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The Politics of Market Selection*

La política en la selección de mercado

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Abstract

This study seeks to determine the effects of an economic sector's political power on the policies faced by its plants, its market survival probabilities, and finally, aggregate productivity. Data from the Colombian manufacturing sector at the plant level for the period 1990-1998 is used to estimate several empirical models. Additionally, several political power variables are constructed. First, we find that sector's political power has a significant positive effect on the tariffs faced by its plants. In the second place, we find that a plant belonging to a more politically influential sector may survive in spite of lower productivity levels. Finally we calculate that, since the political power effect allows less productive plants to survive, aggregate productivity is decreased by an average of 9.86% per year.

Key words: market structure and performance, policy-making analysis, aggregate productivity, political processes.

JEL Classification: L100, D780, O470, D720.

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Resumen

Este artículo busca determinar el efecto del poder político en el desempeño de mercado de las plantas, y en la productividad agregada de la economía. Para tal efecto, se utilizan datos empresas colombianas del sector manufacturero para el período 1990-1998, y se construyen variables de poder político. Se encuentra en primer lugar que el poder político del sector tiene un efecto significativo y positivo en los aranceles a los que se enfrenta una planta. En segundo lugar, encontramos que una planta que pertenece a un sector con mayor poder político puede sobrevivir presentando niveles de productividad menores. Por último, calculamos que se encuentra que el efecto del poder político, dado que permite la supervivencia de plantas menos productivas, llega a reducir la productividad agregada en un promedio de 9.86% anual.

Palabras clave: estructura y desempeño de mercado, implementación de políticas, productividad agregada, procesos políticos.

Clasificación JEL: L100, D780, O470, D720.

Introduction

Resource reallocation is one of the most important mechanisms by which market economies are able to affect production units, by getting rid of the most unproductive plants and thus enhancing the economy's aggregate productivity. In an analysis of a plant-level longitudinal dataset for Colombia for the years 1982 through 1998, Eslava *et al*. (2004) find that reallocation accounts for most of the change in aggregate productivity. In their paper, the effect of institutional changes on the reallocation process is emphasized. Reforms, in particular market-oriented ones, are, in principle, intended to weaken distortions by establishing profitability as the main determinant of survival among plants. When this is the case, productive plants are defined as those that continually make more profits and stay in business, while those that are defined as unproductive lose market shares and eventually shut down. This constitutes a productivity enhancing market selection mechanism (Jovanovic, 1982). Since the plants that manage to

survive are the most productive, this mechanism ends up raising aggregate productivity by promoting efficient reallocation (Roberts *et al.*, 1997). By contrast, other types of reforms may shield unproductive plants from market dynamics, allowing them to continue making profits and survive, and thus decrease aggregate productivity.

Economic policies may therefore widen or narrow the gap between the survival of a plant and market fundamentals by impacting on the actual exposure to those fundamentals. We understand market fundamentals as constituting a series of economic traits that characterize plants, or plants and their respective markets. For instance, these might constitute production costs, sale prices, factors hired, and, most especially, productivity. When referring to the 'exposure' to market fundamentals, we mean the extent to which differences in productivity levels, prices or demand shocks determine plant survival. The final effect of policies depends very much on which plants are affected. If differential treatment between sectors is the case, then shielding sectors with unproductive plants will clearly be more harmful to aggregate productivity than shielding more productive sectors (Neil *et al.*, 1992). Among those institutions and policies showing differential treatment between sectors, we find sector-specific production subsidies, tariffs and import quotas, public expenditure focused on one sector's production, environmental regulations, and tax exemptions.

A straightforward example of institutional barriers against efficient reallocation and the resulting differential treatment of sectors can be found in trade policy, particularly with respect to tariffs. Although this is not necessarily the case with all trade policies, many shield certain sectors from market forces and market selection dynamics. In an attempt to explain these policies' heterogeneous treatment between sectors, we might naturally turn to the literature on political economy, bargaining and special interests. Most results point to a strong relationship—one that is probably causal—between the political power of special interest groups and policy outcomes (Grossman, and Helpman, 1994).

An explanation of the determinants of differential policies between sectors constitutes the first subject of interest in this study. The second one is related to the effects of those determinants on plant per-

formance indicators, such as productivity and survival. More specifically, we are interested in the political power exerted by some sectors to determine these policies. We consider this to be the most important channel in this process. The main goals of this paper are, in the first place, to empirically link political/lobby power and policies; in the second place, political/lobby power and the probability of a plant exiting the market; and finally, the effect of the political power on aggregate productivity.

More specifically, in terms of the first objective, this study attempts to empirically explain the relationship between a sector's political power and the treatment the sector receives through trade policy. To do this, a set of empirical models are tested in order to calculate the effect of political power on trade policy. Political power is captured through a constructed political power index that weighs the production (or employment) share of each sector in its the region with the region's votes share in the national political scene. This is done in order to capture the importance a production sector's economic strength and the respective region's political strength have in determining the sector's political power. In order to have an effective impact, it is expected that these two conditions should necessarily happen simultaneously. This is due to the fact that, a production sector's economic importance is only able to translate its economic importance into effective political power to the extent that the region enjoys political importance in the country. We use tariffs to capture trade policy, as they meet the requirements that interest us—they affect the economic performance of plants—in particular probability of their exiting the market—and they exhibit differential treatment across sectors.

A probit market selection model is then estimated in order to measure the effect of political power on the probability of the survival of plants. We also attempt to capture the effects of trade policies as well as of other benefits not so easily quantified (this, by making adjustments to the model that controls for tariffs). Moreover, we construct variables that indicate the extent of a sector's affiliation with strong lobbying associations and large economic groups. This allows the political power constructed index to account for the political influence of a specific sector beyond that derived merely from organized lobbying. Finally, we estimate a model that determines aggregate productivity,

both under the influence of political power, and where it is absent. This is done in order to quantify the cost in terms of aggregate productivity on the process of efficient reallocation implied by the influence of political power.

This work benefits from the database constructed by let al. (2004) on Colombian Manufacturing Plants[1]. The period that this database covers (1982-1998) allows us to include the two senate and presidential periods encompassed by the period of our estimations (1990-1998). This period is of particular interest as many market-oriented reforms, including changes in the tariff structure, were implemented then.

Among the most relevant results we find is that a sector's political power has a positive and significant effect on the tariffs it faces. We also find that it is slightly more convenient for a sector to be politically significant in presidential elections than in senatorial elections. All results are robust to the inclusion of population controls and different specifications of the political power index. When we only use the specification of the political power index that takes into account the share of votes, both the magnitude of the effect and the significance decrease considerably. This shows that political importance is only relevant when the sector is economically important. Finally, we find that the resulting aggregate productivity where there is an absence of political power is significantly larger than the resulting aggregate productivity where it is present.

This structure thus links two strands of the reviewed literature: that on market selection and that on special interest groups and lobbying. The connection seems natural once we notice the extent to which market selection depends on reforms and policies, and how these in turn depend on political processes. In general, it is considered that an analysis of this mechanism is helpful to understanding why heterogeneous policies are applied across sectors, and the effect this has on the exposure of each sector to market fundamentals.

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[1] This is constructed using data from the Annual Manufacturing Survey. The database, which includes measures of plant-level productivity that use individual plant prices—measures the productivity more accurately than traditional estimates using a sector-level deflator. This improves the results of the market selection model, so that the effects on productivities attributed to political variables do not stem from unobserved movements in prices.

This work contributes to the still scarce empirical literature concerning the effects of lobbying and political power on market selection and aggregate productivity. The results achieved here could help make policy-makers more aware of the magnitudes of the costs implied by some distortive policies, especially when differentially applied to sectors that are not necessarily the most productive. Another contribution of this work is its calculation of political power indices and dichotomous variables indicating sector/plant affiliation with strong lobbying economic associations and large corporate economic groups. Case studies from Echavarría *et al.*, Lora (2001), and Rettberg (1998) are reviewed in order to put together a fairly comprehensive list of the economic associations and economic groups found in Colombia. Finally, this study creates a digital database providing information on the senate and presidential election results at the departmental level. The official results for elections prior to 1998 have, until now, only been available in printed format.

The rest of the paper is divided as follows. In section I, we review the literature, both for market selection and for special interests politics. In section II, we construct a sector political power index. With this compound index, we attempt to make the best of the available political information (by region, that is, department) and economic performance information (by sector). We then examine the effects of the sectors' respective political power on the outcome of policy decisions. In section III, we test a market selection empirical model wherein political power is introduced; this is in addition to the economic fundamentals and reform measures of other market selection models (Eslava *et al.* 2004). Finally, in section IV, we present an estimation of the aggregate productivity that would occur in the absence of the distorting effect of political power. Section V summarizes the results.

I. A review of literature

In this section we review the two strands of literature covering the subjects most relevant to our work: that on market selection and that on special interests groups. At all times, it is our intention to give a general overview of each subject. Nonetheless, we focus on those transmission channels most relevant to our empirical exercise. While

reviewing the literature on market selection, we focus on the effects policies have on market selection; likewise, the effects of market selection on aggregate productivity. On the other hand, while reviewing special interest groups, we focus on the effects lobbying has on sectoral policies and productivity.

A. Market selection

The exit and entry of plants play an important role in an economy's dynamics. While market selection dynamics depend largely on economic circumstances, they also affect those economic circumstances in return. For instance, sector adverse demand shocks may cause unproductive plants to go out of business, and allow only those productive enough to cope with the new situation to survive. This increases the average productivity of the relevant sector. Sector adverse demand shocks are affected by the productivity levels of plants entering the sector, as well as by the new conditions in the productivity levels of incumbent plants. One strand of literature proposes a strong relationship between productivity and plant survival (Hopenhayn, 1992). More specifically, we can say that a plant with very low productivity levels relative to others in the sector will, under regular market conditions, eventually exit the market (Roberts *et al.*, 1997). In the absence of distortions, lower productivity require higher costs and prices for the same products, which eventually leads to the elimination of that plant's demand. How long the plant survives then reflects the elasticity of demand and the demand shocks confronting the plant; in the presence of a close substitute, no plant could stand a strong decrease in productivity for very long (Jovanovic *et al.*,1994). An unproductive plant would have a hard time enduring such adverse conditions for long, and the process would occur rather smoothly. There would be a productivity enhancing reallocation process, one which works on the basis of economic fundamentals, in particular, those related to productivity. Jovanovic (1982) states that markets make unproductive plants fail. In this way, market selection makes an industry mature and average profits rise. The concept of creative destruction (Bartelsman *et al.*, 2004) supports the convenience of a strong market renewal or market selection mechanism as a condition for productivity growth (Davis *et al.*, 1999). Following this line of thought, Jovanovic adds that high concentrations in markets can be a sign of greater efficiency rather

than constituting a threat to it, since larger plants earn higher rents and low rent earners are pushed out of the market[2].

Empirical research has also been conducted concerning the role of productivity in market selection. Bartelsman and Doms (2000) review the strand of literature using longitudinal micro data, and remark that the results generally show that both entering and exiting plants have lower productivity than incumbent ones[3]. Eslava *et al.* (2004) find a different result for Colombia; according to them, here, entering plants show larger productivities and exiting plants lower ones than incumbent plants. Eslava *et al.* (2004) expand this discussion for the case of Colombia by introducing the effect of the institutional reforms carried out during the 1990s. One interesting result describes the extent to which distortions make adjustment expensive. After a wave of market-oriented reforms, started in 1991 with the promulgation of a new political constitution, the productivity differential between entering and incumbent plants decreased. This probably reflected lower adjustment costs, on the basis of which, incumbent plants were equally able as entering plants to make use of the latest vintage technology. Additionally, the exit rate of plants increased, while the relative productivity of exiting plants against incumbent ones fell even further following reforms as compared to previous years.

The facts empirically found by Eslava *et al.* (2004) might reflect that market-oriented reforms generally lower the protection given to some unproductive plants, allowing them to persist in the market despite low productivity levels. This protection may take many forms, one of them being trade policy. We show that institutions and policies strengthen or weaken the connection between a plant's performance (and its probability of exit) and market determinants or fundamentals. Thus, in the presence of strong distortions, survival becomes likely for low productivity plants, as such distortions work as a shield against market forces that would otherwise force plants to either increase productivity or leave.

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2 This process is altered when there exists firms acting strategically and engaging in collusive actions. There is an important strand of literature dealing with the strategic behavior of firms. This strand is mentioned in the next section, though it is covered thoroughly.

3 For example, they refer to the results reached by Baldwin for Canada for the last two decades (1995).

Whether the entry and exit of plants is closely determined by productivity or is shielded by external distortions is important because of the strong connection between the processes of market selection and aggregate productivity and growth. Plant exit is productivity enhancing if those plants exiting are those with lower productivities. If this is the case, the surviving plants, which already had higher productivities, would increase their shares of production. Consequently, the weight their productivities have in the calculation of aggregate productivity would also increase. Baily *et al.* (1992) find that the exit of low productivity plants is effectively accompanied by increases in the share of the output of high productivity plants; their exit, therefore, affects the growth of manufacturing productivity.

Market-oriented reforms are often sought because of the positive effects exposure to competition, greater access to a wider variety of higher quality inputs, and learning effects have on productivity (Amiti, 2005)[4]. We are aware the research of a good many authors focuses on these effects (e.g., Arbeláez *et al*., 2006; and Meléndez *et al*., 2006). Nonetheless, we do not focus on them here. As we mentioned before, our argument is concerned with the effects of decreasing shares for lower productivity plants (decreasing to zero when they exit) and increasing shared for higher productivity ones. We not necessarily claim that surviving plants increase their productivity as a consequence of market-oriented reforms; rather we concentrate on the productivity growth brought about by shares reallocation.

If the selection mechanism is distorted, as mentioned above, low-productivity plants may not be driven out of business, and there will be no positive effects on aggregate productivity.

If the whole market selection process is subject to distortions, the dynamics can be strongly altered. Changes may result from policies,

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[4] Amiti *et. al*, (2005) perform estimations for Indonesia to quantify the effects of a tariff reduction both on inputs and output. They also consider the fact that more plants that are already relatively more productive increase their market shares; at all times, they take into account the productivity enhancing effects of liberalization. Also, Tybout *et al.* (1991) find that, during the liberalization of Chilean trade that took place during the 1970s, the firms located in the sectors with the highest reductions in tariffs were also those that experienced higher efficiency gains (per firm, not aggregate).

institutions, or market distortions that dampen, or sometimes even stop or reverse the productivity improvements mentioned above. In fact, many studies focus on how this process occurs over time in different economic and institutional environments (Bartelsman *et al.*, 2004). If other aspects apart from performance—such as political influence—determine the survival or market share of each plant, then market selection, will not necessarily be productivity-enhancing. Under such circumstances, plants that survive may not be the most productive but the ones best able to attain greater protection through policies using their political power. This point-of-view is essential to the purpose of this paper. Some theoretical approaches support the idea that market distortions may lower the productivity threshold necessary for survival. Syverson *et al.* (2005) suggest a variant of the market selection model originally proposed by Melitz (2000), one that introduces market power into the determinants of market selection. This model generates an equation of exit that represents the choice plants face as to whether or not they should continue to stay in business. The utility function that the model uses includes a term called the penalty for variety γ (i.e., the cost of substituting between products being consumed)[5].

The authors find that if products are less substitutable (meaning they have more market power, such that γ increases), then there is a lower cut-off profitability cost level (ϕ^*).This greater market power allows for the survival of some plants, even when they may have less competitive products due to higher costs, or lower productivities than their competitors. In this model, the particular value of the exit threshold is affected by the distributions of demand, efficiency, factor price draws, technology, and market features.

Our work here deals too with differentiated plants, which belong to different regions and different sectors with different levels of political influence. Although we do not portray political power in exactly the same manner as market power (namely, with penalties for variety),

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[5] By doing this, market power is introduced, as it creates space for uncompetitive actions like raising prices above market levels. This means that consumers with a higher ã have a more limited consumer response to price differences across an industry's producers.

we do not depart from Melitz model as our theoretical basis; specifically, we solely maintain its basic premise concerning the effects of distortions on productivity thresholds with respect to a plant's market survival. The political influence of a plant grants it protection and preferential treatment, and causes its cut-off profitability cost level to decrease. In particular, policies that benefit a sector may help it reach certain consumers (i.e., the monopolization of a sector in certain regions blocks close substitutes), or maintain lower prices than competitors in spite of having a lower productivity (i.e., the benefits brought about by tariffs). This makes it costly for the consumer to substitute between varieties[6], as portrayed in Syverson *et al.*'s model (2005). Thus, plants benefiting from greater political power may survive even when there is less demand for their product, higher costs, or lower productivities (and consequently, higher prices).

The studies that we have referred to so far support the view that research on the mechanism of market selection is important; likewise that the distortions that are imposed on it are costly in terms of aggregate productivity, and that they affect a process that otherwise would be productivity enhancing. The empirical results have also shown that the process is not necessarily smooth and instant, and that plants are heterogeneous when facing market selection. The roles of reforms and market distortions in this process have also been commented upon. The present study seeks to contribute to this strand of literature, where market selection is studied as a heterogeneous process across plants and sectors, and where institutions and policies affect it significantly. In particular, both the reforms themselves and their effects on plant survival heterogeneity will be approached from a political economic perspective, particularly when considering the role of special interests groups.

B. Special interest groups and policies

Lobbying, that is, the contributing to a campaign by special interest groups (Bonomo *et al.*, 2004), is a fundamental part of policymaking.

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6 We allow for products from different sectors to act as substitutes. For instance, using a ciiu 4 classification as we did in section 3, we have canned juices and sodas competing for a share of the market even thought they are located in different sectors.

For our purposes, the definition of lobbying can be widened to cover all political contributions (Grossman and Helpman, 1994) not only those made to campaigns but those defined as benefits to office-holders. Special interest groups have been widely studied within the literature. Grossman and Helpman (2001) review the different models and approaches dealing with special interest politics. They consider simple voting models, those representing special interest groups that have certain information which they lobby to transmit to policymakers; and finally, those concerning special interest groups that seek to influence policymakers through campaign contributions. In the first case, the policies chosen correspond to the median voter. In the second case, the equilibrium reached is more complicated and depends, among other aspects, on the weight policymakers give the information and the welfare of the general population. In the related models, a principal-agent approach is followed, whereby special interest groups signal policymakers, who then decide policy based on the information that was given. In the third case, that involving campaign contributions, several possibilities might exist—that there is only one interest group; that there are many interest groups competing for a particular policy; that there are several interest groups competing for a particular policy schedule and seeking to influence policymaking after the schedule is set. Additionally, models are modified to include legislative bodies comprised of several parties. Finally, within the models, some variation exists regarding, for instance, whether contributions are made to candidates for office before elections (wherein consideration must be made regarding the probability of their being elected); also whether there is a need for funds to convince the general public regarding the specific interests of the special interest group in question. In all the approaches mentioned in the book (Grossman and Helpman, 2001), a welfare function is ascribed to policymakers, with voters welfare and campaign and in-office resources constituting distinct arguments; however, by introducing employment considerations we want to indicate that both arguments can be intertwined.

Gasmi *et al.* (2004) also develop interesting models for describing the strategic behaviour of plants, in this case, regarding trade issues (antidumping). They develop signalling games wherein, as is the case with Grossman and Helpman (2001), there is hidden information, as well as monetary contributions. Their work focuses on firm-interna-

tional trade agency relationships, but we believe that their points-of-view are applicable to special interest group-policymaker relationships: the resulting equilibrium depends on several aspects, though trade policy often presents incentives for manipulating information and making monetary contributions. Again, our work deviates conceptually to some extent from this one, inasmuch as we are considering special interest groups' contributions and votes as constituting one dimension[7].

In spite of the importance of the lobbying process, the empirical evidence, especially regarding its magnitude, is not is not easily derived, partly because lobbying activities are often either legally forbidden, socially rejected, or both. Still, Hojnacki *et al.*'s (1998) research on this subject using a direct questionnaire methodology concludes that lobbying is a very common practice, and one to which most policymakers are subjected[8]. Gawande and Krishna (2005) test a model using empirical data and following Grossman and Helpman (1994), though here, a dichotomous variable is used and there is no capturing of different continuous levels of lobbying activities.

The existence and intensity of lobbying has strong effects on the economy, as it consumes resources that could be spent on alternative productive uses. Groups spend these resources and may get their preferred policies chosen, even when they do not correspond to what is most beneficial for the majority with respect to democratic elections. This happens because special interest groups are more organized than voters at large, and because the benefits derived of their individual members is generally larger (Grossman, 1996) than the average benefit derived of regular voters. In general, group action can be more effective through lobbying than through elections. Most special interest groups do not comprise a majority in votes; at the same time, they have organizational and pressure-generating skills that easily over-

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7 This adds a voting dimension to political influence, beyond the effects of lobbying. This is done in order to take into account the fact that a favoured sector can bring in votes from employees, relatives, and generally any citizen that benefits from the improvement of the conditions in the sector.

8 His project specifically studies the US House of Representatives in 1996.

come their minority status. However, as mentioned above, the votes these groups are able to contribute can also constitute an important complement to lobbying, in addition to direct contributions.

Commitment to the bargaining process depends to a great extent on the alternative choices groups have (Du Toit, 1987). In the case of policymaking, politicians confront a situation in which campaign support is difficult to attain through other means. The same goes for the representatives of special interests groups. For them, investment that increases market shares is subject to a cost-benefit analysis in comparison to lobbying activities that influence policies; usually the former are more expensive than the latter. The principle of mutual dependence proposed by Bacharach *et al.* (1981) states that the relationship between politicians who are policymakers and lobbyists is strong, and their level of mutual commitment is powerful. Asymmetry is needed for bargaining power to exist (Wagner, 1988), and in the case of policymaking, there are indeed differences in the respective powers of both bargaining sides to create rents and resources. In contrast to this position, some theorists say that rents are not created by any one side of the bargaining process, but rather arise in the market. Politicians and plants then bargain over them (Dorwick, 1989). All these approaches coincide in highlighting that bargaining is definitely taking place in situations where political support and policy outcomes are at stake. In fact, this scene is very appropriate for strong credible commitments to develop from bargaining.

In the study of lobbying as a way of exerting political influence over the implementation of policies, trade policy has a special place. Commercial policy, for instance, has always seen much lobbying take place (Grossman *et al*., 2004). In commercial policy, the interests of the economic groups involved are well defined and the benefits concentrated. When it comes to trade policy, lobbying is strong, and the groups that promote it can be rather easily identified (namely, whichever sector is being affected by tariffs, quotas, etc.). Grossman *et al.* (1995) have studied specifically the political process behind protectionist trade policies. They have theoretically studied the politics of free trade agreements and have divided the process into two steps: first, internal interests determine government preferences; governments then confront international interests in the agreement negotiations. Here, we are only

interested in the first step of the political process affecting policy.[9] Grossman *et al.* approach protective measures through the concept of endogenous protection[10]. By this, they mean to say that trade measures are not taken exogenously, but are a result of a process in which incumbent policymakers maximize their utility. This, in turn, depends on the amount collected through contributions made by special interests groups and on the welfare of voters. The authors conclude that the whole structure of trade protection reflects to a great extent the outcome of what is a competition for political favour. The structure of protection for an industry is a function of certain variables, such as the state of organization of the specific industry. Additionally, they show that in the presence of competition between special interest groups, trade policy is the preferred system of special interest groups for extracting rents from political influence, rather than any other means of income transfer[11].

Some policies show differences in treatment across different groups. Figure 1 shows that the tariff levels in Colombia have not been homogeneous across sectors for the period 1986-1998. The dispersion was lowered during the period being used for our estimations (1990-1998), but there are still differences across sectors. It is not a true ex-ante that all of these differences are politically driven, but this is one possible explanation that we want to explore.

Along with variation across sectors, variation of nominal tariffs across time within each sector is also noticeable. We calculate the standard deviations for each sector across time. The average of the within-sector deviation for all sectors is 14.8%. When this standard deviation is taken separately for the period prior to the year of reforms, 1991 (1986-

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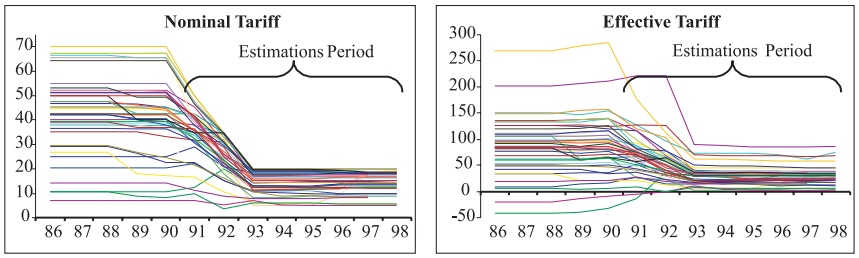
9 Trade agreements signed by Colombia have still left enough room for national policymakers to direct trade policy in the direction of their choice. For an overview of trade agreements made by Colombia, see Vallejo (2004).

10 Endogenous protection has been studied under the same framework by Grossman and Helpman (1994) and Gasmi *et al.* (2004), among others.

11 Grossman *et al.* 1994. If the government has an efficient way of transferring income at hand, then it poses a "credible threat to join forces with the opposing lobbies." Since this situation leaves groups little lobbying power, they prefer to leave out competition for these efficient policies, and to bid for trade policies.

1990) and for the period after 1991 (1991-1998), we get values of 14.1% and 8.6% respectively. On the other hand, the data shows an average between-sector standard deviation per year of 14.6% for the period prior to 1991, and of 5.26% for the period after. In both cases, variability is reduced following the market-oriented reforms of 1991. However, there seems to be enough variability for tariffs to be included in our estimations.

Figure 1. Nominal and Effective Tariffs for Colombia Ciiu4 Rev. 2, 1986-1998.



When it comes to policies that affect groups heterogeneously, it is tempting to address the process itself in which these policies are arranged as one of the necessary steps for understanding the outcome of policy. Following this idea, we refer to the political economic literature, especially that dealing with special interest groups, in order to better understand the phenomenon of differential policies in general, and of differential tariffs specifically.

The strand of literature on special interest groups, bargaining, and lobbying shows how this political power affects policymaking processes, and why this relationship is bound to be strong and recurrent, due to the interests of both special interest groups and politicians. Additionally, it is useful for our purpose to emphasize that trade policy is one area where political influence efforts are concentrated, especially because of the distinct effects it has on the relevant special interest groups. Also, it supports the idea that lobbyists acquire political power through campaign contributions. Some more general approaches also accept other kinds of political contributions. We added the dimension of votes, which is not necessarily the most important, but may act as a complement to other political contributions. Both eco-

nomic and political (in votes) campaign contributions require a large and wealthy group to be effectively exerted. Our approach to groups using political power deals with production sectors, so our interest revolves around both the political power of the sector, and the economic power it holds to exert that power effectively. To follow this line of thought in this study, we would like to use both economic and political data to construct an index that captures information about the political power of economic sectors. Also, since we conclude that organization also implies an advantage in carrying out political pressure, we want to use variables that give information as to whether or not a sector has organized lobbying groups or belongs to an important economic group.

II. Political power variables and influence on policies

The first empirical model features sector level tariffs in order to capture trade policy as a dependent variable, and explanatory variables that include a political power index and controls:

$$tariff_{st} = f(politpower_{st}, X_{st}, \in_{st}) \quad (1)$$

The first challenge we face is to construct a *politpower* index. We want to capture political power in a manner that captures both the economic importance of sector s in different regions r[12], weighing the different regions by the political power of each at the national level. *Politpower* is thus constructed as an index comprised of two components that capture two effects: the economic importance of sector s in region r in year t (S) and the political importance of region r in the whole country in year t (I).

To estimate this equation and the other two models that correspond to section III and IV, we use variables from several data sources that we describe next:

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12 When referring to regions, we mean the Colombian political division known as a departamento, the equivalent of a state or province in many countries. Each departamento has its own executive and legislative body as chosen by popular election.

The first of these are plant-level measures of economic fundamentals and plant choices taken from the database created from the Colombian Annual Manufacturers Survey (AMS)[13] by Eslava *et al.* (2004). Also, we take reform indicators constructed by Lora (2001) and transformed by Eslava *et al*. (2004). We use tariffs data from DNP databases for the period 1990-1998 too. We use nominal tariffs because this seems to be the standard convention in the literature. However, some estimations have been carried out using effective tariffs, and the results were found to be robust. Among other advantages, the database based on the AMS features enhanced productivity estimations due to the existence of plant level prices. This means that the calculated effects on plant exit will be more accurate, as movements in sector price indices are not recorded as productivity movements[14]. Therefore, the effects of political variables, which we want to control using productivity levels, are in fact being controlled by accurate variables. The fundamentals used here are taken from Eslava *et al.* (2004). Plant productivity in that database is estimated using plant-level physical output data and an instrumental variables approach. Demand shocks are aimed at capturing changes in demand not explained by fundamentals. They are calculated from the errors of the production function estimations, using a linear demand specification as well as instrumental variables techniques. These shocks are calculated by Eslava *et al.* (2004), who describe the process thoroughly.

These variables are used to construct an economic component to the political power index. We measure how important an economic sector is in each region, in terms of employees and production. Even though the sectors are located in different regions, we use regional level variables and shares as the link used to effective political power, as we will see in the next section, is the political importance of the region at the national level.

The second is election outcomes, taken from Registraduria Nacional printed archives, and compiled and transformed by the authors. All

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[13] The database contains data taken at the plant level for all industrial sectors. It includes data for 44,816 plants from the post-reform period (our estimation period). Eslava *et al.* (2004) has several tables with the descriptive statistics of this database.

[14] See Eslava et al. (2004) for a detailed explanation.

calculations are performed for the years 1990-1998, which span over two presidential and congressional elections. This covers the information available so to date for the post-1991 reforms period; during this period, market-oriented reforms were carried out, starting with Constitution of 1991. We use the election results for the Presidency and the Senate[15], disaggregated by region. As we explain in the next section, the location component plays a key role in our study. Citizens elect the members of the Chamber of Representatives from a list of candidates that exclusive to each region. The number of candidates from which each department gets to choose depends basically ex-ante on its population. This affects the variability of the percentage of the votes of an elected candidate that comes from one region (it is either 0 or 100%, because all elected candidates in the Chamber are only elected by only one region), as well as the variability of the share of votes the region has at the national level (something depending on factors not related to the political power of sectors). On the contrary, each Senate candidate is voted for nation-wide; hence, the variability issues mentioned above do not arise. We want to capture the political power of a region in a given period using the share of votes it contributed to elected candidates to the Senate. If a region contributes a large share of votes to an elected candidate to Senate, it means that the Senator gives greater political importance to that region. This does not take into account only a region's population, but also its voting participation and political agreement, among others. For these reasons, in attempting to capture a region's political power in the legislative branch, we do not use the data for the elections for the Chamber of Representatives, but rather stick to the Senate results. As was mentioned earlier, it was necessary to put together a database containing information on the results of Senate and Presidential election prior to 1998, since for this period, they were only available in printed formats. Aggregates for the results by candidate and by regions were also constructed.

A specific region generally has different sectors, some more economically important than others, which affects the extent to which they can benefit from the net amount of political importance that the re-

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15 The Colombian Congress is comprised of two chambers: a Senate, and a Chamber of Representatives.

gion has in the national political scene. We use the economic importance (share of output or share of employment[16]) of each sector in one region specifically to weigh the effective amount of political importance that the sector can benefit from in that region. A wealthy sector means possibly more campaign contributions. A large sector that has many employees implies more votes. A sector that is responsible for a large share of the region's overall output could compromise politicians due to the influence the sector has in all aspects of the region economy, and its failure would be very visible and harmful to the politician popularity. In all cases, policy makers from one region tend to be influenced in their decisions by what is beneficial to an economically important sector in that region[17].

In conclusion the political power index must capture both the sector's economic importance in the region, and the region's political importance at the national political level. The political power indices built here play a key role in this study, and a large part of this section will be devoted to explaining their construction.

The first part of the *politpower* index, S_{srt}, captures the sector's economic importance in the region. S_{srt} is constructed from economic variables (reflecting the output and the number of employees). The variables have four different specifications and are constructed in the following way:

$$S_{srt}\begin{cases} S_{srt}^{prod} = \dfrac{\text{output of sector } s \text{ in region } r \text{ in time } t}{\text{total output of region } r \text{ in time } t} & (2.a) \\ S_{srt}^{empl} = \dfrac{\text{employees of sector } s \text{ in region } r \text{ in time } t}{\text{total employees of region } r \text{ in time } t} & (2.b) \\ S_{srt}^{prod} = \text{lag of 3.2a} & (2.c) \\ S_{srt}^{elag} = \text{lag of 3.2b} & (2.d) \end{cases}$$

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16 We choose employment as a way to capture the number of people directly affected by the welfare of plants, which can eventually translate into votes. This could imply an underestimation of the economic importance of capital intensive plants. However, the results we reach are robust whether we used the economic importance from production or from employment.

17 This scheme implies that plants that belong to a sector that is economically important in one region can exert effective political pressure at the national level if that region is politi-

These variables are used to introduce the role of the pure economic importance of a sector. Greater economic importance increases the weight policymakers give a sector at the time of choosing between policies. It is interesting to use the employment and output variables as lagged variables as well, as affected agents respond to the preferential treatment of policies with votes and contributions in subsequent periods. The variables S_{srt} present one observation each by sector, department and year.

The second part of the index shows the political importance of the regions at the national political level. Its purpose is to capture the political importance of regions for candidates. I_{srt} is constructed from election results. The variables have two different specifications and are constructed in the following way:

$$I_{rt}\begin{cases} I_{rt}^{sen} = \sum_{e} \dfrac{\text{votes from region } r \text{ in time } t \text{ for senator e}}{\text{total votes in time } t \text{ for senator e}} & \text{(3.a)} \\ I_{rt}^{pres} = \dfrac{\text{votes from region } r \text{ in time } t \text{ for president}}{\text{total votes in time } t \text{ for president}} & \text{(3.b)} \end{cases}$$

The variable presents one observation for each department for each year. Consequently, it affects all sectors in any given department. Since the political candidates elected remain the same[18] for a period of four years, the values of I_{rt} are repeated for those four years. Finally, equations (2) and (3) are brought together to construct different versions of *politpower*. This measure has an observation for every department, year and sector:

$$politpower_{srt} = S_{srt} I_{rt} \qquad (4)$$

cally important itself. However, if the region has no significant voting importance, wealthy sectors in that region cannot make effective use of this wealth to transform it into political influence at a national level. Something similar happens to economically unimportant sectors located in a politically influential region. These cannot profit from the region's voting significance due to their own regional unimportance.

18 Changes within periods only occurred in the Senate. Senators who resign from office give up their places to candidates belonging to their political party and that were known by the electorate at the time of election. We assume that a replacement's relationship to special interests groups and groups of voters remains the same as that of the original senator.

In the equation described by (1), we use tariffs as policy indicators; these vary between sectors, but not between departments. Consequently, the influence of a sector is conveyed to national policymakers through its respective region. Benefits of the derived influence are received by the sector nation-wide as well. We therefore construct an aggregate variable at the sector level, capturing the importance of the sector across all regions in the country. This variable varies across sectors, so as to exploit sector variability in the political power indicator—this is in order to explain sector variability in tariffs. The new variable has one observation for each sector for each year:

$$poltot_{st} = \sum_{r} politpower_{srt} = \sum_{r} S_{srt} I_{rt} \qquad (5)$$

According to the definition of poltot in (5), wherein we combine S_{rt} (2) and I_{rt} (3), we get 8 different variables[19]. The empirical model to be estimated is given by

$$tariff_{st} = \beta_1 poltot_{st} + \beta_2 EA + \beta_3 EG + \beta_4 tradecol_t + \beta_5 X_{st} + \in_{st} \qquad (6)$$

Here, each observation corresponds to the data at the sector level for year t. Since the original variables in the database of economic data are found at the plant level, sector averages are taken, and estimations made, weighted by the number of plants. The variables are constructed exactly as we described at the beginning of this section[20] Tradecol is a trade reform index, initially developed by Lora (2001) for several Latin American countries for the period 1985-1999. Tradecol increases along with the level of reform and therefore shows the degree of openness to trade. The inclusion of this variable is for the purpose of capturing a country's overall stance on trade policy, a factor that affects tariffs but is not attributable to the actions of any specific sector. For this, we

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19 The indices we get then are: $poltot^{prod}$ (S^{prod} and I^{sen}), $poltot^{emp}$ (S^{empl} and I^{sen}), $poltot^{prodlag}$ ($S^{prodlag}$ and I^{sen}), and $poltot^{emplag}$ (S^{emplag} and I^{sen}) using Senate results, and $poltot^{prodpres}$ (S^{prod} and I^{pres}), $poltot^{emplpres}$ (S^{empl} and I^{pres}), $poltot^{prodlagpres}$ ($S^{prodlag}$ and I^{pres}), and $poltot^{emplagpres}$ (S^{emplag} and I^{pres}), using the results from the presidential elections.

20 Each plant has data on its corresponding department and sector. For example, since politpower has a value per sector per department per year, each plant is assigned its value of politpower according to the sector and department it is located in, and the year to which its values correspond.

use a transformed version of Eslava *et al.* (2004)[21]. X_{st} is a vector of control variables—. In this case, it only includes gdp growth and political cycle effects[22]; the latter are dummies for each year of a politician's term in office.

Economic association (gremios) (EA_s) is a dummy variable created following a review we made of several documents[23], mainly lists reported by the National Association of Industries (ANDI). If the sector belongs to an EA, then the variable has a value of 1; otherwise, it has a zero value. The same process was applied to create a dummy variable identifying sectors represented in one of the four most important economic groups (EG_s)[24]. As mentioned in the special interests groups review, organization plays a very important role with respect to a group's potential to convey their interests into effective political influence. In fact, group cohesion, the organization of common activities, and a concentration in preferences is what allows them to effect enough pressure to get policies carried out that are beneficial to them, even when they may be harmful to the population at large. These dummy variables are intended to capture the importance of belonging to these organized groups. However, the index of political power is still important, because the dummy variables do not capture variability over time; the quantitative dimension of the political power of a sector; or other ways by which political power can be exerted besides belonging to a group. These 'other ways' include the votes from indi-

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21 The transformation basically consists of re-scaling the index for Colombia so that the observation showing the most liberalized state of trade reforms in the country equals one, and the least equals zero.

22 The political cycle refers to the differences existing in policies based on what point a politician is in his term. For example, a politician may be more willing to engage in large amounts of public expenditure during the final year of his term—despite its effects on future public finances—as his immediate interest is to make a favorable impression on the voters in order to get himself or his party re-elected. This means, for example, that public expenditures may follow a cycle caused by political determinants. For a further explanation, see Eslava *et al.* 2005.

23 We use data mainly coming from Echavarría *et al.* (2000), Rettberg (1998), and Lora (2000).

24 Angelika Rettberg identifies the four most important economic groups in Colombia: el Grupo Empresarial Bavaria, la Organización Ardila Lulle, la Organización Sarmiento Angulo, el Sindicato Antioqueño. Una Mirada Crítica a los Gremios Colombianos, 1998, Departamento de Ciencia Política Universidad de los Andes.

viduals benefiting from that specific sector's welfare, the temporary lobbying movements of a sector that do not constitute a permanent EA or EG, and the regional visibility that an important sector's welfare can bring a politician. Whenever the political power index appears in a model together with the dummy variables, it should be interpreted as the effect of political power that comes from the economic importance of a sector in a politically important region, one that is exerted through channels other than belonging to an EA and/or an EG.

As a cross-check to our construction of the political power index, variable case studies are taken from Echavarría *et al.* (2000), from selected sectors that have been historically favoured by policies due to strong lobbies; these are compared against our measure of political power. To determine whether the political power index ($poltot_{st}$) behaves in a manner consistent with the evidence from these case studies, the sectors are ordered from lowest to highest according to their political power index value. This is done for every political power index specification listed in Table 1. If at least 70%[25] of the sectors considered by Echavarría *et al.* (2000) as being historically favoured by policies are on the top half of the ordered arrangement, then the variable is considered to agree with the evidence (indicated as 'YES' in the sixth column of the table). All cases are found to agree with the historical evidence.

Correlations are also calculated between political power and EA and EG categorization. Correlations are significant and positive but not very high, which means that sectors with higher political power indices tend to belong (though not necessarily) to an EA and EG. Additionally, the fact that the correlations are not close to 1 means that the EA and EG variables provide additional information over what is conveyed by the political power indices. This justifies introducing them into the estimations—they act as a complement to the political power indices in explaining the effects of political power.

The following table summarizes the cross-checks created on the political power indices:

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[25] The threshold level is defined by the authors.

Table 1. Political power indices relationships.

Political power index (4 and 5)	Economic component (2)	Political component (3)	Correlation with economic associations (gremios) dummy	Correlation with Economic Group dummy	Correspondence to historical case studies of strong lobby groups.
$poltot^{prod}$	S^{prod}	I^{sen}	0.65	0.56	YES
$poltot^{prodpres}$	S^{prod}	I^{pres}	0.54	0.55	YES
$poltot^{emp}$	S^{empl}	I^{sen}	0.63	0.53	YES
$poltot^{empres}$	S^{empl}	I^{pres}	0.64	0.62	YES
$poltot^{emplag}$	S^{emplag}	I^{sen}	0.57	0.58	YES
$poltot^{emplagpres}$	S^{emplag}	I^{pres}	0.64	0.68	YES

We estimate model 6 to test for the effect of political power on sectors' tariffs. The results are presented in Table 2.

Table 2. The determinants of tariffs.

	(1) $poltot^{prod}$	**(2) $poltot^{prod}$**	**(3) $poltot^{emplag}$**	**(4) $poltot^{emplag}$**
Political power	0.1103*	0.0973*	0.1145*	0.1009*
	(0.0107)	(0.0108)	(0.0109)	(0.0111)
Trade reform	-3.6981*	-3.6536*	-3.7022*	-3.6574*
	(0.3013)	(0.2926)	(0.2997)	(0.2918)
Economic sector association	-	0.0318	-	0.1804*
		(0.0416)		(0.0034)
Economic group	-	0.2609*	-	0.2495*
		(0.0686)		(0.0687)
R square	0.5134	0.5452	0.5185	0.5480
N	261	261	261	261

Notes: The dependant variable equals nominal tariffs averaged for the ciiu 3 sector level (weighted by the number of plants at the ciiu 4 level, since that is the level for the tariffs data). This table reports the results of the model estimated using ordinary least squares, with fixed effects to account for differences across sectors. The political cycle and gdp growth controls were included as well. Tests were to check for error homoskedasticiy. Asterisks denote significance at the 5% level. Standard errors are reported in parentheses. For definitions of $\boldsymbol{poltot^{prod}}$, and $\boldsymbol{poltot^{emplag}}$, see Table 1.

Different specifications of the model are estimated, each using a different specification of the political power index. The model is estimated using ordinary least squares with fixed effects in order to account for sector differences. Some models are also estimated controlling for population. The results are robust to the introduction of this variable.

The effect of political power on tariffs[26] is positive and significant. This result shows that having higher political power results in more protection from these trade policies, even when controlling for the general stance of trade reform. A negative effect for/ trade reform index is expected and obtained, because the general trend of trade reform during the period was to open the economy to international markets. The effect is also significant. The effect of the variables indicating whether or not plants in a sector belong to EAs and EGs have a significant and positive effect in all but one case. When they are introduced, the political power effect decreases, but remains significant, which shows that part of the political power influence comes from belonging to the mentioned associations and groups. The effect of the political power index does not change regardless of whether we use that containing/accounting for production or the one containing/ accounting for employees. We also find that the effect of political power calculated using votes for presidential elections shows consistently higher values than the effect of the index calculated using Senate elections' votes. However, the differences are not large.

In summary, these results indicate that a plant in an economically important sector in a politically important region can gain oneself policy favours, at least in the case of trade policy. Despite the fact that tariffs are laws, and therefore are legislated by the Congress, this result tells us that in the Colombian political system, the President still has a strong/an important role in determining trade policy.

III. Political power and market selection

In this section, we propose an empirical model that tests the effect of political power on the probability of plants exiting the market. Following the discussion in the literature review, we estimate a probit market selection model that, just like/much like the market selection equation in Syverson *et al.* (2005), includes market fundamentals as well as a variable representing a source of power or protection in market performance (in this case political power). The empirical model fol-

[26] The results using nominal tariffs are reported since it is a standard in the literature. However, effective tariffs are also used, and the results are mentioned as well.

lowing the intuition discussed and estimated in this section is described as follows:

$$probit(exit_{it}) = \beta_1 Fundamentals_{it} + \beta_2 tradecol_t + \beta_3 otherreforms_t + \beta_4 poltot_{st} + \beta_5 interactions_{st} + \in_{st} \quad (7)$$

A probit model is used, and the marginal effects are reported. Exit is defined as follows:

$$exit_{it} = \begin{cases} = 1 \text{if plant exits in } t \\ = 0 \text{ otherwise} \end{cases} \quad (8)$$

Both *poltot* and the trade reform index hold the same definitions as in Section II. We expect political power to have a negative effect on the probability of exit, as it increases the threshold of minimum performance levels required for survival, as introduced in the Melitz model mentioned in the literature review. We again use the reform indices constructed by Lora (2001) and transformed by Eslava *et al.* (2004). In fact, Eslava *et al.* (2005) already used these reform indices for his market selection estimations; we are interested in testing them here again to control for the country's general stance on trade reform as well as the rest of reforms. The Tradecol index is the same index we used in the model defined by equation (6) and explained in Section II. The Other reforms index refers to the composite index calculated by Eslava *et al.* (2004) using the data gathered by Lora (2001). This index averages the indices corresponding to labour, financial, tax, and privatization reforms.

We also use fundamentals to control for a plant's economic traits that may also affect the probability of its exiting. The fundamentals used here are: lagged productivity (TFPlag), the logarithm of energy and material prices (lprelag, lprmlag), the logarithm of production (lprod), the demand shock (directsh2lag), the elasticity of demand (elas2lag), and the interactions of some of these variables with reform measures. We use demand shocks and elasticities of demand as constructed by Eslava *et al.* (2005). We expect productivity to reduce the probability of exit, ceteris paribus, because of lower costs and larger profits. We expect the latter two factors to affect a plant's performance as they

represent changes in market power. In particular, we expect shocks and elasticities to have a negative and positive effect respectively. Finally, production is used to control for the size of plants. Interactions with reforms are included as well to test whether the liberalization of the economy has changed the degree to which political power affects market selection. To test for robustness, sector tariffs are included in some versions of the estimated models. The results for estimations of the model given by equation (7) are reported in Table 3. The results agree with the intuition we proposed. Most of the results are robust to the changes in the specification.

Table 3. The effect of political power on exit probability.

Regressor	(1)	(2)	(3)	(4)
$poltot^{prod}$	-.0254* (.0086)	-.0333* (.0091)	-.0268* (.0085)	-.0333* (.0091)
Lagged productivity	-.0099* (.0025)	- .0097* (.0025)	-.0099* (.0025)	-.0097* (.0025)
Lagged demand shocks	-.0192* (.0009)	-.0187 * (.0009)	-.0192* (.0009)	-.0187* (.0009)
Output prices	.0174* (0.003)	.0164 * (.0035)	.0174* (.0035)	.0164* (.0035)
Tariffs		.1447* (.0429)		.1447* (.0429)
Trade reform	-.0051 (.0552)	-.0026 (.0553)	-.0051 (.0552)	-.0026 (.0553)
Other reforms	.0841* (0.041)	.1001* (.0419)	.0841* (.0415)	.1001* (.0419)
Economic association			-.0763* (.0315)	-.0980* (.0345)
Economic group			.0292* (.0075)	.0024 (.0146)
Poltot interacted with trade reform	.0564* (.0127)	.0582* (.0130)	.0564* (.0127)	.0582* (.0130)
Poltot interacted with reforms other than trade	-.0394* (.0104)	-.0324 * (.0105)	-.0394* (.0104)	-.0324* (.0105)
Likelihood ratio	-8149.7087	-8100.4924	-8149.7087	-8100.4924
N	28,786	28,598	28,786	28,598

Notes: The dependant variable is the probit of a dichotomous variable that indicates staying in or exiting from the market at time t. A generalized linear model estimation using probit link function was used (probit model). Asterisks denote significance at the 5% level. Standard errors are reported in parentheses. Gdp growth controls are included as well as a control for time trend. Sector controls are used as well. For a definition of $poltot^{prod}$, see Table 1.

The effect of political power on the probability of exit is negative, and significant, or all versions of the political power index. This happens both when the model is estimated using the political power measure based on Senate votes (reported) and when it is estimated using that based on presidential votes. Once again, it is slightly more convenient for a sector to be politically significant for the President than for the Senate. The results are robust for the inclusion of population controls. When included, the EG and EA dummy variables show/elicit

different types of behaviour. The EA shows a significant negative effect on the probability of exit. In contrast, the EG is sometimes positive and only slightly significant, and sometimes, not significant at all. This means that belonging to an economic association can represent an advantage in terms of shielding plants from factors that would otherwise make them exit the market. Productivity causes a negative and significant effect on the probability of exit, which confirms the link between productivity and market selection. As expected, the more productive plants are less likely to go out of business. However, other variables also prove to be determinants of the probability of exit. Plants that are exposed to larger demand shocks, for instance, also have a smaller probability of exiting the market. The trade reform index shows no significance in the regressions using the aggregate political power indicator (5). On the other hand, the indicator for other reforms has a negative and significant effect. This probably means that reforms have made plants stronger and better able to endure difficulties that would otherwise have driven them out of the market. One possible example of this is financial reforms, which give smaller plants access to credit and thus help them to get around hard times. Interactions between these reforms show that political power loses influence as trade reforms open markets. Still, even if we start from a situation where trade reforms as well as other reforms are at their most liberalized stage, political power continues to show an overall negative effect on the probability of a plant exiting.

IV. The costs of political power influence

Finally, we seek to estimate the effects of political power on aggregate productivity. Our main motivation comes from what we conceive as the costs political power cause, on efficient reallocation, market selection, and overall productivity. Here, we try to measure these costs. In order to do this, we follow a simple approach that seeks to describe the link between the aggregate productivity of a sector and its political power. In doing this, we emphasize our point that plants that are still in business are either productive enough to be making profits; are receiving positive demand shocks; or, although not particularly productive, are benefiting from political power and obtaining protection that allows them to survive in spite of low productivity levels. Put

another way, the productivity levels of surviving plants are determined not only by economic variables, but by political power as well.

We follow the argument discussed in Section I.A., that political power affects the distribution of shares, inclusive of those plants driven out of the market; this in turn affects aggregate productivity. Aggregate productivity here is calculated first at the sector-level. To do this, we add together the productivities of all the plants in the sector, each weighted by its share of production in the sector. Reallocation thus affects aggregate productivity, not only through the exiting of plants, but through the weights used (i.e., the shares of production). Since political power allows low productivity plants to survive and grab hold of production shares, we would expect it to negatively affect the aggregate productivity of sectors and of the economy in general. In this way, we can see that, despite the fact that productivity at the plant level is defined as a random shock, reallocation processes do affect aggregate productivity.

Our empirical model estimates the correlation between aggregate productivity at the sector level as a dependant variable and political power, controlling for several effects. The model is given by:

$$TFP_{st} = \beta_1 ddshock_{st} + \beta_2 poltot_{st} + \beta_3 tariffs_{st} + \beta_4 gdp\_growth_t + \in_{it} \quad (9)$$

In this model, aggregate productivity is calculated using plant level productivities as calculated by Eslava *et al.* (2004). Tariffs and political power index (equation (5)) are already at the sector level. In some versions of the model we use an EA and EG in order that we might include the political power stemming from these groups. We include tariffs to control for the effects of protective measures on productivity. We already discussed in Section II how tariffs depend to a certain extent on political power. However, we still include them in order to take account of the effects of trade policy that do not depend upon political power. When they are introduced, the political power index should be interpreted as influence that is transmitted through channels other than tariffs. These other channels, as we have mentioned, might be public expenditure directed towards sector production, subsidies and tax exemptions, or access to preferential treatment in financial markets, and so forth. We are aware of the fact that the inclusion

of tariffs in the determination of productivity may introduce a potential endogeneity problem, since tariffs may be affected to some extent by certain industry traits such as sector aggregate productivity, our dependant variable.

Robustness checks are carried out and the results are mentioned below. We expect a negative effect from political power on aggregate productivity. As we have argued before, political influence may allow unproductive but politically influential plants to survive, even if they have low productivity levels. More than simply surviving, it allows them to gain larger production shares of their markets than would be possible without political power influence. In conclusion, plants that belong to politically influential sectors may survive despite low productivities, thus lowering aggregate productivity through two channels—their own low productivities and the larger[27] share of production they contribute to the calculation of the aggregate.

Demand shocks were included to account for the fact that different aspects of the market may also affect aggregate productivity[28]. Demand shocks were transformed from the plant level to the sector level by taking sector averages.

Several versions of the model were estimated[29]. Table 4 shows one representative result.

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27 These low productivity plants would otherwise have lower shares, and eventually zero shares, when the plants drop out of the market.

28 For instance, a large average demand shock could benefit the plants in a sector, securing them enough profits to survive even if they have low productivity levels or higher than average prices.

29 The results for the estimations made with political power calculated using Senate votes are reported as usual. Some general results for political power derived from presidential votes are commented upon.

Table 4. Estimation of productivity with fundamentals and political power.

Regressor: aggregate productivity at the sector level	**Political power index calculated using production: poltot^{prod}**	**Political power index calculated using employment: poltot^{emplag}**
Political power	-.0373* (.01000)	-.0387* (.0101)
Demand shocks	-.06704* (.0180)	-.0656* (.0179)
Tariffs	-.0900 (.2430)	-.0801 (.2429)
Economic association	-.0908* (.0375)	-.0924* (.0374)
Economic Group	.0298 (.0623)	.0305 (.0622)
Fit statistic[30]	-	-
N	261	261

Notes: Asterisks denote the significance at the 5% level (p-values lower than 0.05). Standard errors are reported in parentheses. Clustered regressions were used to correct group-wise panel-heteroskedasticty. Gdp growth controls were included as well. For definitions of *poltot*^{prod}, and *poltot*^{emp}, see Table 1.

In general, political power is found to have a significant negative effect on aggregate productivity, as expected. The magnitude is slightly larger with the political power that stems from presidential elections, but the direction and significance are similar. The same negative and significant effect is found for demand shocks. Tariffs are not found to have a significant effect in any case. The potential endogeneity problem we mentioned could be part of the reason why the tariffs do not come out as being significant. Robustness checks were carried out to avoid this problem. The same model was used introducing the trade reform index in the place of tariffs. Since this variable is an aggregate

[30] Clustered regressions were used to separate errors with different variances; consequently, there is not one single R-square. The F-statistic hypothesis that all coefficients are zero is rejected with a p-value of 0.0000.

of all policy for all sectors, endogeneity is not probable: one could not say that it is influenced by the aggregate productivity of a single sector. In this case, the related reform index turns out not to be significant, showing the same behaviour as tariffs. The instrumental variables technique was also used to prevent more directly the potential endogeneity problem caused by the tariff variable. We used political power and the variables indicating whether or not plants belong to economic groups and/or economic associations as an instrument for tariffs. Again, tariffs turn out not to be significant.

It can be seen then that political power influence affects aggregate productivity through other channels. This does not mean, however, that general benefits related to trade policy do not affect aggregate productivity. This result only accounts for nominal tariffs, which are only a part of trade policy. Trade policy benefits other than tariffs might still be captured by political power. Belonging to an economic association shows a robust, significant negative effect on aggregate productivity. We might thus say that the political influence coming from economic associations can also bring protection to unproductive plants. By contrast, the influence of economic groups is not important to the dynamics of aggregate productivity, and in all cases, its effect is not significant.

Following this estimation, aggregate productivity at the sector level is estimated both with and without accounting for the effect of political power. The predicted values in each case (one per sector per year) are aggregated, using the shares of production in the economic output of each sector for each year as weights. From this, we obtain one single value accounting for the effect of political power and one ignoring it. Comparing the two shows us the cost implied by the distortion imposed by political power on the allocation process. According to our model, political power decreases aggregate productivity by an average of 4.35%. Additionally, the estimated aggregate productivity at the sector level is calculated ignoring both the effects of political and economic power and the effect of belonging to economic groups and/or economic associations. In this case, political influence reduces aggregate productivity by an average of 9.86%.

Table 5. The costs of political power on aggregate productivity.

Calculated aggregate productivity	political power index used	
	Calculated using production: $poltot^{prod}$	***Calculated using employment:*** $poltot^{emplag}$
1. Aggregate productivity using Eslava *et al*. (2004) data	.9807359 (.9447 / 1.0167)	.9807359 (.9447 / 1.0167)
2. Aggregate productivity estimated using the Model	.9807358 (.9683 / .9932)	.9807358 (.9681 / .9933)
3. Aggregate productivity with no political power effect	1.022649 (1.0116 / 1.0337)	1.02502 (1.0141 / 1.0359)
4. Aggregate productivity with no political power effect or economic associations effect	1.075874 (1.0672 / 1.0846)	1.079208 (1.0707 / 1.0877)
Number of observations	261	

Notes: The arithmetic means of each variable is reported. The 95% confidence interval is reported inside parentheses to show the lower and upper limit values that the variable could take. Variable 1 is calculated using productivities taken directly from Eslava *et al.* (2004). Variable 2 is calculated using the prediction of the model defined by (9). Variable 3 is calculated using the prediction of the model defined by (9), though imposing the restriction that the coefficient of the political power index is zero. Variable 4 is calculated using the prediction of the version of the model defined by (9) that includes the economic associations variables EG and EA, and imposes the restrictions that both the coefficients of the political power index and of the economic association variables are zero. For definitions of $\boldsymbol{poltot}^{emplag}$, and $\boldsymbol{poltot}^{emplag}$, see Table 1.

V. Conclusions

Political power has been found to be an important factor in the way plants interact with economic conditions. The index we constructed was cross-checked, comparing it to variables that indicated the representation of the sectors in economic associations and economic corporate groups, and to case studies of sectors favored by policies related to Colombian industry. The index performed fairly well in these tests. In the first empirical exercise, political power proved to be an important determinant of trade policies. This influence on policies was then shown to affect the dynamics of reallocation facing plants, namely market selection. The benefits go beyond trade policy and are transmitted through other channels as well. These other channels are captured by controlling for protection and introducing tariffs to the model. The effect of membership in economic groups and economic associations behaves almost constantly, just like the political power index, though there were some cases that were not significance.

In general, we can conclude that a plant with large political power benefits from convenient policies, particularly, though not exclusively, those related to trade protection. Moreover, it benefits in such a way that it is able to maintain lower productivity levels and still survive. This leads us to consider the effects on aggregate productivity. Political power allows low productivity plants to maintain large market shares; in the absence of political power, they would probably drop out and have lower or even zero shares. Thus, political power has a harmful effect on aggregate productivity. We find that removing the distortive effects of political power increases aggregate productivity by up to 9.86% annually.

Further study might go further in studying the effects of political power on other kinds of policies that can be assigned to specific sectors. Such study would seem relevant given the importance of the variable 'other reforms' in market selection estimations.

Additionally, some improvement in the estimations remains to be done so as to account for other aspects that may affect both policies and market selection processes. For instance, we might consider the direct effects of liberalization on productivity that come from exposure to competition and access to higher quality, cheaper inputs (Amiti, 2005). Also, it would be useful to capture the heterogeneity in plant responses to reforms and changes in policies (Schor, 2004). Although we try to capture the heterogeneity in plant response by introducing several traits of the plant analyzed (e.g., sector effects, membership in economic groups), we could still strengthen estimations by taking into account the nature of the industry being considered (whether importing or exporting, capital or labour intensive).

Additionally, it would enrich the scope of analysis if we re-built the political power index by calculating it as a weighted average of the economic and political components, with weights á and 1- á respectively. By changing á, we could then perform simulations and analyses of political and economic reforms on plants political power itself. Finally, this study could be enriched by expanding the period considered. In this case, the analysis of political trends (political cycles, repetitions of terms, compositions of congress) could be expanded upon.

Bibliography

AMITI M., and KONINGS J. (2005). "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia", IMF Working Paper.

ARBELÁEZ M., ECHAVARRÍA J., and ROSALES M. (2006). "La productividad y sus determinantes: el caso de la industria colombiana", *Desarrollo y Sociedad*, pp. 77.

BACHARACH, S. and LAWLER, E. (1981). *Bargaining: Power, Tactics and Outcomes*. San Francisco, Jossey-Bass Printing.

BAILY, M.; HULTEN, C., and CAMPBELL, D. (1992). "Productivity dynamics in manufacturing establishments", *Brooking Papers on Economic Activity: Microeconomics*, pp.187-249.

BALDWIN, J. (1995). *The Dynamics of Industrial Competition: A North American Perspective*. New York, Cambridge University Press.

BARTELSMAN, E. and DOOMS, M. (2000). "Understanding productivity lessons from longitudinal microdata", *Journal of Economic Literature* 38(3):569-95.

BARTELSMAN, E.; HALTIWANGER, J., and SCARPETTA, S. (2004). *Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries.* World Bank.

BONOMO, M. and TERRA, C. (2004). "Special interest and political business cycle", preliminary version, September 30, *Political Economy Network - PEG. LACEA Meeting Cartagena, Colombia.*

BROCK, W. and MAGEE, S. (1978). "The economics of special interests: The case of the tariff", *The American Economic Review*, 62(2).

DAVIS, S., and HALTIWANGER, J. (1999). "Gross job flows", *in* David Card and Orley Ashenfelter (eds.), *The Handbook of Labor Economics, North-Holland*, publisher?

DOWRICK, S. (1989). "Union-Oligopoly bargaining", *Economic Journal*, 99(398):1123-42.

DU TOIT, P. (1987). "Consociational democracy and bargaining power", *Comparative Politics*, July, 19(4):419-30.

ECHAVARRÍA J. and GAMBOA, C. (2000). "Colombia and Venezuela alter the Uruguay round: Trade policy reforms and institutional adjustments", *Fedesarrollo*.

ESLAVA, M.; HALTIWANGER, J.; KUGLER, A. and KUGLER, M. (2004). "Heterogeneous adjustments of employment and capital after factor market deregulation", *NBER Working Papers No. 11656*.

____ (2004). "The effects of structural reforms on productivity and profitability enhancing reallocation: Evidence from Colombia," *Working paper*.

____ (2005). *Plant Survival, Market Fundamentals and Trade Liberalization*. Mimeo.

ESLAVA, M., and DRAZEN, A. (2005). "Electoral manipulation via expenditure composition: Theory and evidence", *NBER Working Paper No. 11085*.

FARUK, G. (1989). "Bargaining foundations of shapley value", *Econometrica*, January, 57(1):81-95.

FOSTER, L.; HALTIWANGER, J. and SYVERSON, C. (2003). *Reallocation, Plant Turnover, and Efficiency: Selection on Productivity or Profitability?* University of Maryland, Mimeo.

GASMI, F.; MALIN, E. and TANDÉ, F. (2004). "Lobbying in antidumping", 31st Conference of the European Association of Research in Industrial Economics.

GAWANDE, K. and KRISHNA, P. (2003). "The political economy of trade policy: Empirical approaches", *in* James Harrigan and E. Kwan Choi (eds.), *Handbook of International Trade* (pp. 213-250).

GROSSMAN, G. and HELPMAN, E. (1994). "Protection for sale", *The American Economic Review*, 84(4).

____ (1995). "The politics of free trade agreements", *The American Economic Review*, 85(4):667-90.

____ (1996). "Electoral competition and special interests politics", *Review of Economic Studies*, 63(2):265-86.

____ (2001). *Special Interest Politics*. Cambridge: MIT Press.

____ (2004). "A protectionist bias in majoritarian politics", *NBER Working Paper No. 11014*, December.

HOJNACKI, M. and KIMBALL, D. (1998). "Organized interests and the decision of whom to lobby in congress", *The American Political Science Review*, 92(4):775-90.

HOJNACKI, M.; KIMBALL, D.; BESLEY, T. and COATE, S. (2001). "Lobbying and welfare in a representative democracy", *The Review of Economic Studies*, (68)1.

HOPENHAYN, H. (1992). "Entry, exit and plant dynamics in long run equilibrium", *Econometrica*, 60(5):1127-50.

JOVANOVIC, B. (1982). "Selection and the evolution of industry", *Econometrica*, 50:(3):649-70.

JOVANOVIC, B and MACDONALD, G. (1994). "The life cycle of a competitive industry", *Journal of Political Economy,*102:(2): 322-47.

Law 171-03 of Colombia, regulating lobby activities.

LORA (2001). "Las reformas estructurales en América Latina: qué se ha reformado y cómo medirlo", *BID Research Department Working Papers Series*, 348.

LORA, R. (2001). *Los gremios empresariales. En Colombia: en los inicios del siglo XXI*. Bogotá, Universidad Javeriana.

MELÉNDEZ, M. and SEIM, K. (2006). "Reformas a la política comercial y productividad: el sector manufacturero colombiano, 1977 a 2001", *Desarrollo y Sociedad*, p. 1.

MELITZ, M. (2000). *Estimating Plant-Level Productivity in Differentiated Product Industries*. Harvard University, Mimeo.

NEIL, *et al*. (1992). "Productivity dynamics in manufacturing plants", *Brooking Papers on Economic Activity, Microeconomics*. pp. 187-267.

RETTBERG, A. (1998). *Entre el cielo y el suelo: una mirada crítica a los gremios colombianos*. Bogotá, Universidad de los Andes.

ROBERTS, M. J. and TYBOUT, J. R. (1997). "Producer turnover and productivity growth in developing countries", *World Bank Research Observer*, Oxford University, 12(1):1-18.

SYVERSON *et al*. (2005). "Reallocation, plant turnover, and efficiency: Selection on productivity or profitability?", *IZA Discussion Paper Series*.

TYBOUT, J.; De MELO, J.and CORBO, E.V. (1991). "The effects of trade reforms on scale and technical efficiency: New evidence from Chile", *Journal of International Economics* 31:231-250.

VALLEJO, H. (2004). "Some worrying theoretical consequences of the non-linear relationship between the economic size of preferential trade agreements and welfare", *CEDE Documents*, Bogotá, pp. 2004-06.

WAGNER, H. R. (1988). "Economic interdependence, bargaining power, and political influence", *International Organization*, 42(3):461-63.