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Government agoraphobia: home bias in developing country procurement markets

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Discussion Paper

5/2016

Government Agoraphobia

Home Bias in Developing Country Procurement Markets

Alexandros Ragoussis

Government agoraphobia

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Abstract

In this paper, we present a novel set of facts on procurement openness to foreign goods and services across a large number of countries and years. In particular, we show that there is a U-shaped relationship between development levels and procurement openness, and argue that deviations in middle-income countries are associated with a distinct set of economic and institutional drivers. Besides depending on the availability of local alternatives, procurement openness in developing countries is closely associated with corruption control and decentralised governance structures. Using instrumental variables, we also demonstrate that trade agreements are not associated with convergence between private and public import intensities over time. The question of their effectiveness in middle and low-income countries thus remains open, as improvement in more fundamental institutional qualities appears to be key to minimising distortion.

Keywords: Government procurement; home bias; input-output tables

JEL Classification: F13; F14; H57

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Abbreviations

EU	European Union
GDP	Gross domestic product
GPA	Government Procurement Agreement
IO	Input-output
PPPD	Private-public purchase differential
PTA	Preferential Trade Agreement
RTA	Regional Trade Agreement
SME	Small and medium-sized enterprises
WTO	World Trade Organisation

1 Introduction

Textbook gains from trade do not distinguish between end-users: in theory, quality, price and variety gains apply in the same fashion to all consumers in the market. Yet not all end-users are equally open to foreign goods and services in practice. Demand-side heterogeneity has received little attention in the context of trade, with one notable exception – government consumption. The fact that governments demand a smaller share of foreign goods and services than might be expected by applying standard economic theory has been both known and studied for some time now.

Preferences, as conceptualised in economic theory in an exogenous manner, do not offer a convincing explanation for home bias in procurement. Governments' somewhat "agoraphobic" behaviour, i.e. their aversion to open international markets, has been attributed to a variety of factors. In addition to corruption control, which has received a fair amount of attention (see Laffont & Tirole, 1991; Burguet & Che, 2004; Compte, Lambert-Mogiliansky, & Verdier, 2005; Burguet & Perry, 2007), various legitimate motivations for the discriminatory treatment of foreign suppliers have been proposed. These include foregone tax revenue (Branco, 1994; Vagstadt, 1995; Weichenrieder, 2001); excess monitoring and the compliance burden in relation to foreign contracts (Rothenberg 1993); partial information on foreign firms' costs (McAfee & McMillan, 1989); all of which can indeed justify home bias in theory. The sheer magnitude of government expenditure has also instigated a stream of literature on the consequences of home-biased procurement, i.e. on whether discriminatory procurement practices translate into sizeable macro-economic effects (see Baldwin, 1970, 1984; Brulhart & Trionfetti, 2004; Shingal, 2011, 2015). The limited empirical evidence published to date suggests that this is indeed the case.

The policy debate often takes answers to these questions as given, thereby departing from the academic literature in many respects. The tension here is between retaining policy space for an array of government objectives on the one hand, and efficient public spending thwarted by the excessive market power of protected suppliers on the other (Evenett & Hoeckman, 2005; Dawar & Evenett, 2011). Based on scarce evidence, but also simply on liberal predilections, various policy instruments have been developed to open up procurement to trade. In addition to the pluri-lateral Government Procurement Agreement (GPA) adopted by the World Trade Organisation (WTO) in 1996, numerous commitments in the form of Preferential Trade Agreements (PTAs) have been signed since then (see Anderson, Muller, OseiLah, Pardo de Leon, & Pelletier, 2011) and guidelines issued by international organisations (Dawar & Evenett, 2011). WTO initiatives have always aimed explicitly at engaging developing countries in the process, even though there is hardly any evidence as to how open procurement markets actually are in developing countries, or how effective trade disciplines are in further opening up markets over time.

The objective of this paper is to fill this gap by seeking evidence on the latter two issues. Using internationally harmonised government expenditure data that have recently been published for a large number of countries and years, we demonstrate that procurement openness has a clear development dimension. In particular, there is a U-shaped relationship between levels of income and procurement openness, with large deviations occurring in middle-income countries. We also show that deviations in middle-income countries may be attributed largely to the fact that the public sector responds differently from private firms to a distinct set of economic and institutional drivers. Besides being linked to market size and

competitive pressure from local firms, procurement openness is also shown to be associated with corruption control and governance structures.

Regarding the effectiveness of trade disciplines in relation to procurement, we did not find any evidence of association over time with more outward-oriented public consumption. Engaging developing countries in these disciplines thus remains a questionable strategy. This is firstly because improvements in more fundamental aspects of government operations seem to be key in minimising distortions, and secondly, because these disciplines do not appear to have contributed to progress over time.

The rest of the paper is structured as follows. The next section sets the scene by discussing the arguments surrounding procurement liberalisation based on the economic and policy literature. Section 3 reviews the data and ways of measuring home bias, and also proposes testable hypotheses for developing countries. The econometric approach and results are discussed in section 4. A number of concluding remarks are presented in the final section.

2 Why liberalise government procurement?

Much ink has been split in the debate as to whether discriminatory procurement practices translate over time into discernible effects on welfare, industrial specialisation or the spatial organisation of production. Counter-intuitively, some early works suggested that discrimination may not matter on the whole as much as one would expect: home-biased government demand may induce private firms to prefer cheaper imports over expensive domestic products, thereby offsetting – at least partly – the effect of government preferences on aggregate trade and production patterns. This is the essence of Baldwin's so-called *neutrality proposition* (Baldwin 1970, 1984).¹ Yet the proposition does not manifest itself empirically, as the evidence points towards substantial aggregate effects of home bias. Where industrial specialisation is concerned, for example, Brulhart and Trionfetti (2004) show that home-biased procurement induces a significant “pull effect” in sectors where it applies, while also countering agglomeration forces in those sectors, thereby attenuating the overall degree of international specialisation (a process known as the “spread effect”).

The policy debate departs from these theoretical discussions in many respects. On the one hand, the need for preserving policy space for an array of government objectives such as income redistribution, industrial and regional development, support for SMEs and national security is regarded as a matter of great concern (see Dawar & Evenett, 2011). In fact, this was for many decades the primary rationale for excluding procurement from mainstream trade disciplines. At the other same, more pragmatic concerns about distortions and the cost of domestic protection are now gaining ground. There was early empirical support for these distortions: competitive procurement markets were shown to yield cost savings of around 20% (Domberger, Hall, & Ah Lik Lee, 1995), complementing various other

1 As discussed in subsequent studies (see Miyagiwa, 1991), the argument holds theoretically under some fairly intuitive conditions: product homogeneity, allowing substitutability between what the government and the private sector is consuming; a certain degree of competition, i.e. the absence of government monopsony; and evidently a volume of government demand that does not exceed the supply capacity of domestic firms.

estimates about the savings resulting from international tendering in certain countries (see Wang, 2011, on China). This value-for-money argument takes on a heightened importance in the context of budgetary constraints facing both industrialised and developing countries in equal measure. Dawar and Evenett (2011), for example, underscore the value of these savings for developing countries: if about 15% of national income is spent on goods and services procured by the government, a 10% saving is equivalent to 1.5 percent of the gross domestic product (GDP). This is a larger amount than the aggregate value of the aid received by many developing countries.

Efficiency and transparency in public procurement are fundamental to sound public service delivery. Yet policy arguments in favour of liberalisation extend beyond the effectiveness of government service provision. Opening up procurement markets is often part of a reciprocal process of liberalisation aimed at creating access to foreign procurement markets, business opportunities and a substantial growth potential for domestic exporters. From first principles, the magnitude of this growth potential outweighs the alternative presented by protected domestic markets. This does not apply solely to small economies. Liberalising procurement can also act as an incentive for foreign investment in sectors of great systemic importance such as infrastructure. In fact, this is an argument that has been receiving increasing attention in the context of sustainable development goals (Roberts 2014; UNEP 2012).

Why, then, is opening up procurement markets to foreign competition such a tough challenge for developing countries? Setting up an effective government procurement regime requires specialised institutional frameworks and expertise. For many developing countries, alternatives to uncompetitive procurement regimes are either too expensive or too sophisticated (Dawar & Evenett, 2011). Reforms introduced in the recent revision of the WTO's GPA Agreement have sought to address some of these difficulties. The reforms provide for special treatment for a considerable period after adherence, as well as more technical assistance in all implementation aspects, with the explicit objective of making the framework more appealing to developing countries.

According to many observers, however, a more fundamental barrier has yet to be overcome. This is a lack of confidence in the benefits of this process, especially when it comes to emerging powers. Wang (2011), for example, argues that Chinese exporters are not convinced that they will enjoy the benefits of reciprocity from accessing the GPA agreement, as European governments are likely to use national security arguments to constrain access to their procurement markets. In India, Chakravarthy and Dawar (2011) have argued that overcoming vested interests in procurement markets is a formidable challenge, whether or not it comes from adherence to trade agreements or simply observing common rules of law. It remains to be seen how successful this effort will be.

3 Data and hypotheses

Government procurement data typically refer to state spending on goods, services and public works. Spending on wages, pensions or property are not included in procurement figures, even though they may represent a substantial share of public expenditure.

Information on procurement expenditure is generally scarce and varies widely in terms of coverage. In particular, besides in terms of country and sectoral coverage, procurement data vary in two key dimensions. The first concerns the importance of contracts. Typically, regulations impose reporting requirements along with competitive tendering for contracts worth more than a certain threshold, which varies from one country to another. Comprehensive reporting applies only to spending above this threshold, while spending on lower-value contracts is reported only at high levels of aggregation in national accounts. The second dimension concerns the *who*: in principle, information on procurement expenditure covers not only central governments, but also sub-national entities, or state-owned enterprises. Nonetheless, the value of procurement contracts awarded by state-owned utilities is rarely made public. If these purchases are also accounted for (as is the case, for example, in Austria and the Czech Republic), the result is a substantial increase in the size of procurement markets.

Similarly, the sources of government expenditure data are limited. A source of detailed information on imports and domestic consumption by government bodies is the WTO Secretariat. This is because, under the GPA, members are required to submit procurement expenditure figures and related data to the relevant WTO committee. The signatories of the agreement consist almost exclusively of industrialised countries, of which only a handful have regularly submitted these data since the Uruguay Round.² Moreover, these submissions are not compiled in a uniform manner.³

National accounts are a more accessible source of information on government expenditure, input-output (IO) tables in particular. These are compiled to describe production-related interactions in detail, both within the national economy and with the rest of the world. Final demand matrices in these tables contain figures on spending by industrial sector, source and end-user, albeit only at a very aggregated level. IO tables have been used to assess procurement home bias (see Trionfetti, 2001; Riker, 2013), although their accuracy to this end has been contested. Compared with data submitted to the WTO, IO tables exclude public capital expenditure (reported in a separate category), but do cover all levels of government, and total expenditure (above and below thresholds). Taking Switzerland and Japan as examples, Shingal (2015) concludes that the differences between the two are not worrying, although no systematic comparison of government import intensities across sources has been published to date.

Despite the fact that IO tables have been compiled in the United States, Japan and Europe since the 1950s and 1960s, international comparisons have never been straightforward. This has changed over the past decade: there has been a revolution in input-output analysis

2 Namely, Canada, the European Union, Hong Kong, Japan, Norway and United States.

3 For example, Shingal (2015) claims that Norway and the United States employ a different classification system from the EU, Japan and Switzerland. Canada does not provide any information on the nationality of winning suppliers. Until very recently, Hong Kong's submissions were made available only to a restricted readership.

mainly thanks to applications that sought either to disentangle domestic and foreign value-added in trade flows, or to distinguish between the environmental impact of industrial activities undertaken in different countries (such as in the form of carbon emissions). The recent development of inter-country IO tables to this end (see UNCTAD, 2013, for a review) entailed harmonising national sources of data and balancing at a global level. A side benefit of this effort is the current availability of internationally harmonised government expenditure data for a very large number of countries and years.

As only a handful of developing countries are party to the GPA, and even fewer publish procurement data, IO tables stand out as the only source of data for studying the internationalisation of procurement in a development context. Of all the inter-country IO databases, we have chosen to focus on two: the OECD Inter-Country Input-Output Tables ('OECD-ICIO') and the Eora Multi-Region Input-Output database (henceforth referred to as 'Eora'; Lenzen, Moran, Kanemoto, & Geschke, 2013). Coverage is the single criterion on which this choice is based. A total of 61 countries are represented in OECD-ICIO over seven non-consecutive years, whereas 189 countries are represented in Eora, over 20 consecutive years.

The government consumption figures in the two databases are not entirely consistent with each other. As the raw input-output data at national level are assumed to be identical, differences can be attributed to the reconciliation methods used in constructing the databases.⁴ Eora uses national IO tables for only a subset of all countries (74) at various time intervals, and balances these while simultaneously imputing values for countries that do not have an IO table, using cross entropy methods. The advantage of the Eora database is that it has a wider country coverage, which is particularly useful for analysing government procurement in the developing and least developed countries. But this greater coverage has to be weighed against the pitfalls of using the data, some of which, in the case of developing countries, come from mathematical imputations.

In a comprehensive comparison of different value-added measures from three inter-country IOs (i.e. Eora, OECD-ICIO and the World Input-Output Database⁵), Kowalski, Lopez-Gonzalez, Ragoussis and Ugarte (2015) conclude that Eora is good at capturing national-level figures, although there are big inconsistencies with other sources at industry level. By contrast, the OECD-ICIO balancing procedure minimises deviations to actual trade flows at a sub-national level, and abstains from imputation over non-existing input-output data. As a result, OECD-ICIO offers a plausibly more reliable snapshot of procurement openness across sectors and countries, whereas the Eora offers the rich variation over countries and years that is needed for an econometric analysis of drivers and effects.

3.1 Measuring home bias in procurement

Import intensity, defined as the share of imports in total consumption, is the simplest of metrics reflecting the outward orientation of government spending. A comparison of import intensities of government and other end-users (i.e. households, firms and non-profit-making organisations) across countries reveals systematic deviations. In fact, a consistent ranking

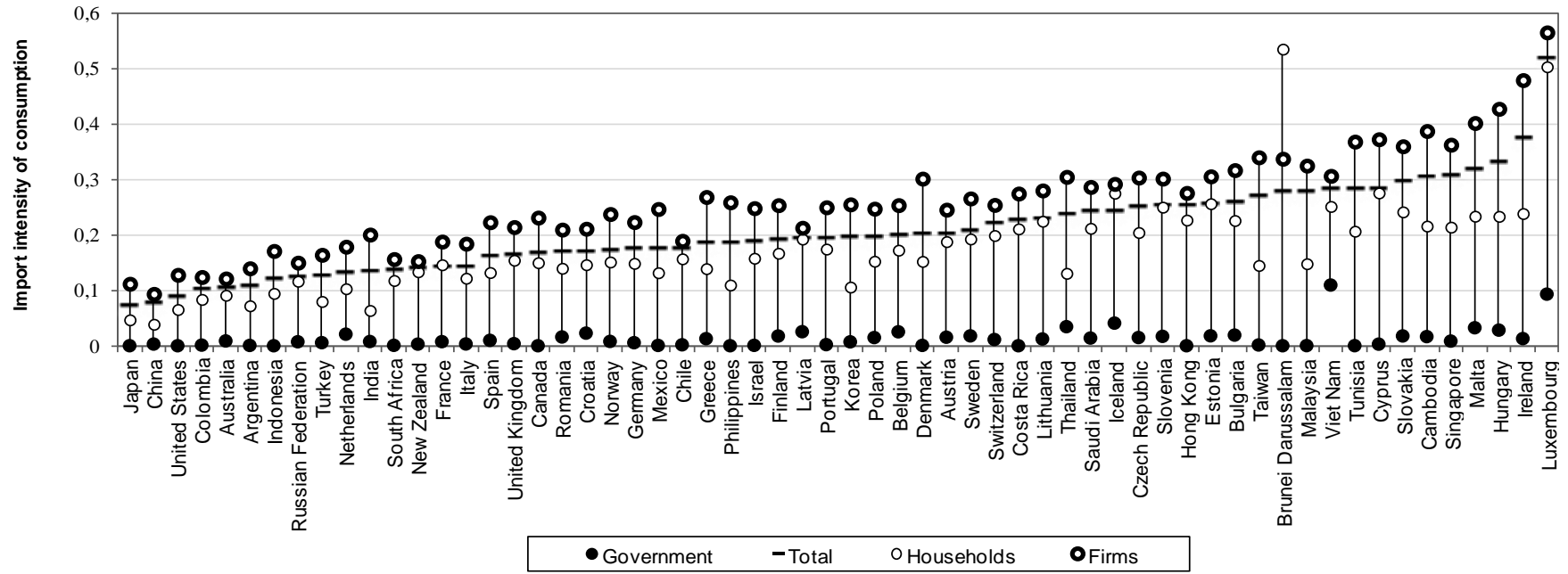
4 Eora relies on balancing aggregate macro-economic figures in national accounts, whereas the OECD-ICIO relies on balancing trade flows at sectoral level.

5 See Timmer, Dietzenbacher, Los, Stehrer, and de Vries (2015).

emerges: firms are more import-intensive than households, and firms and households are both more import-intensive than government (see Figure 1, which is based on OECD data). Intuitively, the premiums that profit- or utility-driven actors are prepared to pay for local products are lower than those applying to households, which are in turn lower than those that the government is prepared to pay.

Nonetheless, there is substantial variation across countries in government import intensities. For example, large European countries with comparable levels of development and facing broadly similar regulatory constraints exhibit strikingly different levels of openness: the French government imports twice as much as the UK government. No clear pattern emerges at a global level. The characteristics of countries whose governments have a high import intensity lie in a very wide spectrum.

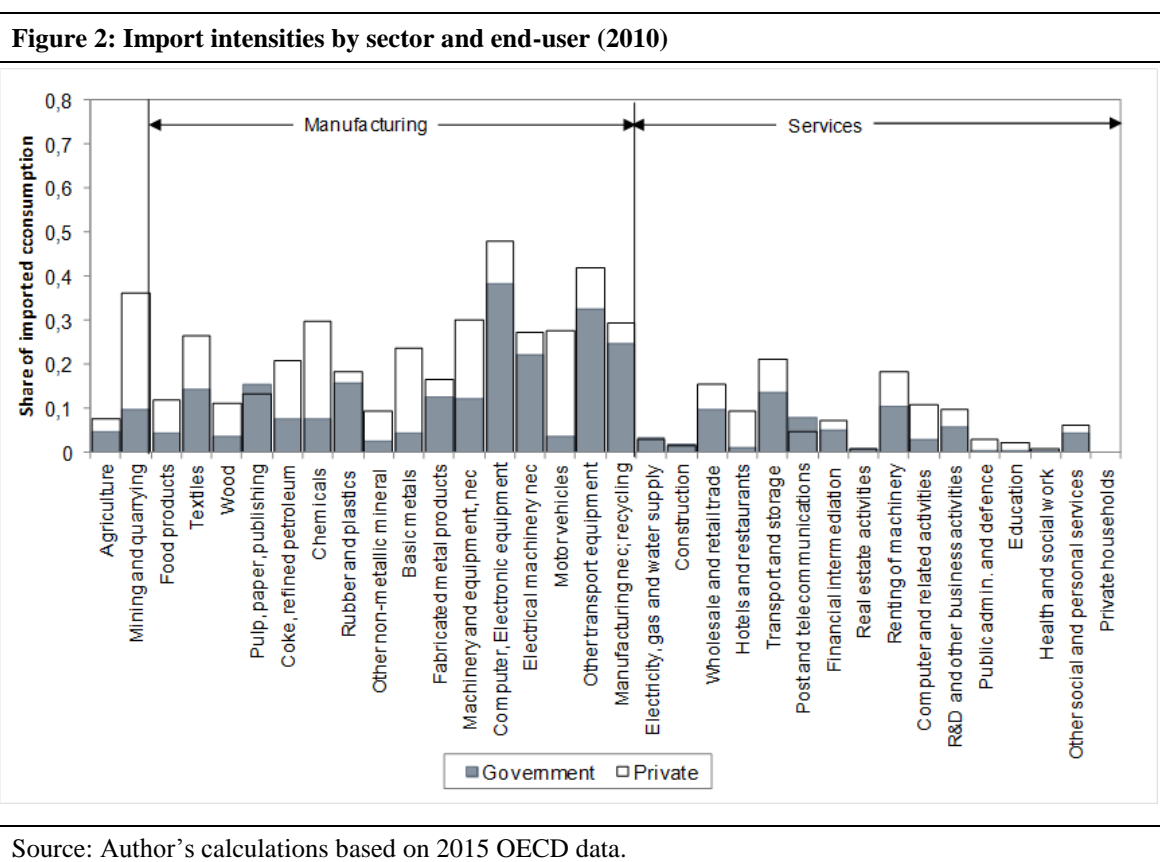
Figure 1: Import intensities by country and end-user (2010)



Source: Author's calculations based on 2015 OECD ICIO data.

A critical issue with the aggregation of import intensities at country level is the fact that *what* the government purchases may influence *where* the supplies in question are purchased from. In other words, because the government is active in sectors that are less tradable, and because the mix of goods and services that governments purchase is not identical, the aggregate import intensity may actually differ for structural rather than “behavioural” reasons. Government import intensities at the industry level confirm the existence of wide variation (see Figure 2) in this dimension, probably significantly wider in fact than across countries.

Scale and industrial specialisation may have a role to play in shaping these patterns. For example, while neither the government nor the private sector is an intensive user of foreign suppliers of construction services, the government purchases a significantly larger share of such services from abroad. This is probably explained by the scale of government projects: local firms tend to be too small to build airports or motorways, so they tend to focus on housing projects that are in high demand in the private sector. The unavailability of domestically produced specialist goods, such as computers, is also a probable explanation for import intensities that do not deviate across end-users. On the other hand, there is an opposite pattern in sectors such as food products, hotels and restaurants, and road transport, where local provision abounds in every country: the government tends to be much less import-intensive on average than the private sector.



In an effort to internalise more structural drivers of import intensities at country and sectoral levels and building conceptually on Baldwin (1970, 1984), Shingal (2011) proposes a simple counterfactual for measuring home bias in procurement. The measure involves simulating the effect of private-sector importing practices on public purchasing decisions. By projecting private-sector import intensities onto total government procurement in each sector, we can estimate the level of foreign procurement, had the government chosen foreign suppliers with the same intensity as private firms. The difference with the actual level of foreign procurement in each sector yields a differential known as the private-public purchase differential (PPPD), which is then aggregated at country level with the aid of the following formula:

$$PPPD_{it} = \frac{\sum_k \left(p_{ikt}^* - \frac{c_{ikt}^*}{C_{ikt}} P_{ikt} \right)}{\sum_k P_{ikt}} \in [0,1]$$

where i , k and t stand for countries, sectors and years respectively; total government consumption P_{ikt} is the sum of p_{ikt} and p_{ikt}^* , the value of domestic and foreign goods and services respectively; total private consumption C_{ikt} is the sum of c_{ikt} and c_{ikt}^* , domestic and foreign private consumption respectively.

Intuitively, the term $(c_{ikt}^*/C_{ikt})P_{ikt}$ represents the level of foreign procurement that would have been undertaken by the government had it chosen suppliers in a similar fashion to private firms. The difference between this counterfactual and the actual level of imports in government consumption p_{ikt}^* is aggregated across sectors (k) to yield a single value for each country (i).

It is worth noting that, across countries, the counterfactual lies exclusively in a negative range with only a few exceptions, confirming the magnitude of home bias in government consumption relative to all other users (see Figure 3 on an inverse scale for countries reporting IO tables in Eora). Moreover, large middle-income economies such as China, India and Brazil stand out as having high levels of bias, along with Thailand, Vietnam, Romania, Ukraine, Colombia, Spain and Greece. The development dimension of procurement openness is therefore less ambiguous once the structural drivers have been netted out.

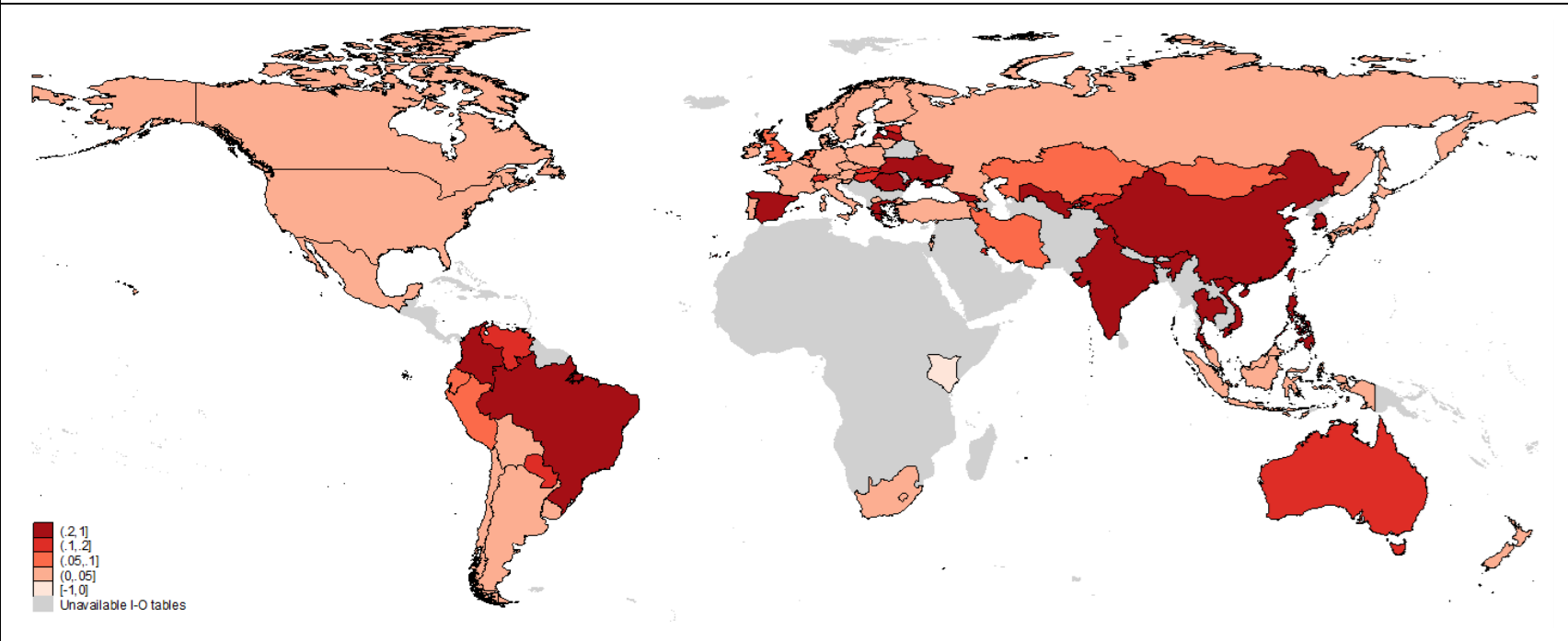
3.2 Hypotheses

A number of interesting hypotheses may be formulated about drivers of procurement home bias based on descriptive statistics. In this paper, we motivate two.

Hypothesis 1: *The propensity to discriminate in government procurement is maximised at intermediate levels of development.*

Development can affect the orientation of procurement via two channels. The first relates to the quality of institutions: theory suggests that the level of corruption, the opaque management of public funds and political clientelism strengthen home bias in procurement (Elinder & Jordahl, 2013; Hessami, 2014). Governments of developing countries that score low on institutional quality are thus likely to be less open to foreign suppliers. Concurrently, theory suggests a number of reasons why governments of countries at lower levels of development should rely more on imported goods and services:

Figure 3: Home bias by country (public-private purchase differentials on an inverse scale, 2010)



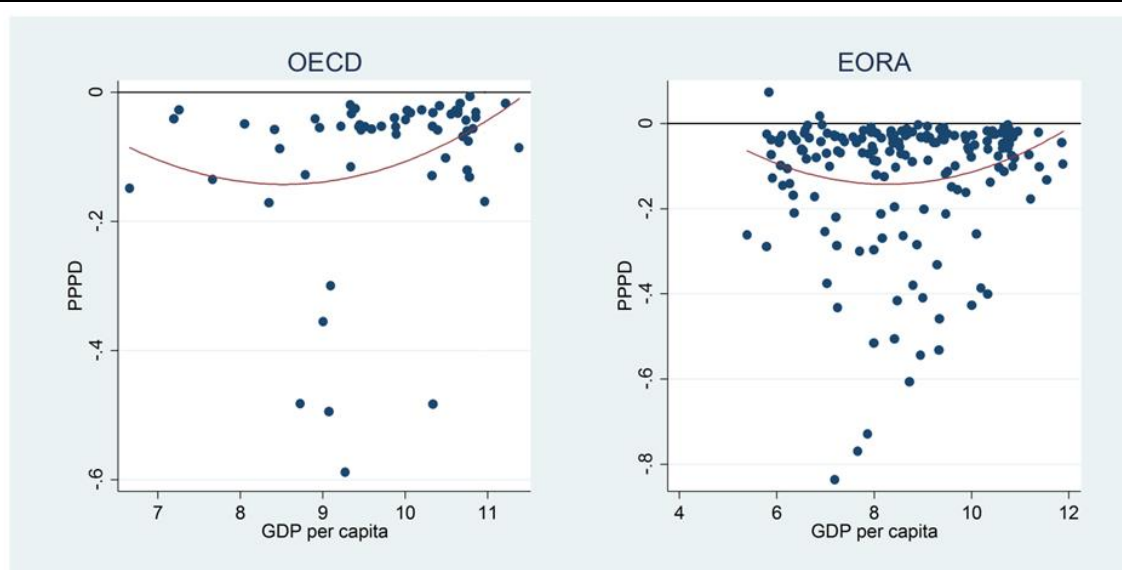
In order to enhance the reliability of estimates, only those 74 countries whose national input-output tables have been used for the compilation of Eora are reported on the map.

Source: Author's calculations based on 2014 Eora data.

(i) fewer alternatives are available in developing countries in terms of specialist manufacturing output and services; this is an observation that dates back to Kuznets (1966);⁶ (ii) budgetary constraints do not allow generous spending on premiums for domestic goods and services; (iii) tied-aid practices impose foreign import requirements in return for financial support. Although this is a practice that has generated a fair amount of controversy over the years, it still persists (Clay, Geddes, & Natali, 2009).

Among developing countries, the governments of least-developed countries face tighter constraints in terms of the availability of domestic alternatives, budget and conditional development aid. All three of these substantially limit the margin for home bias. By contrast, there is greater scope for deviation in middle-income countries, where domestic industrial output is on the rise, along with the associated lobbying pressures, and the government budget is subject to fewer constraints. For this reason, one would expect to see a non-linear relationship between the level of development and home bias in procurement. In fact, plotting home bias against levels of development produces a curve of the expected shape in both in OECD-ICIO and the Eora datasets, warranting further empirical research (see Figure 4).

Figure 4: Home bias and level of income (2010)



Source: Author's calculations based on 2015 OECD data and 2014 Eora data.

Hypothesis 2: *Trade agreements are an effective means of procurement internationalisation over time.*

The question of the direction of causality between trade agreements and their presumed effects is an old one, with numerous interpretations of empirical trends (see Ghosh & Yamarik, 2004; Romalis, 2007). Trade agreements reduce costs that may, in turn, cause

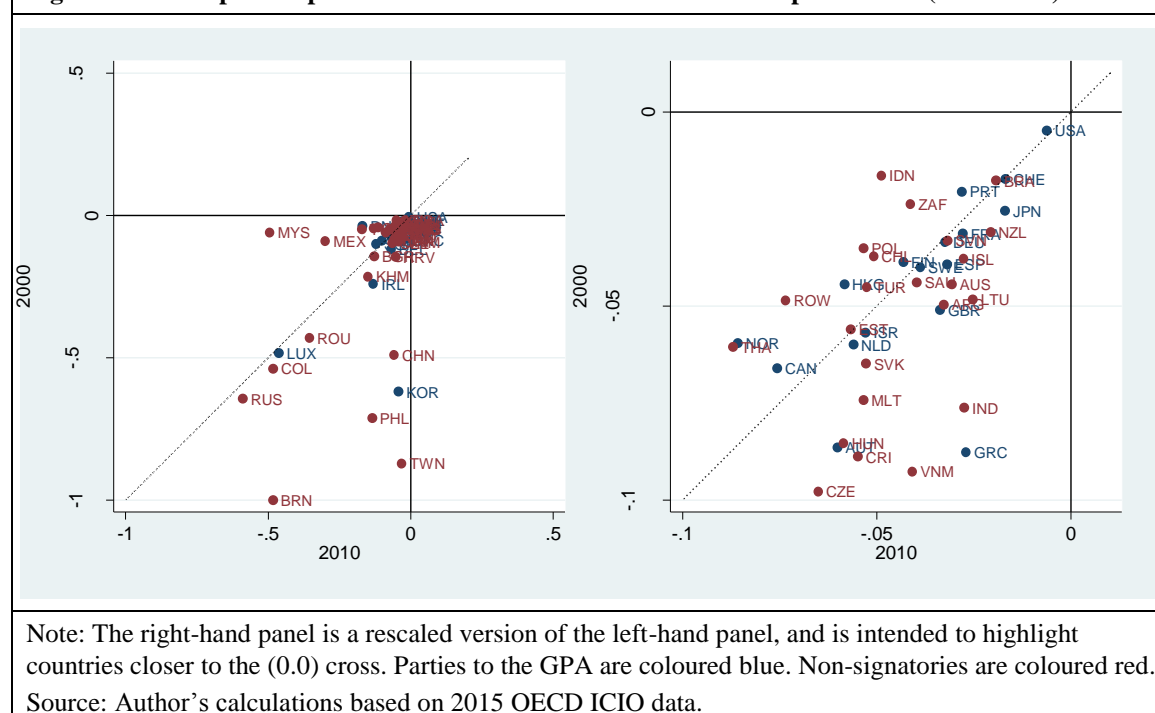
6 Kuznets argued that structural diversification evolves substantially at different stages of development. He identified a U-shaped relationship between diversification and income, which can be used to argue that, as countries move to middle-income status, more local alternatives generally become available.

private firms to trade more. At the same time, trade puts pressure on governments to eliminate barriers.

The situation is different in the case of government procurement, since the government that signs the agreement is the actual consumer. In other words, there is no principal-agent relationship between the government and the importer/exporter. A government that consumes a certain volume of foreign goods and services will make commitments at the appropriate level on the regulatory front, representing itself only. Moreover, exporters' pressure to secure market access abroad will be less effective, since the cost of signing up to agreements will be borne primarily by the government.

In the short run, causality may thus run strongly from the government's actual openness to the regulatory framework, an issue that needs to be addressed appropriately from an econometric viewpoint. In the long run, however, government priorities change, as do production structures and dynamics. Past commitments may turn into potential constraints for governments that wish to grant preferences to domestic producers. Hence, it is eventually in the longer run that the effectiveness of the standstill provisions in the area of procurement may be more pronounced. The question becomes essentially a dynamic one; i.e. whether or not trade disciplines are associated with an *improvement* in procurement openness over time.

Figure 5: Public-private purchase differential and GPA membership over time (2000-2010)



The stagnating level of GPA commitments over the past decades suggests this is not the case, a hypothesis that is supported by descriptive statistics. In Figure 5 (where the 45-degree line represents parity between the level of home bias observed in 2000, a few years after the GPA came into force, and ten years later), the GPA signatories lie on both sides of the panel. The figure suggests that the agreement has not prevented setbacks over time, and that impressive progress has also been achieved outside the agreement. More thorough empirical research would certainly be warranted.

4 Econometric approach

The variable we focus on in our econometric specifications is the private-public purchase differential at country level, i.e. the cumulative difference across sectors between the actual value of foreign procurement and the counterfactual level, had the government chosen foreign suppliers with the same intensity as private-sector firms. The aim of these estimates is to assess the sensitivity of government consumption patterns to a set of drivers that are relevant to the two hypotheses discussed above, taken from both the trade and the political economy literature.

The interpretation of coefficients in a regression with the PPPD differential as a dependent variable has a key particularity: contrary to estimates with import intensities, a variable will be statistically insignificant if its effect across governments and the private sector is uniform. Moreover, given that PPPDs lie almost exclusively on the negative scale, a significantly positive coefficient may be interpreted as an association of the driver with narrowing of the PPPD in absolute terms, while a significantly negative coefficient is associated with a greater gap between the two.

The econometric specification follows the basic linear unobserved effects setting:

$$PPPD_{it} = \alpha + \mathbf{x}_{it}\beta + c_i + d_t + \varepsilon_{it}$$

where $PPPD_{it}$ is the purchase differential observed in country i in year t ; c_i and d_t are country and year unobserved effects; \mathbf{x}_{it} is the vector of core country controls, including GDP and the total value of procurement, capturing market size and government consumption respectively; GDP per capita, capturing the level of development; productivity, capturing the availability of domestic alternatives; as well as the real effective exchange rate as an index of currency strength.

Additional variables are added sequentially to control for institutional quality (index for control of corruption), political cycles (years left for the national government's term of office, authority for expenditure delegated to local governments), as well as procurement trade disciplines (GPA membership; intensity of PTAs with provisions similar to the GPA). External conditions such as the country's remoteness, size and volume of supplies from foreign partners are controlled for largely through the country and year fixed effects. A full description of sources and descriptive statistics of the explanatory variables is given in Table 3 in the Appendix.

Addressing endogeneity concerns

A typical problem in equations of this type is endogeneity of the right-hand side variables, i.e. potential correlations with the error term that induces bias and inconsistency in estimates of coefficients. Of all regressors, the exogeneity of GPA membership is particularly important given the focus of our paper.

Endogeneity often arises for one of three reasons: omitted variables, measurement error, and simultaneity. Using PPPDs as our dependent variable instead of simply government import intensities remedies partly the problem of omitted variables. The advantage of PPPDs is that the effect of regressors with a similar bearing on public and private

purchase decisions, omitted or not, is netted out by differencing between private and public intensities. The effect of time-invariant omitted variables is also eliminated by including country fixed effects. However, since a large part of the Eora database has been mathematically imputed, the risk of systematic measurement error remains large. In order to reduce this risk, regressions are performed and reported only for the sub-sample of 74 countries whose national I-O tables were used in compiling Eora.

Of the three causes of endogeneity, simultaneity is particularly challenging in the case of the GPA. As already mentioned, the voluntary nature of the commitments does not allow a clear identification of the effect of GPA membership on procurement openness, since causation also runs from actual openness to relevant commitments. Such identification can be achieved only by means of instrumental variable (IV) estimation.

We use European Union (EU) membership as a binary instrument for GPA membership. In a two-stage regression, this yields what is known as a *Wald* or *grouping* estimator. Conceptually, this particular instrument has many advantages. It is valid because, arguably, a country's decision to join the EU is not directly related to procurement openness. Other political, geostrategic and financial arguments have dominated the debates over EU accession in candidate countries. Yet countries that accede to the EU are obliged to implement the GPA. EU and GPA membership are thus closely correlated, making the instrument an informative one: EU accession affects procurement openness indirectly rather than directly, via GPA membership. That has applied to all new members during the 2004 and 2007 enlargements. The relevance and strength of the instrument is confirmed by the high values of both the Cragg-Donald Wald F statistic and the Kleibergen-Paap Wald F statistic.

Tables 1 and 2 illustrate the coefficients from the estimations over the pooled sample and sub-samples by income group respectively. The last column in Table 1 (2SLS) presents coefficients of the second stage IV regression using EU membership as an instrument for GPA membership.

Patterns in pooled sample

There are four key messages from the results, as shown in Table 1. First, the fact that several regressors stand out with coefficients significantly different than zero shows that the government does indeed exhibit distinct consumption patterns explained by core drivers of imports. More specifically, the results suggest that the volume of domestic supply narrows the differential between government and private import intensity, while the productivity of domestic producers widens it. Both these variables reflect, roughly, the availability of domestic alternatives to imports.

The relationships make intuitive sense. Import intensities of all agents are expected to fall with the rise in the volume and productivity of domestic supply. Yet the gap between private and public import intensities could move in different directions if the government does not respond in the same fashion to the stimuli. Our results underscore that this is indeed the case. Private firms seem less responsive to the volume of domestic alternatives than the government: a rise in the GDP is associated with a widening of the differential between private and public import intensities. At the same time, the productivity of domestic suppliers is associated with cost and quality advantages to which private firms are

arguably more sensitive. Public import intensity shrinks with domestic productivity less than private import intensity; private firms do not have to contend with any political import constraints in the absence of domestic alternatives. The gap between the two import intensities narrows in that case. Governments are also likely to be less sensitive to fluctuations in currency values, given the relatively large reserves of foreign currencies they hold relative to private market actors. These simple intuitions show up with the expected signs in the PPPDs.

The second message to highlight is that PPPD patterns vary substantially along the income distribution. The negative coefficient on per capita income shows that, as the level of development rises, the differential between the private and public sectors widens. The relationship is non-linear, as is illustrated by the negative coefficient on the squared per capita income. It is worth noting, however, that the sign of the squared term in a fully concave curve is expected to be positive. Thus, the observed deviation in middle-income countries (see Figure 4) is explained largely by variation in factors other than the level of development.

Thirdly, additional regressors added sequentially offer a number of further insights. First, institutional quality seems to matter: the index for control of corruption appears to be associated with a narrowing of the gap between public and private import intensity. Political cycles do not appear to explain variation in the aggregate sample; delegating financial authority to local governments does. What this variable reflects is stronger linkages between local suppliers and local governments, inducing pressure for preferential treatment and producing a wider gap between public and private import intensities.

Lastly, procurement trade disciplines, such as GPA membership or the inclusion in Regional Trade Agreements (RTAs) of provisions similar to those of the GPA, are not associated with convergence between private and government sector import intensities. Indeed, the opposite is actually suggested by the sign and significance of the estimated coefficient on membership to the agreement. Our instrumental variable regression confirms an effect in the opposite direction.

This counter-intuitive result could potentially reflect two things:

- (i) there is no systematic re-orientation of own procurement post-accession. Governments may sign up primarily to secure private exporters' access to foreign procurement markets, and/or
- (ii) progress in opening up procurement markets has been more pronounced outside the agreement.

Both point towards a clear need to evaluate, first, the effectiveness of the specific content of procurement disciplines and, second, the implementation of disciplines across procurement markets of varying characteristics. These two areas were in fact extensively discussed during the recent reform of the GPA, which now includes new provisions along these lines.

Table 1: EORA: OLS (ordinary least square) coefficients on PPPDs							
	I	II	III	IV	V	VI	2SLS
GDP (log)	0.046*** (0.012)	0.050*** (0.013)	0.049*** (0.013)	0.005 (0.020)	0.038*** (0.013)	0.057*** (0.013)	0.037*** (0.011)
GDP per capita	-0.001*** (0.000)	0.000 (0.000)	0.000 (0.000)	-0.001** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.001*** (0.000)
Total procurement	0.017*** (0.004)	0.015*** (0.005)	0.016*** (0.005)	0.027** (0.011)	0.018*** (0.005)	0.018*** (0.005)	0.002 (0.004)
Labour productivity (<i>t</i> -1)	-0.344** (0.175)	-0.539*** (0.171)	-0.575*** (0.171)	-0.828*** (0.274)	-0.042 (0.178)	-0.183 (0.171)	-0.136 (0.212)
Real effective exchange rate	0.000 (0.011)	-0.000 (0.012)	-0.003 (0.013)	-0.068 (0.098)	-0.003 (0.013)	-0.051** (0.025)	0.023 (0.026)
GDP per capita ^ 2		-0.000*** (0.000)	-0.000*** (0.000)				
Control of corruption (index)			0.012*** (0.004)	0.013* (0.007)	0.012*** (0.004)	0.008** (0.003)	0.011*** (0.003)
Remaining number of years in government's term of office				0.001 (0.001)			
Authority delegated to local governments				-0.061*** (0.014)			
GPA membership					-0.009** (0.003)	-0.011*** (0.004)	-0.015*** (0.003)
GPA membership (in years from date of signature)					-0.001 (0.000)		
RTA procurement provisions (coverage)						0.000 (0.008)	-0.004 (0.005)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1102	1102	1085	450	1085	962	962
R ²	0.990	0.990	0.990	0.994	0.990	0.993	
<p>Note: Given that PPPDs lie almost exclusively on the negative scale, a positive coefficient can be interpreted as an association of the driver with a narrowing of the PPPD in absolute terms, whereas a negative coefficient is associated with a greater gap between the two.</p> <p>* Significant at 10%.</p> <p>** Significant at 5%.</p> <p>*** Significant at 1%.</p> <p>Source: Author's calculations.</p>							

Different responses across income groups

In order to assess the responses of the PPPDs to drivers of imports across different income groups, we repeated the estimation over three sub-samples of high-income, upper middle-income and lower middle-income countries, in accordance with the standard World Bank classification. The Eora sample includes a number of low-income countries, but none with non-imputed input-output tables. The last income category is therefore excluded from the estimations, despite its high relevance from a development perspective.

The results, as presented in Table 2, underscore the development dimension of drivers across countries, an aspect that has thus far been neglected. Three points are worth noting.

1. Firstly, PPPDs in upper and low middle-income countries exhibit different sensitivities to market size, lending support to some of our core narratives. A smaller market size induces pressure for preferential treatment. However, lower income governments are less responsive to this pressure, given their limited fiscal space.
2. Varying levels of corruption in the same group explain the significant amount of variation in procurement openness; again, this is a fairly intuitive as well as distinct pattern. The delegation of financial authority to local governments is associated with greater home bias in upper middle-income countries, whereas there is no significant correlation in high-income countries.
3. Lastly, pluri-lateral trade disciplines are associated with setbacks rather than progress in terms of opening up procurement in high-income countries. Rather than pointing to the ineffectiveness of the disciplines as such, the results may point to the systematic abstention of countries that have opened up substantially over the past decades. The effectiveness of the disciplines as such in a developing country context remains, hence, an open question.

Overall, the availability of domestic alternatives (depending on factors such as market size and productivity) appears to drive procurement openness in high-income countries, while the control of corruption and macro-economic volatility appear to be the drivers at the other end of the development spectrum. In between the two, i.e. in upper-middle income countries, both sets of broad drivers play a role, with governance structure (and in particular the delegation of authority for spending to local governments) playing a more pronounced role.

	High-income				Upper-middle income			Lower-middle income		
	I	II	III	IV	I	II	III	I	II	III
GDP (log)	0.045** (0.020)	0.075*** (0.027)	0.041* (0.021)	0.024 (0.016)	0.113*** (0.040)	0.034 (0.121)	0.137*** (0.041)	-0.039** (0.018)	-0.098 (0.153)	-0.033* (0.017)
GDP per capita	0.001*** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	0.042** (0.017)	0.008 (0.007)	0.014** (0.006)	0.019 (0.021)	-0.009 (0.032)	0.003 (0.007)
Total procurement	0.013 (0.009)	0.017 (0.013)	0.021** (0.009)	0.023** (0.009)	-0.034 (0.029)	-0.031 (0.041)	-0.008 (0.021)	0.007 (0.005)	0.031 (0.050)	0.009** (0.005)
Labour productivity (<i>t</i> -1)	-0.459*** (0.159)	-1.163*** (0.341)	-0.198 (0.187)	-0.094 (0.168)	-1.454 (1.154)	-3.549* (2.083)	-1.729 (1.115)	0.954 (1.638)	-6.705 (6.260)	1.123 (1.645)
Real effective exchange rate	-0.130 (0.083)	0.043 (0.126)	-0.114 (0.079)	-0.125 (0.091)	0.053** (0.024)	0.203 (0.516)	0.040** (0.020)	-0.142*** (0.024)	-0.913* (0.453)	-0.132*** (0.021)
GDP per capita ^ 2	-0.000*** (0.000)				-0.002* (0.001)			-0.003 (0.004)		
Control of corruption (index)	0.007 (0.005)	0.013 (0.010)	0.006 (0.005)	0.006 (0.004)	0.019 (0.012)	-0.037 (0.033)	0.028** (0.013)	0.015** (0.006)	0.060* (0.030)	0.016*** (0.005)
Remaining number of years in government's term of office	0.000 (0.001)				0.001 (0.003)			0.000 (0.001)		
Authority delegated to local governments	-0.093*** (0.024)				-0.474* (0.276)			- -		
GPA membership	-0.005** (0.002)				-0.008*** (0.003)			- -		
GPA membership (in years from date of signature)	-0.000 (0.000)				- -			- -		
RTA procurement provisions (coverage)	0.009 (0.009)				- -			- -		
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	677	313	677	602	221	85	221	187	52	187
R ²	0.981	0.982	0.981	0.988	0.982	0.993	0.982	0.998	0.998	0.998

* Significant at 10%, ** Significant at 5%, *** Significant at 1%.
Source: Author's calculations.

5 Concluding remarks

Discipline in government procurement, in the form of either commitments to trading partners or procedures that set store by competitive tendering, transparency and the rule of law, is not a given for developing countries. This study contributes to our understanding of the challenge of opening up the procurement markets of countries at different stages of development, via two channels.

First, we show that not all developing country procurement markets are less open than those in industrialised countries. Home bias in procurement is stronger in middle-income countries, where there is greater scope for deviation due to both institutional failures and a growing pie. These are two fairly intuitive conditions for extensive discrimination. Institutional failures are not likely to be fully offset by commitments to trading partners. Openness in procurement is more likely to be a side effect of transparent institutions, evidence-based policy-making and service-oriented government operations than an international regulatory framework. The adoption of best practices, such as the evaluation of alternative instruments for reaching government objectives that would justify discrimination, is feasible only if institutional quality reaches a certain minimum level.

Second, where institutional quality does indeed reach a certain minimum level in the process of industrialisation, the study shows that trade commitments are not associated with discernible differences over time in procurement openness. The evidence presented in this paper may be used to question the strategy of engaging middle and low-income open economies in these disciplines, as was witnessed during the recent revision of the GPA. In the process of industrialisation, the improvement of more fundamental aspects of government operation would appear to be key to minimising the distortion.

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Variable	Source	Mean	Min.	Median	Max.	# Obs	Description
PPPD	2014 EORA data	-0.176	-0.858	-0.055	0.161	1460	Difference between the actual value of foreign procurement and the value that would have resulted if the government had imported with the same intensity as the private sector. Sectoral differences are aggregated at country level (see equation 1 in the main text.).
GDP (log)	World Development Indicators (World Bank), 2015	25.366	20.594	25.587	30.247	1390	Logarithm (gross domestic product (in 2005 US dollars)). Source of nominal exchange rates: IMF.
GDP per capita	World Development Indicators (World Bank), 2015	14.236	0.098	7.042	112.477	1401	Gross domestic product in thousands of 2005 US dollars, per head of population.
GDP per capita ^ 2	World Development Indicators (World Bank), 2015	451.281	0.010	49.590	12.651	1401	As above, squared.
Total procurement	2014 EORA data	16.396	10.733	16.606	21.596	1460	Aggregate value of government consumption in all sectors (in thousands of US dollars at nominal exchange rate).
Labour productivity	The Conference Board: Total Economy Database™, May 2015	0.051	0.003	0.046	0.161	1273	Labour productivity per person employed in 2014, in thousands of US dollars (converted into 2014 prices with updated 2011 PPPs).
Remaining number of years in government's term of office	World Bank: Database of Political Institutions, 2012	1.870	0	2	6	1322	A zero is scored in an election year, and n+1 is scored in the year after an election, where n is the duration of the term of office. In countries where early elections may be called, the variable is set at the <i>de jure</i> limit of the term of office or election schedule, but is reset in the event of early elections.
Authority delegated to local governments	World Bank: Database of Political Institutions, 2012	0.708	0	1	1	545	Does a state or province have authority to tax, spend or legislate? A 1 is allocated if any of these applies. Responsibility for "cultural affairs", or "planning" in Communist systems, does not qualify.
Control of corruption (Index)	World Bank: Worldwide Governance Indicators, 2014	0.500	-3.22	0.44	2.59	1440	Index capturing enterprise, citizen and expert survey respondents' perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption (see Kauffman, Kraay, & Mastruzzi, 2010), as well as "capture" of the state by elites and private interests. Linear interpolation or extrapolation of results for missing years. The indicator is reported in its standard normal unit, ranging from approximately -2.5 to 2.5, with higher values corresponding to better outcomes.
GPA membership	2015 WTO data	0.268	0	0	1	1460	Binary indicator of membership.
GPA membership (in years from date of signature)	Author's calculations based on 2015 WTO data	1.564	0	0	13	1460	Number of years from the date on which the country in question signed the agreement.
RTA procurement provisions (coverage)	Author's calculations based on Anderson et al. (2011)	0.010	0	0	0.11017	1077	Compilation by Anderson et al. (2011) of bilateral trade agreements containing provisions similar to the GPA. Bilateral binary indicators are weighted using trade potential for each country pair, i.e. fitted values of a standard gravity equation, and subsequently aggregated at country level (see note 1).

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