The Effect of the Number of Special Interest Groups on Total Factor Productivity Growth: An Investigation of Advanced and Developing Countries from 1995 to 2007[1]

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Abstract

The work of Olson suggests that the activities of special interest groups (SIG's) have a negative effect on a country's total factor productivity growth due to institutional sclerosis (Olson, 1965; 1982). There is a limited amount of research on this relationship, with Coates et al (2011) being the first to investigate the link. This paper up-dates their work and answers their call for exploration into sectoral level effects. There are five main conclusions. First, Olson (1982) suggests that in addition to engaging in activities that lead to destructive effects, special interest groups may also perform functions that enhance productivity. Therefore, in testing their effects on productivity one is looking at net effects to see whether or not the destructive outweigh the enhancing effects. Second, by using count data on the number of trade associations from Saur's World Guide to Trade Associations (which has been the main source used in the literature), it is necessary to make the questionable 'act of faith' that higher numbers indicate greater strength. Third, due to the problem of double-counting in Saur's Guide we argue that the analysis should be confined to the 1995, 1999 and 2002 editions. Fourth, we find that for 67 advanced and developing countries the net effect of numbers of trade associations per capita in 1995; 1999 and 2002 on the subsequent growth of TFP from 1995-99; 1999-2002 and 2002-07 is positive. Finally, the paper uncovers interesting results that suggest that the net effect of greater numbers of trade associations per capita in industry on the growth in TFP, is negative. Future research in this area should involve a move away from studies of large number of countries and time periods such as this, to more focussed and detailed analysis of individual countries and industries.

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[1] This paper has been accepted for the WINIR Conference (http://winir.org/) in Boston, USA from 2-4Sept 2016.

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[3] The authors would like to sincerely thank Jac Heckelman for sharing trade association counts from Saur's Guide and other data with us. Thanks also to John Eakins and Robert Butler for their advice.

1. Introduction

This paper looks at the relationship between the number of trade associations, which is used as a measure of activity by special interest groups (Olson, 1965; 1982), and total factor productivity (henceforth TFP) growth among advanced and developing countries.[4]

There has been considerable recent interest in the destructive role of special interest groups in the recent crisis. For example, Igan et al (2011) suggest that the influence of interest groups on government decision making was one of the causes. Similarly, O'Leary (2015) concludes that failure to resist the destructive effects of lobbies resulted in Ireland's deepest recession starting in 2008, and indeed has been a key factor in explaining its serial under-performance since 1970.

This paper adds to this debate. It contributes to the literature by:

(i) Re-evaluating Olson's hypothesis that the activities of special interest groups have a negative effect on productivity growth.

(ii) Drawing attention to some limitations from using count data from *Saur's World Guide to Trade Associations* (1985; 1995; 1999; 2002) (henceforth referred to as the *Guide*), which has been the main data source used by many studies.

(iii) Answering the call from Coates et al (2011) to include a more detailed investigation of the sectoral composition of trade associations from the *Guide*, and

(iv) Up-dating the literature by using later editions of the *Guide* for 1999 and 2002.

The paper is structured as follows. The next section looks at the theory of special interest groups and productivity growth as outlined in Olson (1965; 1982). This is followed by a discussion on the appropriateness of using the data on trade associations from the *Guide* to measure special interest groups. Section 4 presents the models to be estimated and the hypotheses to be tested. In sections 5 and 6 respectively, descriptive statistics and results are presented and discussed. The final section concludes and suggests an agenda for future research.

2. The theory of special interest groups and productivity growth

Following the work of Olson (1965, 1982), a number of studies have investigated the relationship between the number of special interest groups (SIG's) and economic growth (Gray and Lowery, 1988; Heckelman, 2000 and Horgos and Zimmermann, 2009). The focus of this paper is on the relationship between the number of SIG's and TFP growth. Coates et al (2011) is the only paper that investigates this relationship, which following Olson (1965; 1982) is hypothesized to be negative.

Olson defined a SIG as including professional associations, labour unions, trade associations or oligopolistic cartels (1982: 44)[5]. Following Murrell (1984), SIG's may be considered as non-governmental organizations that engage in collective action in pursuit of 'goods' which are, to some degree, non-excludable and non-rival. SIG's represent economic agents who undertake a

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[4] Appendix 1 contains a list of the countries included, classified into advanced and developing based on the IMF classification (see http://www.imf.org/external/pubs/ft/weo/2016/01/weodata/weoselagr.aspx#a110).

[5] Interestingly, Olson also included corporations in his analysis of special interest groups (1965:6). However, this is a difficult hypothesis to test as corporations are also economic agents producing goods and services. They are therefore considered to be outside the remit of this paper.

specific economic activity. They may therefore be classified sectorally as they represent businesses involved in agricultural, manufacturing or services activities.

According to Olson (1965), groups take time to form as difficulties in organizing collective action have to be overcome. This includes bargaining between members of the group on the form that the action might take and the distribution of costs and rewards within the group. It is of course possible, that if these difficulties are not overcome, that a group may cease to exist. Therefore, apart from large scale upheavals such as war, which may lead to their destruction, it is possible to observe over time both the birth of new SIG's and the death of existing ones.

Olson (1965: 36; 1982: 41; Heckelman, 2007) suggest that small groups are more effective in preventing free-riding and consequently in re-distributing society's income to themselves. On the other hand, as groups grow large they face more difficulties in organizing. As a result, large or encompassing special interest groups are less likely to be engaged in re-distributive activities as the cost of doing so would likely outweigh the benefits. However, this does not mean that SIG's cease to exist as they grow large in size. On the contrary, Olson (1982: 40) suggests that even when the collective good they provide is no longer needed, the group may survive. This is because of the role played by selective incentives, which for example, ensure that the organization and its leadership seek to stay in place. Notably, Olson (1965, 145-7) considers that where the business community as a whole organizes to deal with broader issues of national concern, it is not an SIG but rather a large latent group. He cites the National Association of Manufacturers and Chambers of Commerce in the USA as instances of these.

There are numerous examples of re-distributive activity by SIG's, such as: union activity that increases the wages of members at the expense of sectoral and national productivity; the activities of professional associations to restrict entry in order to enhance private gain at the expense of productivity; or the collusive behaviour by businesses to raise price, to lobby government to raise tariffs or to institute tax breaks as a substitute for enhancing productivity. Olson (1982: 42) presents an argument based on intuition that such actions aimed at achieving a larger '*slice of an existing pie'* will dominate the activity of SIG's. However, he does suggest that large SIG's may also *"perform some function in addition to lobbying for collective goods"* (1965: 132). These functions may include circulating information, on for example the impact of legislation or the adoption of best practice technologies between members.

Moreover in using the term, "*special interest groups"*, Olson seems to allow in principle for the possible existence of other interest groups that engage in collusive action which is not re-distributive in that it *"makes the pie the society produces larger"* (1982: 42). His intuitive argument that these will be dominated by SIG's is based on his theoretical argument about the cost of doing so out-weighing the benefits. However, drawing on other literature it is possible to envisage in practice the existence of interest groups that promote productivity by training workers in member businesses or by promoting business innovation through cooperation in research and development. For example, in the more recent literature on national competitiveness, Michael Porter argues how *'institutions for collaboration'* are intermediary entities such as industry associations, professional associations, trade unions, technology transfer organizations, and others may have a positive effect on competitiveness (Porter and Emmons, 2003). Similarly, the literature on innovation networks stipulates that innovation may be fostered by intermediaries facilitating interaction between businesses and their competitors, suppliers and customers (see for example, Howells, 2006).

At a given point in time the total number of special interest groups, referred to as $TSIG_{t1}$, will be made up of the sum of $SSIG_{t1}$ and $LSIG_{t2}$, where S and L represent the number of small and large interest groups respectfully[6] and the subscript 1 refers to the end of year 1. According to Olson (1982: 41) stable societies witness increasing numbers of special interest groups over time. Thus, from year 1 to year 2[7], Olson predicts that $TSIG_{t2} > TSIG_{t1}$. Logically, this could arise if $SSIG_{t2} > SSIG_{t1}$ and/or $LSIG_{t2} > LSIG_{t1}$. In the former case this would be due to the number of small special interest group births exceeding the number of deaths in this category. However the same is not true for large special interest groups, as according to Olson (1982:40), large groups seldom die. Thus, $LSIG_{t2} > LSIG_{t1}$ will be due exclusively to the birth of new large groups or to existing small groups becoming larger in size.

Olson formulated the key hypothesis that is of interest in this paper. This is that, all other things being equal, special interest group activity will have a negative effect on *"efficiency"* (1982, 47) and on *"the capacity to adopt new technologies"* (1982: 65). This may be taken as referring to productivity growth, ideally measured as growth in TFP. This is similar to Coates et al (2011), although they stipulate that special interest group activity will also have detrimental effects on capital deepening. In this paper we focus on TFP as it seems to be more closely related to Olson's hypothesis.

Using $TSIG_{t1}$ as a measure of their strength in year 1 is problematic as it requires an *'act of faith'*. Clearly, this raw count assumes that each special interest group is as powerful as each other, which is questionable as some groups will be more effective than others. In addition some groups may complement others while others may compete (Coates and Wilson, 2007). Notwithstanding this, Coates et al (2011) have drawn the implication from Olson (1965; 1985) that increases in $TSIG_{t1}$ will have a negative impact on TFP growth between years 1 and 2. Note that in strict terms this is attributable more to the actions of the membership of $SSIG_{t1}$ than $LSIG_{t1}$, since, as already observed, the former are more effective at re-distributive collective action that lowers the rate of TFP growth.

Coates et al (2011) proceed to suggest that for international analysis country size might be important. Thus, a given number of SIG's may have a greater negative effect in smaller than in larger countries. They proceed to add a control for population in their regressions estimating the effect of SIG's on TFP growth. This paper takes a different approach by considering the effect of the number of SIG's per capita. This allows for the possibility that the strength of SIG's may vary with population.

Given Olson's (1982:41) suggestion (already discussed) that in stable societies there would be increasing numbers of SIG's over time, the question arises: does the rate of increase in the number of SIG's per capita also have an effect. According to Coates and Heckelman (2003b), it is wrong to assume that the effect of interest groups is constant regardless of the numbers that already exist. Thus, the bigger the number in a given country the greater the possibility that groups would be pursuing the same goals or would be competing with eachother, so that where there are large numbers of groups, each additional group might be less effective at forwarding group objectives than if there are small numbers. Therefore, following Coates and Heckelman

[6] As Olson's is a theoretical work, he does not specify precisely where 'small' ends and 'large' begins in terms of the number of members in an interest group.

[7] Year 1 and 2 should not be thought of as consecutive years. Indeed, given that collective action may take considerable time to organize, it is better to think of years 1 and 2 as 5 to 10 years apart.

(2003) and Zimmerman and Horgos (2008), it can be hypothesized that the effectiveness of additional SIG per capita lessens at the margin.

Another key aspect of the effects of interest groups is that they do not operate in a vacuum. Following, Gray and Lowery (1988) the strength of the special interest group vis-à-vis the government is a major characteristic defining its ability to affect change for its benefit. Indeed, Olson refers to the government as *"the most encompassing group"* (1982, 23). This shows the importance once again of focussing not on the absolute but on the relative strength of SIG's. As a result, it is desirable to combine the measure of per capita SIG with a measure of the relative size of government. The expectation is that the negative effect on TFP growth will be greater where a high value of per capita SIG is combined with a high than a low relative size of government. A similar approach was adopted by Coates et al (2011).

According to Olson (1982: 36-7), these effects are pervasive in that logically no country can avoid the negative effects of special interest group activity on TFP growth. He proceeded to test his theoretical argument using a variety of methods for both advanced and developing countries (1982). Similar to Coates et al (2011), this paper adopts the approach of investigating groups of advanced and developing countries. However, we update Coates et al (2011) by extending the time period to 2007, which is just before the recent international recession.[8]

In terms of stages of economic development, compared to advanced countries, at a point in time, developing countries may have a greater share of the population in rural areas and of employment in agriculture. This may have an effect on the composition of SIG's. As countries industrialize and urbanize, the rising share of employment in manufacturing may be reflected in increasing numbers of SIG's in that sector. Similarly, as countries become more advanced and deindustrialize, they tend to put a heavier emphasis on services so that there may be more SIG's in that sector. Given Olson's (1982) predictions that as countries growth they accumulate greater numbers of SIG's and that LSIG's seldom die, should we therefore expect to see increasing absolute numbers of SIG's with declining shares in agriculture, increasing shares in services and shares in industry first increasing and then decreasing. These are empirical questions which may be investigated by comparing the shifting shares of SIG's to sectoral employment shares, which follow well documented patterns (Abramovitz, 1986; Lewis, 1954). Indeed, Coates et al (2011) suggest that analysis of sector-level data may also reveal whether certain kinds of groups are more sclerotic than others. They suggest that perhaps trades unions, manufacturing groups, or financial sector interests may drive the aggregate findings.

Overall, the discussion above raised questions about whether SIG's will have negative effects on productivity. Olson suggests that in addition to the well-documented destructive effects, Olson also envisaged that SIG's may perform functions that may enhance productivity (1989, 1990). Notwithstanding these questions, the paper attempts to test the key hypotheses that have been outlined above. These are first, that increases in TSIG, driven by increases in SSIG, have a negative effect of TFP growth. Second, the effect of TSIG (and SSIG) diminishes at the margin. Third, the effects are amplified when combined with increases in the relative size of government. Finally, the paper explores whether different kinds of groups have greater negative effects on TFP growth than others.

[8] Due to the unavailability of the *Guide* after 2002, it was not possible to extend beyond this date. See Section 3.

In order to subject Olson's hypothesis to empirical testing, there are however four requirements of the data to be used to measure SIG's. First, it is necessary to understand what groups are included and excluded in a proposed data source. Second, the size of groups is important. Third, for those groups included it is necessary to understand what functions they perform. Finally, it is instructive to compare the structure of groups in advanced and developed countries. These issues are now explored Saur's World Guide to Trade Associations.

3. Using data on trade associations to measure SIG's

The main source used in this study is Saur's World Guide to Trade Associations (hereafter referred to as the *Guide*), which is an international directory of "trade associations" covering up to 185 countries and classified to over 400 categories. This source has been used for counts of numbers of trade associations in many studies (Murrell, 1984; Mueller and Murrell, 1986; Kennelly and Murrell, 1991; Bischoff, 2003, Coates and Wilson, 2007, Heckelman, 2000; Coates and Heckelman, 2003a and 2003b; and Coates et al., 2007a, 2007b, 2010 and 2011).

There are six editions of the *Guide*: 1973, 1980, 1985, 1995, 1999 and 2002. The first edition was presented in two volumes, with European and non-European trade associations. The next three were presented in one volume, then, starting with the fifth edition for 1999, a second volume with Chambers of Commerce was added. Given Olson's argument, outlined in the previous section, that these are not SIG's, Chambers of Commerce are excluded from the analysis in this paper. A similar exclusion was made by the other research in the area. The first two editions of the *Guide* include "local organizations", which are sub-national in that they relate to cities. These are not present in the following editions. As a result, it is not possible to compare counts of the number of trade associations of these two editions with the last four. We therefore decided, similar Coates et al (2011), to omit the 1973 and 1980 editions. Unfortunately, no further issues of the *Guide* exist after 2002.

In the 2002 edition, the *Guide* contains entries for *"no fewer than 23,641 associations including every conceivable field of commercial, service and industrial activity, from the construction industry to demolition firms, from the chocolate and candy trade to dental equipment and dentures and from fire insurance to hoses. In contrast to other, similar reference works ...[it]...also includes trade unions"* (Amazon.com, 2016). Compared to Olson's definition discussed in the preceding section, this source includes everything except oligopolistic cartels. Clearly, being illegal these arrangements are difficult if not impossible to detect. As such it is to be expected that they would be excluded from the analysis. In concentrating on the more measurable categories of professional associations, labour unions and trade associations the *Guide* appears to be a potentially useful source. Indeed, according to Coates et al (2011), "*the Guide is quite comprehensive with respect to association types, and includes groups in the industrial, commercial, trade, and service sectors, as well as professional organizations, consumer organizations, employer and labour groups, and organizations of service professionals"* (2011: 442). This addresses the first question set out at the end of the previous section.

The second question relates to the importance of the size of trade associations. The data in the *Guide* are collected through "(...) *a questionnaire distributed worldwide and from numerous international and national reference works.*" (Saur: 1985:x; 1995:v; 1999:v; and 2002:v). Unfortunately the *Guide* does not include a copy of the questionnaire or any information on the reference works accessed. The authors attempted to make contact with the publisher to find this additional information, but were not successful. However, when all the information sought is provided for a given entry, there is information on the trade associations name; its address; telephone; e-mail; fax; homepage; year of establishment; names of officials such as General

Secretary; number of members; field of activity and information on the trade associations periodical publications. However, complete entries are only available for approximately 1% of entries, mostly in advanced countries. Unfortunately, one of the implications of this is a significant lack of size data in the *Guide* for many countries. This suggests that it will not be possible to distinguish between SSIG and LSIG in this study. As a result, the study has no choice but to focus on TSIG.

The third question relates to the functions or objectives pursued by the trade associations included in the *Guide.* Note that in the preceding section, Olson, in his conception of the SIG, is quite circumspect in this regard. He refers to actions that achieve a larger slice of an existing pie. Like the actions of oligopolistic cartels, such actions as carried out by trade associations may be difficult to detect. This problem is made more intractable by Olson's stating that large SIG's may also pursue other functions. It is therefore instructive to inquire into the kinds of the functions pursued by the trade associations included in the *Guide*.

Three examples of trade associations in the 2002 edition were chosen based on the availability of an English language option on the website and representativeness of the different kinds of trade associations included. The first is the *Irish Homebuilders Association* in the construction sector. Its website shows its objective as "*the promotion, representation and protection of the interests of house builder members of the Association within the construction industry in Ireland.*"[9] It provides general services to homebuilders (practical advice on a broad list of regulations), promotes networking, provides trainings and actively lobbies "*(...) government at the highest level on issues that affect the housing and development industry.*"

The second example, the *Italian Association of Publishers – AIE- (Associazione Italiana Editori)*, is in the professional sector in Italy. Its aims are *"(...) representing and safeguarding publishers, promoting professional growth, removing obstacles to the development of a modern publishing market, and fighting against illegal phenomena and lack of respect for copyrights."*[10] Its activities, as listed on the association's website include lobbying, research and development, legal and fiscal advice for members, training and education and "*(...) participates and often coordinates European projects in such areas, aimed at providing information, education, guidance or services to publishers."*

The last example, is the *Norwegian Farmers' Union (Norges Bondelag)*[11]. Its aim is to improve conditions for farmers and in agricultural production. It recruits and train workers to enhance farm development, it takes measures to reduce the number of predators in grazing lands, it protects national customs with regards to farming and promotes national agricultural policy through events at farms nationwide. This association also negotiates with the government about farmer's income.

These three examples underline that trade associations provide a range of services to their members in addition to lobbying. These include providing information, training and networking. This is consistent with Olson's theory, in that he states that for large special interest groups, *"the lobby is...a by-product of whatever function...[the]...organization performs that enables it to have a captive membership."* (1965: 133). However, it cannot be assumed that the activities of the

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[9] Irish Home Builders Associations, [online] [(accessed the 11 June 2016] Available from Internet URL: http://cif.ie/about/associations/ihba.html

[10] Associazione Italiana Editori, [online] [accessed the 11 June 2016] Available from internet URL: http://www.aie.it/English.aspx

[11] Norges Bondelag, [online] [accessed the 11 June 2016] Available from internet URL: http://www.bondelaget.no

trade associations included in the *Guide* for a given country at a given time will automatically have a negative effect on TFP. This is because some of the activities listed may enhance productivity. Of these, lobbying seems to be the only one that might have a clear negative effect. Clearly, it should be noted that trade associations are not likely to highlight such activities. However, this does not preclude them from occurring. Indeed, this is Olson's central hypothesis. In conclusion, it can be stated that in testing the effect of TSIG on TFP growth we are observing a net effect, made up of the combination of negative and positive effects of such activity.

Before proceeding to presenting the data on the number of SIG's per capita, it is important to point to an important anomaly that is present in the *Guide*. For the 1985 edition, trade associations are presented by category. The 1995, 1999 and 2002 editions are presented both by category and by country. The same association may be listed in more than one category depending on its area(s) of expertise. For example, in the 2002 edition, the *Norwegian Trade Union EL & IT Forbundet* is listed under categories: *Electrical Installation* and *Energy*. This is probably explained by trade associations being able to tick more than one category when they completed the questionnaire. The result is that the count by categories may be larger than the count by countries, where each trade association is listed once. For example, in the 2002 edition (Saur, 2002) out of the 87 countries considered in the Coates et al (2011) study, 85% have a bigger count total for categories than for countries. This double-counting may cause a problem when comparing the 1985 to later editions, as the count in 1985 may be inflated by it being only presented by categories.

Figure 1 shows the total number of trade associations for all 87 countries and in advanced and developing countries in the 4 editions. There is a noticeable decline following 1985. From 1985 to 1995 it was 24% overall. This decline is concentrated in absolute terms in the 26 advanced countries. Individually, 81% of countries experienced a decline from 1985 to 1995. For example in Canada the decline was 88%; in Italy it was 73% and neither of these countries experienced upheaval in the previous ten years. Due to this double-counting problem in 1985, and a lack of time to undergo the detailed work required to remove the duplicates for this year, it was decided to drop 1985 from the analysis. It is notable that a number of other studies included 1985 along with 1995 and later editions (for example, Coates et al, 2011).

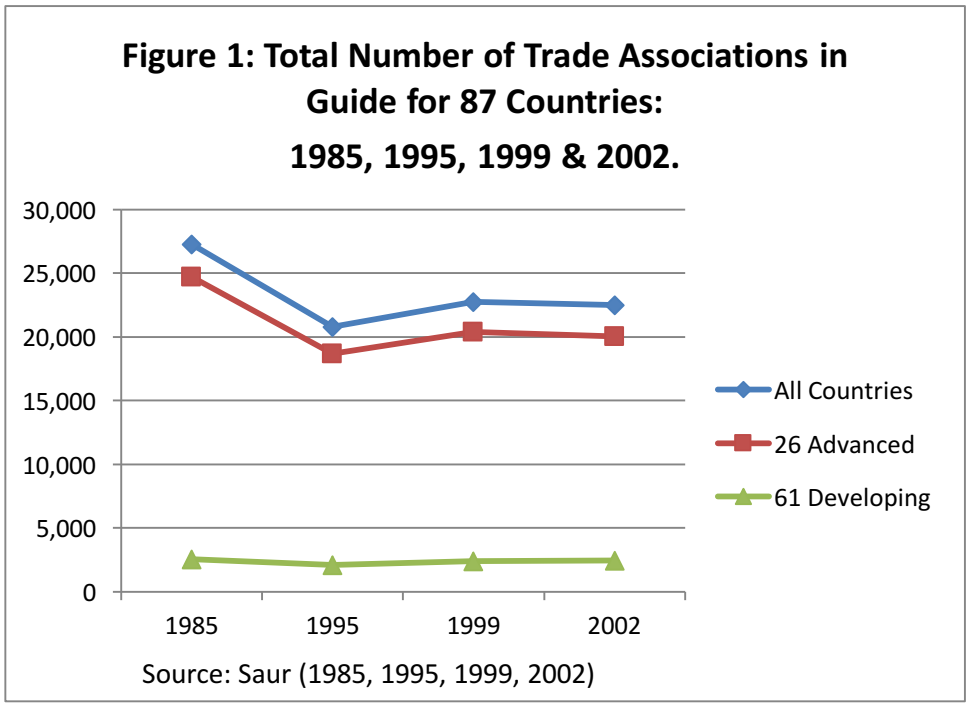
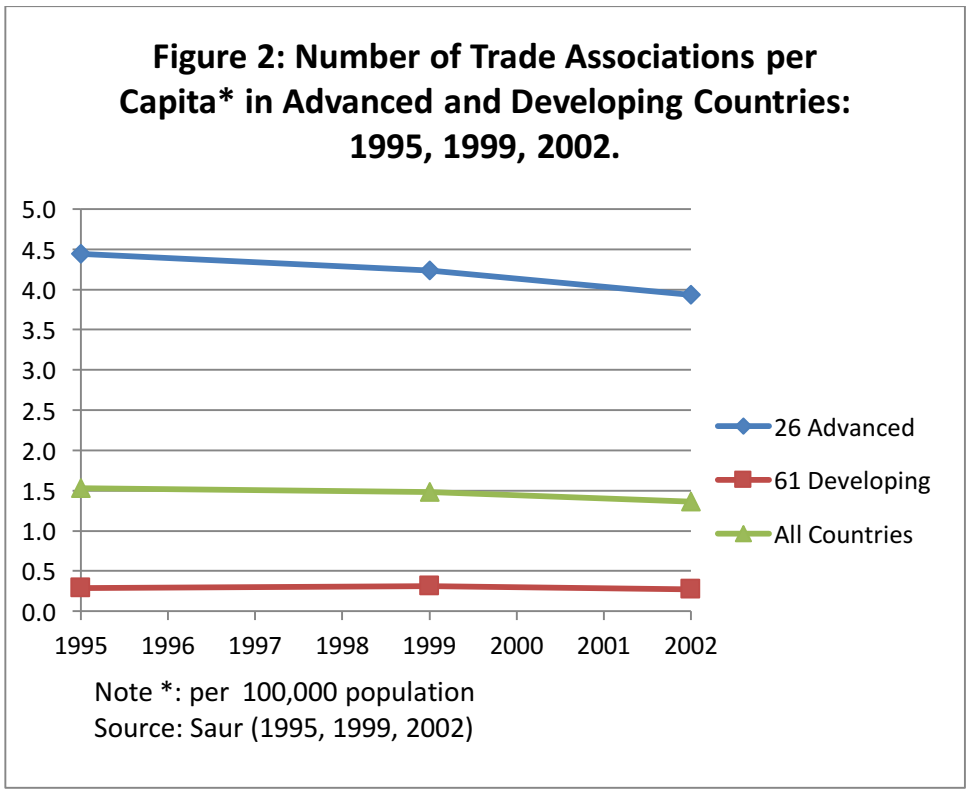


Figure 2 presents the average number of trade associations per capita for advanced and developing countries and for all 87 countries for the three years, 1995, 1999 and 2002. Clearly, the number in advanced countries is considerably higher in advanced countries, who have approximately 15 times more trade associations per capita than developing countries. The average number is remarkably stable over the period, with the only perceptible declines taking place for advanced countries in 1999 and 2002. However, it should be noted that there are large variations in all categories, with the coefficient of variation being approximately 220%. The level of variation among developed is distinctly higher for advanced countries.[12]



The final question formulated in the previous section refers to the changing structural composition of SIG's as countries develop. In the 2002 edition of the Guide, there are 421 different categories.[13] The key question is the extent to which the classification system used is both mutually exclusive and collectively exhaustive of all possible trade associations. As mentioned by Coates et al (2011), the Guide seems quite comprehensive. Categories include *pigs, sandstone, pasta, chemicals, tools, advertising, insurance, lawyers and crafts* (Guide, 2002). It seems that classification is based on the industry represented by a trade association. However, trades unions are treated differently in that they are separately classified, which implies that they are not classified to the industry(s), whose workers they represent.

In order to facilitate analysis the *Guide's* categories were classified into the NACE Rev 2 nomenclature (Eurostat, 2008).[14] When not clear, a "majority rule" was used to arrange the 421

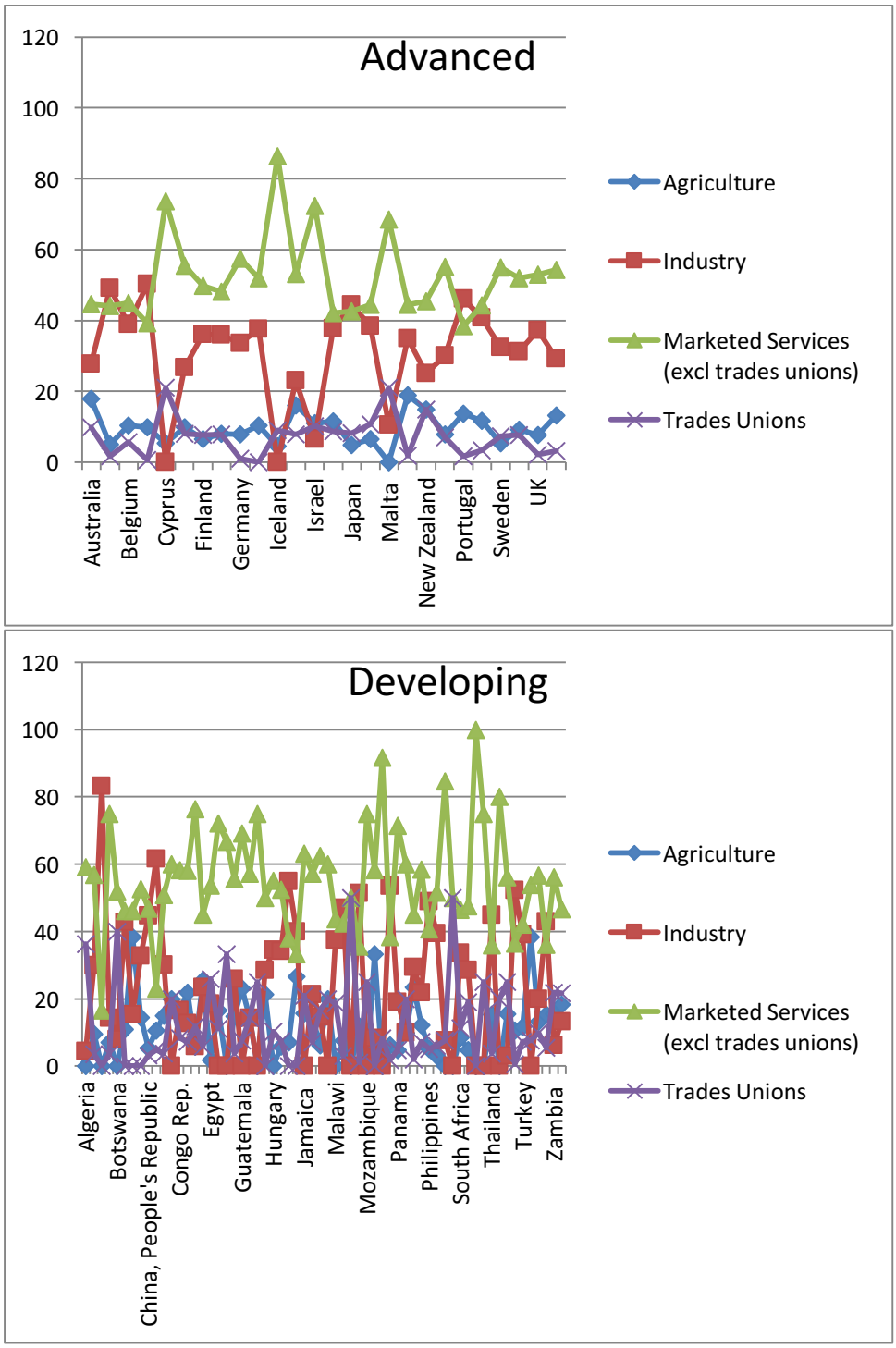
[12] See section 5 for further discussion of the descriptive statistics for this key independent variable.
[13] Detailed sectoral investigations were only conducted for the 2002 edition of the *Guide*.
[14] See appendix 2 for the link between the Guide's categories and the NACE classification. Note that trades unions were classified to NACE 36 *Other Market Services.*

categories of the *Guide* into the 38 NACE categories. This involved identifying the main products of the associations in a category and checking in which NACE category the majority would belong. Clearly, this may be imprecise but it is the best that could be done in the circumstances.

Figure 3 shows the percentage shares of the total numbers of trade associations in agriculture, industry, market services[15] and trades unions for both advanced and developing countries in 2002. The average shares for the 26 advanced countries are 10% for agriculture, 31% for industry, 52% for market services (excluding trades unions) and 7% for trades unions. This compares to 11%, 22%, 55% and 12% respectively for the 62 developing countries. However, for developing countries there is considerably more sectoral variation, especially in agriculture and industry where the coefficient of variation in developing countries is approximately twice that in advanced countries. Interestingly, the percentage share of trades unions in the *Guide* in 2002 in considerable larger in developing than in advanced countries.

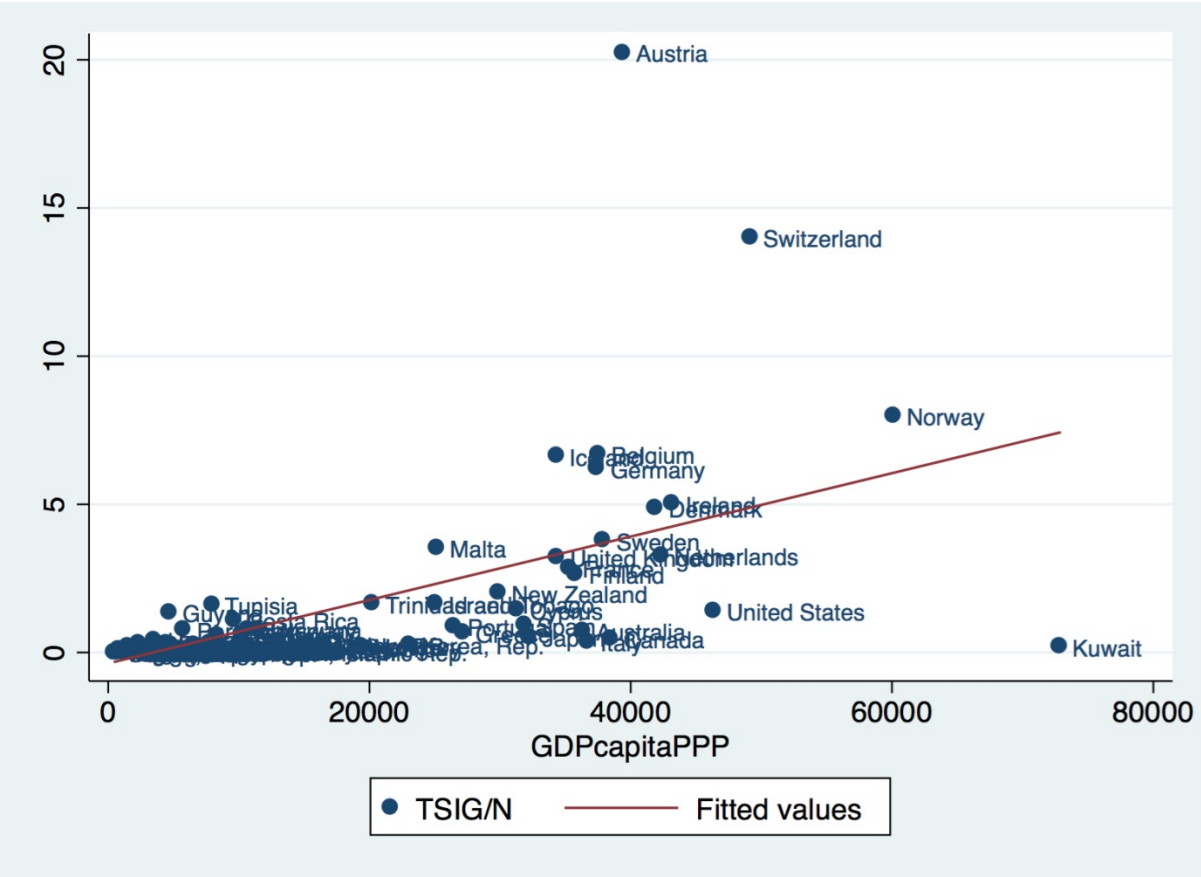
[15] No trade associations were classified to non-market services.

Figure 3: % Composition of Trade Associations in Advanced and Developing Countries: 2002



Another possible anomaly with the *Guide* is the appearance of a number of outlier countries. For example in the 2002 edition, the number of trade associations per capita for all 87 countries was 1.36. However, for 2 countries, namely Austria and Switzerland this average was 20 and 14 respectively. Figure 4 shows the scattergraph and line of best fit for the regression of

Figure 4: Regression of per capita GDP on the number of trade associations per capita: 87 countries for 2002.



per capita GDP[16] on the number of trade associations per capita for all 87 countries for 2002. It is clear that Austria and Switzerland appear to be outliers in 2002. They also appear as outliers for 1995 and 1999. These outliers may be explained by these countries having federal structures, so that instead of one national trade association, there are branches in each region. In the analysis that follows, Austria and Switzerland are excluded.

4. Formulating the model and hypotheses.

The relationship between the number of trade associations and TFP growth is tested in three stages to reflect the key hypotheses identified in section 2. The following are the three models. The first concentrates on the main hypothesis that increasing numbers of trade associations per capita has a negative effect on TFP growth:

$$GTFP_{i,t,\,t+T} = \alpha_0 + \alpha_1 TTA/N_{i,t} + \alpha_2 TTA^2/N_{i,t,t+T} + \alpha_3 P_{i,t} + e_{it} \qquad (1)$$

Where

- GTFP is the average annual growth of TFP between 1995 and 1999; 1999 and 2002 and 2002 and 2007 respectively.
- TTA/N is the total number of trade associations per capita (ie N is population).
- P is the initial level of per capita GDP.

[16] See Section 5 for details of how this was measured.

- D is a dummy for Austria and Switzerland.
- t refers to the years 1995; 1999 and 2002 for which data are available on TTA, while t+T refers to 1999, 2002 and 2007.
- i refers to the 87 countries for which data are available from the *Guide* on TTA.

It is hypothesized that:

- if α_1 is found to be negative then the net effect of TTA's on TFP growth is negative, which lends some support to Olson's hypothesis. If it is positive, this suggests that the Olson effect may be over-shadowed by the TFP enhancing activities of trade associations.
- α_2 depends on the sign of α_1. Where $\alpha_1 < 0$ it is expected that $\alpha_2 < 0$. This points to trade associations having a diminishing negative effect at the margin. If $\alpha_1 > 0$ then no particular hypothesis is being advanced. If $\alpha_2 <$ (>) 0 then this signifies decreasing (increasing) returns respectively.
- α_3 is a control that may have a positive (divergence) or negative (convergence) coefficient.

The second model focusses on the interaction of the numbers of trade association per capita with the size of government:

$$GTFP_{i,t,\,t+T} = \delta_0 + \delta_1 TTA/N_{i,t} + \delta_2 GOVSHARE_{i,t} + \delta_3 (TTA/N)x(GOVSHARE)_{i,t} + \delta_4 P_{i,t} + e_{it} \quad (2)$$

Where all variables are as before, except:

- GOVSHARE is the percentage share of government expenditure in GDP.

It is hypothesized that:

- if δ_1 is found to be negative (positive) then, once again, this reflects the net effect of TTA's on TFP growth.
- δ_2 is negative in line with numerous studies, including Coates et al (2011).
- δ_3 depends on the sign of δ_1. If δ_1 is negative then δ_3 is expected to be negative. This indicates that the combination of large number of trade associations per capita and a high government expenditure share of GDP will have a negative effect on TFP growth. If δ_1 is positive then we have no expectations about the sign of δ_3.
- δ_4 is a control that may have a positive (divergence) or negative (convergence) coefficient.

The final model concentrates on the effect of the sectoral composition of TTA's in 2002[17] on TFP growth between 2002 and 2007.

$$GTFP_{i,t,\,t+T} = \beta_0 + \beta_1 TTAA/N_{i,t} + \beta_2 TTAI/N_{i,t} + \beta_3 TTAS/N_{i,t} + \beta_4 TU/N_{i,t} + \beta_5 P_{i,t} + e_{it} \quad (3)$$

Where all variables are as before, except:

- GP is the average annual growth of TFP between 2002 and 2007.
- TTAA/N is the total number of trade associations in agriculture per capita.
- TTAI/N is the total number of trade associations in industry per capita.
- TTAS/N is the total number of trade associations in market services per capita.
- TU/N is the total number of trades unions per capita.

[17] Only 2002 is chosen as, due to time limitations, it was not possible to classify trade associations to NACE categories for the other years.

- t refers to the year 2002, as this was the only year for which a sectoral decomposition was completed. t+T refers to 2007.

It is hypothesized that:

- if β_1, β_2, β_3, and β_4 are found to be negative (positive) then at a sectoral level this once again reflects the net effect of TTA's on TFP growth.
- β_5 is a control that may have a positive (divergence) or negative (convergence) coefficient.

5. Data and descriptive statistics

Table 1 presents the descriptive statistics for the variables used in the analysis. The source for the dependent variable, the growth in total factor productivity (hereafter TFP growth), is the Total Economy Database (Conference Board, 2015). Growth is calculated as the average annual growth for three periods: 1995-1999, 1999-2002 and 2002-2007. Data on TFP growth are available for only 67 countries from this source, giving a total of 201 observations. The average growth in this sample is +0.89% per annum with a standard deviation of 1.95. The minimum growth in the sample was -5.9% per annum. This was in Indonesia during the period 1995-1999. The maximum was in South Africa which registered +8.1% per annum in 1999-2002.

The key independent variable of interest, TTA/N is outlined in Section 3. For the 67 countries included in the analysis, the average was 1.29 trade associations per 100.000 inhabitants with a high standard deviation. The country with the lowest TTA/N was China, where it was 0.005 per 100.000 inhabitants in 1995. The highest was Iceland at 21 per 100.000 inhabitants in 1995.

In our regressions we have two additional control variables: P, which is the initial level of per capita GDP, is from the World Bank Development Indicator Database (World Bank, 2016) and is at constant 2011 international dollars and purchasing power parities. The second is GOVSHARE, which is general government final consumption expenditure as percentage of GDP[18], also sourced from the World Bank (2016). Table 1 reveals that the mean per capita GDP is $17,244, while the mean GOVSHARE was 15%.

[18] As per the World Bank Indicator Database, this variables excludes the government military expenditures that are part of government capital formation.

Table 1: Descriptive Statistics

VARIABLES	Mean	Standard Deviation	Min	Max
Growth TFP (% annum)	0.893	1.952	-5.943	8.076
TTA/N (per 100.000 inhabitants)	1.291	2.483	0.000498	20.94
GovShare (% of GDP)	15.63	5.167	4.577	32.19
GDP per capita ($)	17,244	15,519	369.8	79,712

6. Results of regressions

This section outlines the estimation strategy used and the results achieved. In order to estimate the effect of TTA/N and its squared term (Equation 1) and GOVSHARE and its interaction with TTA/N (Equation 2) on TFP growth, we used random effects. For these two equations we built a panel, which is short and wide, with 67 countries and 3 time periods. Following Stock and Watson (2003), an estimation using random effects is more appropriate in these circumstances. We performed a Hausman test to check whether estimations using fixed or random effects would be more appropriate. This confirmed that random effects are the best estimator. In order to check whether the sample has panel effects (ie significant differences between the units in the sample) we also performed the Breusch-Pagan Lagrange Multiplier test which confirmed once again that random effects are the appropriate choice also when tested against pooled ordinary least squares. For the estimation of the effects of TTAA, TTAI, TTAS and TU on TFP growth (Equation 3), we used Ordinary Least Square.

Tables 2 and 3 present the results. Table 2 presents the estimation of Equations 1 and 2. Overall, Equation 1 is not statistically significant. This suggests that on their own, TTA's have no effect on TFP growth. Equation 2 is statistically significant, with the net effect of TTA/N being positive and significant. A one unit increase in TTA/N has the effect of increasing TFP growth by 0.012%. This result is achieved in the presence of a control for the size of government, with GOVSHARE being found to be positive and significant. However, the interaction of TTA/N and GOVSHARE has a negative and significant effect of TFP growth. This represents the only suggestion in these results that trade associations have a destructive effect on growth. In Equation 2, per capita GDP is negative and significant, indicating a convergent effect (ie poor countries exhibit faster TFP growth than rich countries).

These results differ from Coates et al (2011), who find that the number of trade associations have a negative effect on productivity growth. While they also use the *Guide*, their results are for 88 countries and for the periods 1985-94 and 1995-2004. For reasons outlined in section 3, this paper has omitted the 1985 edition of the *Guide* as we argued that this is not comparable with later editions due to the problem of double-counting. We would suggest that including 1985 may have the effect of biasing the results. Other differences of this paper compared to Coates et al (2011) are that we up-date the analysis by using the 1999 and 2002 editions of the *Guide* to investigate growth from 1999 to 2002 and 2002 to 2007. We have also focussed on the growth in TFP as the main dependent variable of interest, which we believe is consistent with Olson (1965; 1982). The measure of TFP is from the Total Economy Database (Conference Board, 2016) is different from Coates et al (2011), who construct their own

Table 2: Results for Estimation of Equations 1 and 2

	Equation 1	Equation 2
TTA/N	0.159 (1.36)	1.199 (2.11)**
$(TTA/N)^2$	-0.005 (0.85)	-
GOVSHARE		0.108 (3.11)***
TTA/N*GOVSHARE		-0.054 (2.02)**
GDP per capita[2]	-0.290 (1.51)	-0.483 (2.57)**
Constant	3.401 (1.95)*	3.487 (2.35)**
Wald Chi-Square	5.68 (0.12)	12.87 (0.01)**
N	201	

Note 1: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

2: Taken in natural logs.

measure with the assumption that the capital income share is fixed at 30% for every country and every time period. We would suggest that the Conference Board measure is preferable, being based on a Tornqvist index.

Table 3 presents the estimation for Equation 3. This ordinary least squares regression is statistically significant. However, the negative coefficient on TTAI/N is the only significant coefficient. This indicates that a 1 unit increase in TTAI/N causes TFP growth to decrease by 1%. This suggests that the net effect of trade associations in industry, which includes sectors that trade internationally and that are important for country competitiveness, is negative so that productivity enhancing effects are outweighed by destructive Olsonian effects on TFP growth. Interestingly, trade associations in agriculture and services and trades unions in general have no discernible net effect. These findings contrasts with the positive and significant coefficient found for Equation 2. Although care has to be taken in comparing these results, they point to the importance disaggregating TTA/N. Further work is required to build on these results.

Table 3: Results for Estimation of Equation 4

	TFP Growth
TTAA/N	1.75 (0.92)
TTAI/N	-1.00 (1.82)*
TTAS/N	0.08 (0.26)
TU/N	0.82 (0.44)
GDP per capita[2]	-0.18 (0.67)
Constant	2.95 (1.21)
R^2	0.08
N	67

Note 1: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

2: Taken in natural logs.

3: F-test value 14.96 (0.00)***

7. Conclusions and future research

Overall, there are five main findings in this paper, relating to theory, the data source used to test the theory and finally, to the results. First, Olson suggests that in addition to the well-documented destructive effects, SIG's may also perform functions that may enhance productivity. Therefore, in testing the effects of SIG's on productivity we argue that one is investigating net effects to see whether or not destructive outweigh enhancing effects. Second, by being restricted to using count data on the number of trade associations from the *Guide* we suggest it is necessary to make an 'act of faith' that higher numbers indicate greater strength in terms of their activities. Clearly, this assumption is questionable. Third, we have made the argument that it is necessary to confine the analysis to the 1995, 1999 and 2002 editions of the *Guide* and to exclude a small number of outlier countries. This is a major difference from previous research in the field.

Our fourth finding is that for 67 advanced and developing countries the net effect of numbers of trade associations per capita in 1995; 1999 and 2002 on the subsequent growth of TFP from 1995-99; 1999-2002 and 2002-07 is positive. Therefore, productivity enhancing activities by trade associations outweigh any effects associated with Olson (1965; 1982). However, when numbers of trade associations per capita are combined with the share of government spending in GDP, we find a negative net effect. Thus, large numbers of trade associations co-existing with dominant government is detrimental to productivity growth. Finally, in answering the call from Coates et al (2011) to include a detailed investigation of the sectoral composition of trade

associations, the paper uncovers interesting results that suggest that the net effect of greater numbers of trade associations per capita in industry on the growth in TFP, is negative.

This research has unearthed more questions than answers. While the *Guide* is a source that has been widely used in research testing Olson's hypotheses, it seems clear that a reliance on aggregate count data alone is insufficient. Further more detailed 'contents analysis' are therefore required in order to unearth the size of trade associations, the balance of effort expended in trade associations on activities associated with Olson's SIG's and on other activities. Clearly, such research will involve a move away from a large number of countries and time periods, to more focussed analysis of individual countries and industries.

Appendix 1

Country List:

Advanced Economies in the sample:

Australia, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea (Rep.), Malta, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, United Kingdom, United States of America.

Developing Countries in the sample:

Bangladesh, Bolivia, Brazil, Cameroon, Chile, China, Colombia, Costa Rica, Dominican Republic, Ecuador, Egypt, Ghana, Guatemala, Hungary, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Kuwait, Malawi, Malaysia, Mali, Mexico, Mozambique, Niger, Pakistan, Peru, Philippines, Poland, South Africa, Sri Lanka, Sudan, Thailand, Trinidad & Tobago, Tunisia, Turkey, Uganda, Uruguay, Venezuela, Zambia, Zimbabwe.

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