence demonstrate that public

procurement is likely to be more distorted than other types of markets, and this is associated to the intrinsic “greyness” of government purchases.

This evidence highlights the importance of detecting overt and covert barriers to international public procurement markets from international traders’ point of view, even though this problem has attracted limited attention from academia. In this paper, we have reviewed three different approaches that can be alternatively used for detecting the extent of government international discrimination into procurement markets.

Each approach is characterized by opportunities and challenges. The import-elasticity is built upon the assumption that, without discrimination, countries’ imports and procurement spending should move in the same direction. A potential mismatch or null relationship between imports and public spending variations might be a signal of international discrimination in procurement markets, since it would mean that higher levels of procurement spending have not relied upon higher foreign supplies. This approach is very intuitive and easy to implement. However, this approach needs data at aggregate level for its implementation. Although aggregate data are easy to collect and elaborate, they may be not so accurate to provide a consistent estimation of discrimination in procurement markets. The inclusion of data coming from input-output tables may be, for instance, fundamental for obtaining a more comprehensive consideration of the international dimension of procurement markets, thus obtaining more reliable estimates of international discrimination.

The probability approach is certainly the most accurate method for estimating the extent of procurement barriers to international trade. It is based on the probability that a foreign firm wins a procurement contract and calculates what the determinants that may affect such probability are. Although very intuitive and precise, this methodology needs data at contract or bid level that may be difficult to obtain, especially in developing countries that do not own specific and accurate databases on their procurement activity.

We argue however that, when data are a serious challenge to the estimation procedures, a qualitative assessment of public procurement markets may be of some help in obtaining a measure of the extent of international discrimination. A qualitative assessment may be supported by an accurate assessment of regulation and trade laws that may highly affect the participation of foreign firms. Covert barriers may be identified through an in-depth analysis of “procurement habits” and tender documentation, along with surveys and questionnaires that

can be sent to procurement professionals for detailing the types of barriers foreign firms in the access to local procurement markets.

The decision over which approach to use ultimately depends on the type of data available. From one hand aggregate data are relatively easier to collect but may lack of precision in a number of respect (aggregate data cannot be used to disentangle between the effect of covert and overt barriers to public procurement markets). On the other hand, contract data are very difficult to obtain and manage, they rarely cover the universe of countries' procurement markets and only in some circumstances they are fully detailed to support consistent statistical analyses. We argue that the international trader should be aware of such important elements when approaching such kind of analysis and should correctly evaluate the nature of information at her disposal before exploring one research path rather than the other one. A qualitative assessment could be much more than a last chance, since a careful examination of a country's procurement system may much more informative than a careful statistical analysis supported by bad data.

In this regards, it would worth mentioning the important role played by governments and international institutions in developing better procurement dataset. We argue that more detailed and standardized databases, possibly with the inclusion of information on firms and tender characteristics, would be a necessary step for improving the methodological analysis of procurement barriers to international trade.

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