INTEREST GROUPS AND TRADE REFORM IN MEXICO

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Mexico experienced widespread economic reform in the last two decades. From being a protectionist economy with a policy of import substitution, it has turned into an export-oriented open economy. Why was protectionism a stable policy, and how was it overturned by a reform that went against entrenched interests? I apply a game theoretic model of political influence and economic reform to answer these questions using data to calculate the payoffs for the relevant interest groups. In the underlying cooperative game, the core is empty and a protectionist coalition of import-substituting firms and the government was "stable" until the eighties. Adjusting the model's parameters to changes in the government's financing options in the late eighties and early nineties leads to a different and unique outcome. In the predicted outcome a free trade policy is adopted through cooperation between all players.

En la últimas dos décadas México transitó de una economía proteccionista a una economa abierta y orientada a la exportación. ¿Por qué fue el proteccionismo una política estable, y cómo fue sustituido por una reforma que actuó contra intereses creados? Para contestar estas preguntas, utilizo un modelo de teoría de juegos en que la influencia de los grupos de interés influye en las decisiones de política. Al ajustar los parámetros del modelo a los datos, el juego cooperativo subyacente, tiene un núcleo vacío y predice que una coalición de empresas que sustituyen importaciones y el gobierno es "estable" hasta los años ochenta. Para tomar en cuenta los cambios en las opciones del financiamiento del gobierno a finales de los ochenta y principios de los noventa, se ajustan los parámetros del modelo. De ahí surge un nuevo equilibrio único que predice la adopción de una política de libre comercio.

Keywords: Trade Reform, Mexico, Coalition Formation, Aspirations, Cooperative Games, Interest Groups.

JEL Codes: C71, D72, O12, O24.

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1 Introduction

> There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order to things.
>
> Niccolo Machiavelli, *The Prince*

Why did Mexico keep a protectionist policy for almost four decades? Why did it change to free trade? After the Mexican Revolution and particularly after the Second World War, the Mexican government followed a policy of import substitution industrialization. The government supported the "National Industry" through tariffs and subsidies. In the late eighties, the government made a complete change in trade policy. In the span of eight years, from 1986 to 1994, the Mexican government lowered import tariffs, entered the GATT and successfully negotiated a free trade agreement with Canada and the United States.

I provide an answer to both questions by applying a cooperative game theoretic model and examining its equilibrium outcomes by matching the model's parameters to the data from the relevant periods. The main points of my argument are as follows

1. Initially the government and the small and middle sized firms form a coalition in which the government commits to keeping high tariffs in exchange for transfers from the import substituting sector. The cooperative game induced by the data has an empty core and therefore admits an inefficient equilibrium outcome.

2. After the oil and debt crisis of the early eighties, the government's main outside source of financing -oil revenues- is restricted. In response, the government implements an overhaul of the income tax and VAT policy as well as stricter enforcement.

3. Matching the model's parameters to the exogenous change in the government's revenue from taxes leads to a new game with a non-empty core. The resulting equilibrium outcome of the game have the government and the export oriented firms cooperating and supporting a policy of free trade.

The findings suggest that the failed trade reforms of 1971-1975 and 1977-1980 could be the result of the underlying cooperative game having an empty core.

The change in policy predicted by the model does not depend on any assumptions of positive transaction costs or commitment problems.

2 Protectionism and Free Trade in Mexico

In this section, I describe the historical and institutional details that are necessary background for the development of the model of trade legislation in Mexico over the last 30 years.

2.1 Tax and Trade Reform

The theory set forth links tax and trade reform to explain the trade policy change that took place in the period of 1986-1994. I treat the tax reform that took place in the years of 1988-1989 as the exogenous variable, while the trade policy choice as determined in the equilibria of the model. Both reforms took place after a severe economic crisis in 1982. The following describes both reforms and their context.

For seventy years, from 1929 to 2000, Mexico had a single party rule. In the year 2000, the presidency fell to an opposition party for the first time. The *Partido Revolucionario Institucional* or PRI held, until the 1990's, all governorships, a majority in both chambers of Congress and the presidency.

The "official party" appeared at the closing of the Mexican Revolution with the intent of consolidating the remaining factions in a single political entity. Unique in Latin America, the PRI maintained relative peace during seven decades. The party's three sectors are: agriculture, labor and the "popular sector" (the urban middle class). For political and ideological reasons, the private sector was not in the party.[3] Nonetheless, the government fostered the creation of business organizations, which would provide a unified representation, and which were in fact the only political channels businesses had available.[4]

At the end of the Second World War, the Mexican government adopted a policy of import substitution industrialization (ISI). Several reasons existed for that choice.

[3]Schneider 2002, 79-80.

[4]Ibid., 81.

First, there was the ideological orientation of the government looking to create a "National Industry." During the war, many small and middle-sized producers substituted imports that were no longer available and even exported to the U.S. At the end of the war the organizations representing them asked for trade barriers to be set up to protect them from foreign competition.

The ISI policy, coupled with an orthodox handling of fiscal and monetary policy appeared to have been successful until the end of the 1960's, what is now called the "Stabilizing Development" phase.

During the 1970's, the government pursued aggressive fiscal and monetary policies and had an increasing participation in the economy. The government aimed to modify income distribution and alleviate historical injustices. The end of the decade saw the discovery of large oil reserves. With the increase in oil prices, the country was able to borrow significant amounts: from 1971 to 1982, the public sector's foreign debt grew at an annual rate of 26.3%. In 1982 the government deficit reached 17.6% of that years GDP.[5] It is widely believed that mismanaged policy and the fall in oil prices led to the debt crisis of 1982.

After the crisis, the government could not borrow from the foreign credit markets. The government of president De La Madrid attempted to balance the budget as part of a macroeconomic stabilization program but failed.

To finance expenditures the government needed other sources of revenue. When the Salinas administration took over in 1988, an objective for fiscal policy was to

[5]Solís Manjarrez 2000, 378-379.

increase overall tax revenue by 1% of GDP.[6] The fiscal authorities took several measures for that effect: changes in the taxable base to adjust for inflation, much stricter enforcement of tax laws and the introduction of a minimum corporate tax. The minimum corporate tax took the form of a tax of 2% of the value of firm's assets (adjusted for inflation). The firms that reported profits could credit the asset tax payments for their income tax obligations. The number of firms paying taxes increased from 1,929,124 in 1989 to 5,602,486 in 1993.[7] Administrative changes also simplified tax collection. The government sold virtually all government owned firms, including the banks nationalized in 1982. All the above allowed the government to lower marginal tax rates to international levels.[8] The corporate tax income revenue increased from 2.38% of GDP in 1989 to 2.78% in 1993. A complete description of the tax reforms is in Gil Díaz and Thirsk, 1990.

The stabilization plan included curbing inflationary inertia. The government, leading firms and unions agreed to increase their prices by no more than a certain amount for a predefined period of time. The "pacts," as they came to be called, were renovated periodically.[9]

To take advantage of the "law of one price" as an aid in curbing inflation the government lowered tariffs on certain imports. In 1986, Mexico entered the Gen-

[6]Gil Díaz and Thirsk 1999, 30.

[7]Ibid., 81-83.

[8]Urzúa 2000, 79.

[9]Solís Manjarrez 2000, 395.

eral Agreement on Tariffs and Trade (GATT).[10] It is important to notice that even then, this mild form of trade liberalization was neither an end in itself nor a binding commitment. Mexico had *unilaterally* decided to lower tariffs.

Trade reform eventually became an end in itself as part of the government's package of structural reforms. From an inward looking economy, the government promoted an outward looking economy based on exports. In 1993, the government signed the North American Free Trade Agreement with Canada and the U.S. The agreement went into effect January 1st, 1994. The Secretary of Trade during the Salinas administration, Jaime Serra, responding to criticism of the government's lack of industrial policy, said "NAFTA *is* our industrial policy."[11]

2.2 Business Organization in Mexico

The second component in the story is the set of interest groups that promoted or blocked the trade reforms. The two subsets of the private sector relevant for this exercise are the "Import Substituters" and the "Export Oriented Firms." A brief description of Mexican business organization clarifies which firms they contain.

There are two types of business groups in Mexico: the compulsory and the voluntary. Although recent changes in legislation removed compulsory participation, it was a significant difference during the period of study. Table 3.1 summarizes the business organizations discussed below.

[10] Ibid., 198, 200.

[11] Johnson Ceva 1998, 137.

TABLE 3.1

Business Organizations in Mexico

	Sector	Founded	Members	Trade Orientation
Compulsory				
CANACINTRA	Industry	1941	Small & medium size firms	Protectionist
CONCANACO	Commerce	1918	Regional chambers	Toward protectionism
CONCAMIN	All Industry	1918	Regional chambers	Toward protectionism
Voluntary				
COPARMEX	Employers	1929	All types of entrepreneurs	Free trade
CMHN	Industry	1964	Big Corporations	Free trade
CCE	All Business	1975	Business Groups	Toward free trade

Source: Flores Quiroga (1998), Schneider (2002) and Thacker (1999, 2000).

The government fostered the first group, business organizations with compulsory participation, by legally forcing firms to join an industrial or commerce chamber. The government founded the Confederation of Industrial Chambers (CONCAMIN) [12] and the Confederation of National Chambers of Commerce (CONCANACO)[13] in 1918, to represent the interests of industry, retailers and other service providers.

Several dozen chambers representing particular industries like foodstuffs, tobacco, textiles, chemicals and capital goods compose the CONCAMIN. The relative presence of specific industries changes its position in matters of trade policy, which has not been consistent across time.[14]

[12]Confederación Nacional de Cámaras Industriales.

[13]Confederación Nacional de Cámaras de Comercio.

[14]Flores Quiroga 1998, 87-89.

Due to the Second World War, imports from the U.S. were unavailable. This gave the opportunity for Mexican producers to substitute for them and even export them to the United States. In 1941, many of the small producers that had appeared just before and during the war were joined by the government in the National Chamber of the Transformation Industry (CANACINTRA).[15] At the end of the war, CANACINTRA demanded a high level of protection from the government and continued incentives for the development of the national industry.

CANACINTRA's lobbying was successful with the abolishment, in 1951, of the U.S.-Mexico free trade agreement of 1943 and the passing of a law that forced the government to buy Mexican goods whenever possible (even if imports were cheaper!).[16]

To counterbalance the government's policies, activist firms joined in voluntary organizations. The first such group was the Employer's Confederation of Mexico. (COPARMEX), founded in 1928 by a group of Monterrey's firms disgruntled by labor laws.[17] The second and arguably most important one is the Council of Mexican Businessmen (CMHN),[18] founded in 1962. The CMHN is a "not secret, but discreet" association of 30 to 40 of the CEO's and owners of the biggest corporations in Mexico, (they comprise the majority of the firms now publicly traded).[19] The CMHN has the privilege of an annual closed door meeting with the president as well as hosting a

[15]Cámara Nacional de la Industria de la Transformación.

[16]Ibid., 90-91.

[17]Confederación Patronal de la República Mexicana; Ibid., 97.

[18]Consejo Mexicano de Hombres de Negocios.

[19]The CMHN "no es secreto, pero sí discreto." Quote in Schneider 2002, 90.

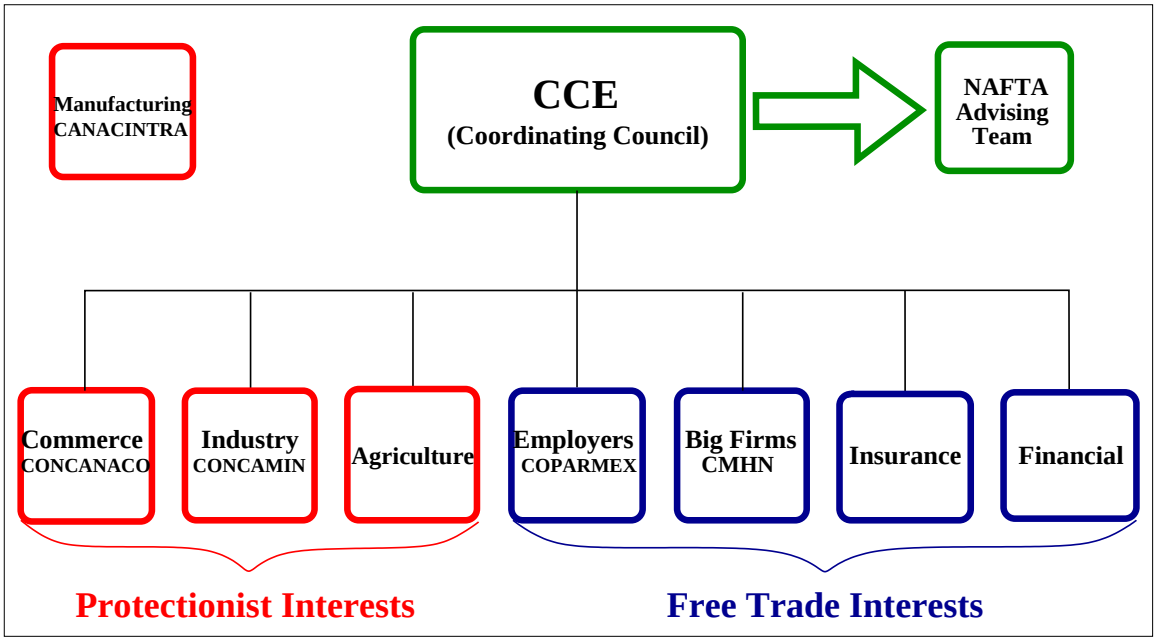
monthly luncheon/discussion with a cabinet member involved in economic policy.[20]

The CMHN proposed and sponsored the formation of the Entrepreneur Coordination Council (CCE) in 1975.[21] The CCE, an umbrella association representing all business councils, formed a unified front against president Echeverría's perceived "leftist" policies.

Figure 3.1 shows the structure of the CCE. Each member holds one vote, giving the export oriented firms and their related financial interests the majority. CANACINTRA does not hold a vote but is a permanent guest of the CCE.

FIGURE 3.1

MEMBERS OF THE CCE



The CCE hired an advising committee that would accompany government officials

[20]Ibid. 83, 89-90.

[21]Consejo Coordinador Empresarial. Flores Quiroga 1998, 98-99 and Schneider 2002, 94-100.

during the NAFTA negotiations, mostly financed by the CMHN. Some of the other groups complained of the committee's bias towards the interests of the larger firms with international interests.[22]

The free trade interests of the CCE have 4 out of 7 votes but represent only 4% of the indirect members of the CCE. The CONCAMIN and the CONCANACO represent 13.8% and 55.2% respectively.[23]

The protectionist firms represented by CANACINTRA and CONCAMIN will be the import substituting "player" in the theory. Similarly, the CMHN represents the free trade oriented player.

2.3 Coalition Building in Mexico

Other authors, like Flores Quiroga and Thacker, have previously studied the political influence of the private sector, as an explanation of trade in Mexico.

In a regression exercise, Flores Quiroga finds that the size and trade orientation of firms are statistically significant for the level of protection in the economy. His work stresses that trade policy needs to gather political support from interest groups.[24]

He also mentions two instances of failed trade reform, one in 1971-1975, and another in 1977-1980. He argues both failed because of the pressure of protectionist business groups.[25]

[22]Thacker 2000, 161.

[23]Flores Quiroga 1998, 101.

[24]Ibid., 119.

[25]Ibid., 194-196 and 255-257.

Two works by Thacker (1999, 2000) describe the importance of political coalitions to support policies in Mexico. He argues that government sponsorship for trade reform is not enough; trade reform needs the support of a political coalition. In his argument, the government and protectionist firms formed a coalition to promote import substitution policies. However, during the 70's and 80's the power structure between the three players (Exporters, Import Substituters and Government) shifted due to a series of external effects beyond their control (international financial changes, oil shocks, etc.). The changes in power structure disrupted the existing coalition and led to the formation of the free trade coalition, which supported the changes in trade policy in the late 80's and 90's. One of the key points in Thacker's argument is that policy makers form coalitions with private groups whose leverage is the greatest.[26]

I will argue such an assumption is not necessary; an implicit cooperative game, and whether it has an empty or non-empty core, determines the outcomes. Exogenous changes in the 1980's changed the underlying game to one with a non-empty core therefore leading to a trade policy that was more efficient in the aggregate.

The results also suggest that the failure of the proposed free trade reforms of 1971-1975 and 1977-1980 could be attributed to the emptiness of the core of an associated cooperative game.

[26]Ibid., 37.

3 Modelling Policy and Coalition Formation

A general version of the model is developed in detail elsewhere.[27] Here, I present a three-player version along with the relevant calculations, from the data, of the exogenous variables in the model. The relevant economic agents in this setup are a set of interest groups. Each agent is an interest group with access to resources it can use to influence policy or institutional reform. Interest groups choose from a set of policies and receive payoffs based on their policy choices. The choice itself is made trough voting, similar to the standard cooperative games of voting.[28]

The set of players is $N = \{X, M, G\}$ where X is represents the export oriented firms, M the import substituting firms and G the government.

Let the policy choices be $\{P, FT\}$, P is the protectionist policy and FT is the free trade one. Three types of variables are relevant to the players: the number of votes that players have for policymaking, the endowment of resources they can bargain with and the final payoffs they will receive. The voting rights and endowments are given exogenously but the final payoffs are determined in equilibrium.

A *voting rights profile* is a function $\omega : 2^N \to \mathbb{R}_+$ with $\omega(\emptyset) = 0$, $\omega(N) > 0$ and such that

$$\omega(S) + \omega(T) \leq \omega(S \cup T) \text{ for all } S, T \subseteq N;\ S \cap T = \emptyset.$$

A coalition can choose policy if it is winning. For $\mu \in (\frac{1}{2}, 1]$, a coalition S with

[27] See Sánchez-Mier, 2005.

[28] For an introduction to cooperative games and their applications see Shubik, 1984.

$\omega(S) \geq \mu \cdot \omega(N)$ is called a *μ-winning coalition.*

An *endowment* is a vector $\psi(\cdot) \in \mathbb{R}^n_+$ that assigns "disposable income" to each player for each policy choice. Each endowment profile is the result of the underlying economic structure in this case the international trade arrangements. Assume that $\sum_{i \in N} \psi_i(FT) > \sum_{i \in N} \psi_i(P)$.[29]

The bargaining position of each coalition is the minimum payoff it can guarantee for itself even if the rest of the players vote against it. In general cooperative game theory this payoffs are represented by functions $v : 2^N \rightarrow \mathbb{R}^n$ that vanish on the empty set. The number $v(S)$ is called the *worth* of coalition S; N is called the grand coalition. I refer to an arbitrary cooperative game as v, while the cooperative game resulting from the environment of interest groups and policy choices as g. Formally the game g is defined as

$$g(S) = \begin{cases} \max\{\sum_{i \in S} \psi_i(P), \sum_{i \in S} \psi_i(FT)\} & \text{if } \omega(S) \geq \mu \cdot \omega(N) \\ \min\{\sum_{i \in S} \psi_i(P), \sum_{i \in S} \psi_i(FT)\} & \text{if } \omega(S) < \mu \cdot \omega(N) \end{cases}$$

$$\forall S \neq \emptyset \text{ and } g(\emptyset) = 0.$$

This way of defining the game is standard in game theory though not the only alternative. For this particular application the worths of each coalition given by g should be thought of as "reservation prices". In particular they are not outcome allocations. It is convenient to think of them as what each coalition brings to the table, a starting point for negotiation. The point in defining the game is to find which

[29] As the data shows, this is not an unrealistic assumption as far as the three players are concerned.

coalitions are likely to form and what side payments players make. An *outcome* for this game is a vector of payoffs and a partition of the set of players containing a winning coalition. The winning coalition pins down the policy choice.

The set of players in the game is: $N = \{$Export Oriented Firms, Import Substituting Firms, Government$\}$. The first group represents the larger (mostly public) corporations represented by organizations like the CMHN and the CCE. The second group would be the small to middle sized firms represented by the CANACINTRA and the CONCAMIN.

The exogenous variables to calculate are: the voting rights profile (the leverage of each player relative to the others) and two sets of endowments, the ones resulting from continuing the status quo policies of a closed protectionist economy and the ones under free trade. This is necessary since two games will be obtained, corresponding to the economy before and after the tax reform.

TABLE 3.2

ENDOWMENTS

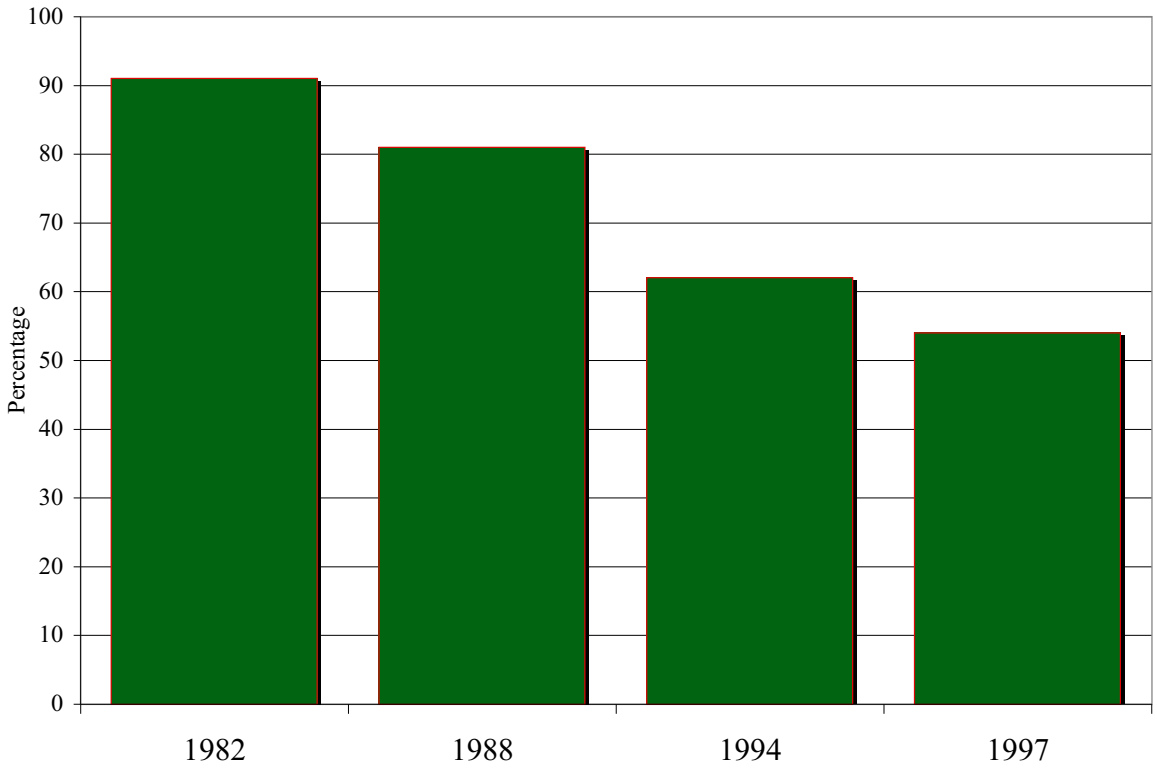
	Before Tax Reform	After Tax Reform
EXPORT ORIENTED	$\psi_X(P), \psi_X(FT)$	$\psi'_X(P), \psi'_X(FT)$
IMPORT SUBSTITUTING	$\psi_M(P), \psi_M(FT)$	$\psi'_M(P), \psi'_M(FT)$
GOVERNMENT	$\psi_G(P), \psi_G(FT)$	$\psi'_G(P), \psi'_G(FT)$

The government's endowments are calculated before and after the tax policy that increased the taxable base by including the asset tax.

3.1 Voting Rights Profile

FIGURE 3.2

OFFICES HELD BY THE PRI



Source: Base de Datos Políticos de las Américas, (1999).

The voting rights profile stands for the number of votes or resources that the players have to influence policy outcomes. At the time the trade and tax reforms took place the PRI still had control of both chambers in congress as well as the presidency. If all the PRI officials followed the party line, they had the opportunity to have any policy passed without significant congressional opposition. There are many examples of party discipline in the PRI during the period of study not least of which is the number of laws and constitutional reforms the government of Carlos

Salinas was able to pass. Even after the 1995 crisis the government of Ernesto Zedillo was able to push through a hike on the VAT rate by means of the PRI majority in Congress. The signing of the NAFTA itself is an often quoted example of the "PRI Bulldozer".[30]

As figure 3.2 shows, even though the political control of the PRI was in decline it still held a majority until the 1997 midterm elections. The *Base de Datos Políticos de las Américas* reports that the PRI held 81% of the available public offices in 1988. This includes municipal heads, state representatives, governors, seats in both chambers of congress and the presidency. The figure had decreased to 64% by 1994.

The voting rights for the government are assumed to be $\omega(G) = \omega(N)$, that is 100% of the total voting rights. The other players have $\omega(X) = \omega(M) = 0$. The majority parameter is $\mu = 51\%$. The government had control of the policy choice. The "power" of the private sector relies not on the ability to dictate policy but rather on the resources they have which can be used to influence policy.

3.2 Endowments

Excluding oil, the manufacturing sector is the most significant contributor to exports and imports. As reported by the National Institute of Statistics (INEGI),[31] the manufacturing exports averaged 90.2% of non-oil exports in 1980-2002. The manufacturing

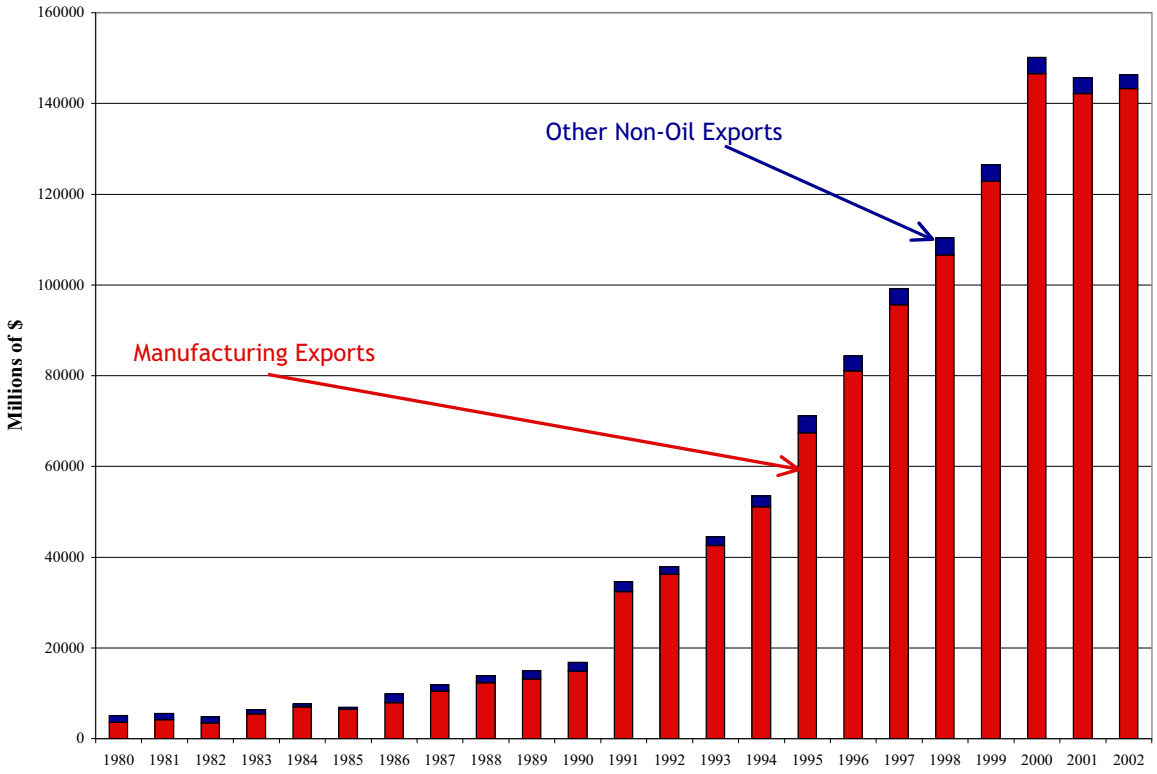
[30] *La aplanadora priísta.*

[31] Instituto Nacional de Estadística, Geografía e Informática.

imports accounted for 90.7% of total imports from 1980-2002.[32]

FIGURE 3.3

NON-OIL EXPORTS



Source: INEGI.

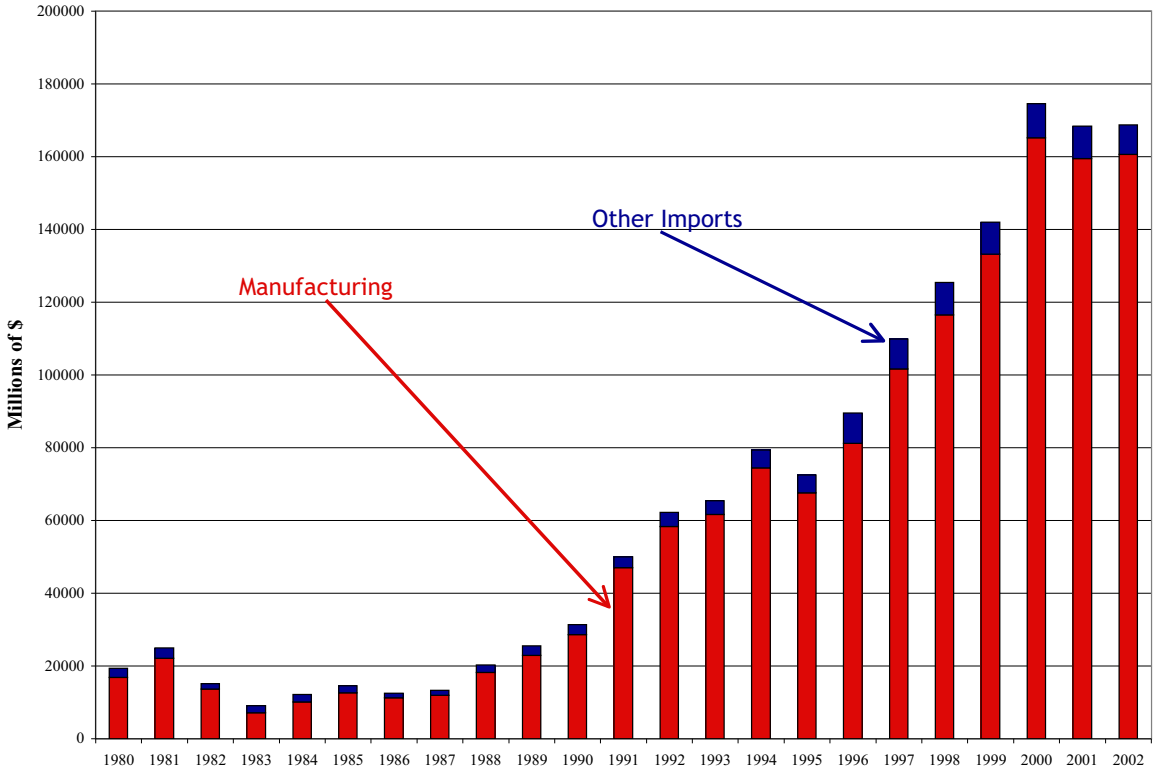
Figures 3.4 and 3.5 show the yearly participation of manufactures in both exports and imports.

The calculated values of $\psi(X)$ and $\psi(M)$ are based on the data for the manufacturing sector. I assume the business leaders maximize the common accounting profits or net income (or the present value of them). In this model business leaders have rational expectations, they fully anticipate the benefits and costs associated with different trade policies.

[32]Riner and Sweeney (1998) discuss the importance manufacturing in Mexico's foreign trade.

FIGURE 3.4

TOTAL IMPORTS



Source: INEGI.

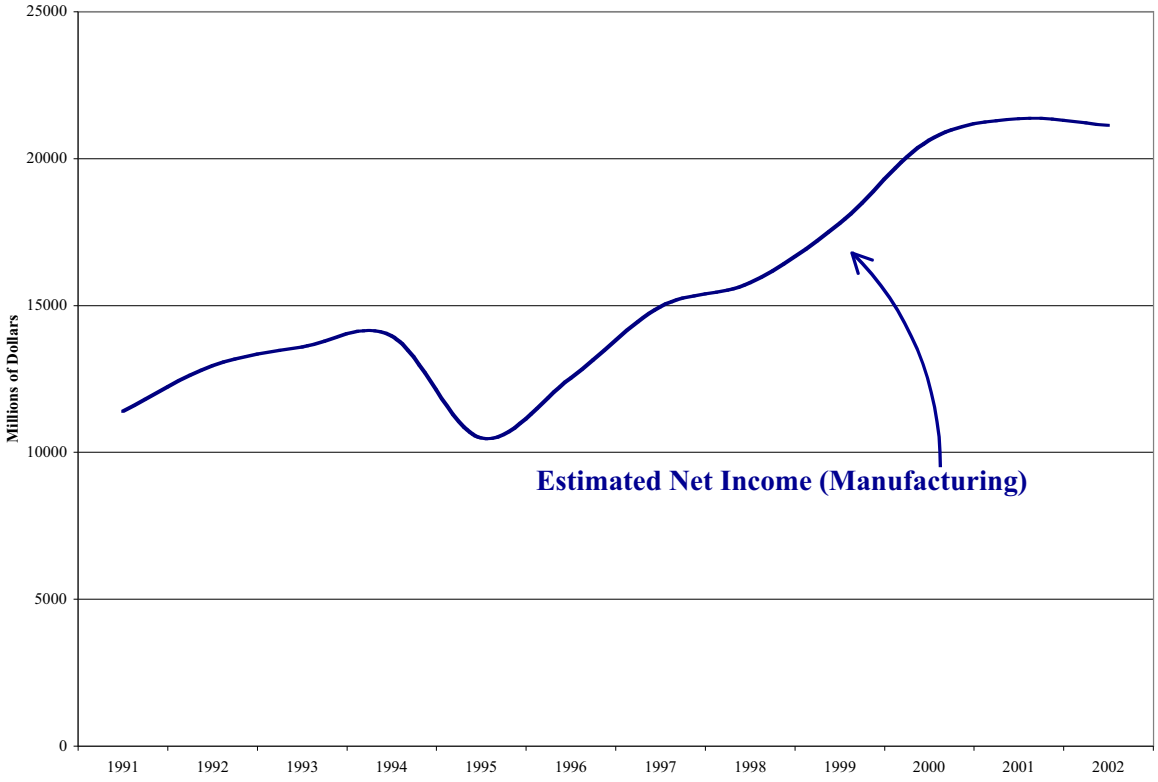
The income statements of the public firms in manufacturing reveal an average net income margin[33] of approximately 8%. This estimate is based on the reported net income margins of 33 firms traded in the Mexican stock exchange for the years of 1992-2001.

INEGI reports value of sales data for the manufacturing sector only from 1987 to 1995. Using this figures and the average net income margin of 8% gives an average of net income to *output* of 4%. Using output data from INEGI, Figure 3.5 shows the estimated net income of the manufacturing sector in the period 1991-2002.

[33]The ratio of net income to total sales.

FIGURE 3.5

ESTIMATED NET INCOME



Source: Constructed by the author with data from INEGI, Worldscope.

The endowments identified to the net income of the manufacturing sector given that its *change* is attributed for the most part to the surge in exports. The values of $\psi_X(P)$ and $\psi_X(FT)$ are therefore set equal to the averages of the net income for the periods of 1991-1993 and 1994-2002 at 1996 dollars.

As reported by INEGI, the proportion of imports to total manufacturing supply has gone from roughly 10% in 1980 to 35% in 2002. [34] Assuming the 35% share of manufactured goods were substituted under protectionist policies gives a rough estimate of what domestic firms could have sold had they remained protected. Again,

[34]Total manufacturing supply is output-exports+imports.

a net income margin of 8% of sales is used to estimate the net income of the protected firms for the 1980-2002 period. Using output data from INEGI, the values of $\psi_M(P)$ and $\psi_M(FT)$, in 1996 dollars, are the averages of the estimated net income for the periods 1980-1993 and 1994-2002 respectively.

The calculation of the government endowment is based on the idea that in the bargaining situation, the players consider the government's corporate income revenue associated with the manufacturing sector. It is the baseline revenue the government gets from the private sector regardless of any other agreements. The Mexican government reports an aggregate figure for the personal *and* corporate income tax so following Trigueros and Fernández I assume a corporate tax revenue share of 3/5 of total income tax revenue.[35]

Figures of the corporate income tax revenue paid by the manufacturing firms are not available. An estimate is obtained assuming the corporate income tax is uniform across all sectors in the economy, and using the ratio of revenue to GDP calculated by Urzúa.[36] I use 2.38% as proxy for the before reform tax rate and 2.78% as the after reform tax rate. With the series for manufacturing GDP it is possible to construct two series for the "before" and "after."

Then, $\psi_G(P)$ and $\psi_G(FT)$ are equal to the average revenue of manufacturing corporate income tax for the period 1980-1988 and 1994-2002 assuming the 2.38% average tax rate. That is the revenue the government would obtain from the manufacturing

[35]Trigueros and Fernández 2001, 108.

[36]Urzúa 2000, 81-83.

sector without the tax reform. The values of $\psi'_G(P)$ and $\psi'_G(FT)$ are calculated similarly but using the 2.78% rate. This represents the government revenue with the tax reform.

TABLE 3.3

CALCULATED ENTITLEMENTS AND ENDOWMENTS

$\omega(X) = \omega(M) = 0$	$\omega(G) = 1$
$\psi_X(P) = 12.22, \psi_X(FT) = 15.16$	$\psi_M(P) = 4.58, \psi_M(FT) = 1.16$
$\psi_G(P) = 4.82, \psi_G(FT) = 7.84$	$\psi'_G(P) = 5.63, \psi'_G(FT) = 9.16$

Billions of Dollars of 1996

Note that I have not changed the endowments for firms before or after the tax reform. I take the position that the changes in revenue were due mostly to the increase in the taxable base and greater efficiency in collection. Sobarzo, in an applied general equilibrium model, found that in simulations, changes in tax polices didn't have strong effects in the allocation of resources while they did increase tax compliance.[37]

3.3 Before Tax Reform

So what does the model predict, given the calculated endowments? The parameters induce two cooperative games, g and g', representing two instances of bargaining over trade policy. The game g stand for the negotiation before the tax reform, g' is the game after the reform. The induced game g is displayed in Table 3.4.

[37]Sobarzo 2000, 59.

TABLE 3.4

GAME BEFORE TAX REFORM

$g(X) = 12.22$	$g(X, M) = 16.32$	
$g(M) = 1.16$	$g(X, G) = 23.00$	
$g(G) = 7.84$	$g(M, G) = 9.40$	$g(X, M, G) = 24.16$

Billions of Dollars of 1996

The numbers $g(\cdot)$, are the payoffs that each coalition can guarantee for themselves even if all other players act against them. For example, the coalition of the protectionists and the government (M, G) can obtain \$9.40 billion if the government chooses P and \$9 billion if it chooses FT. If the coalition were to form, it would choose P.

What policy will be chosen? Will all players cooperate? First note that g has an empty core. There is no division of the \$24.16 billion that cannot be improved upon by a smaller coalition. Consider any payoff vector $x \in \mathbb{R}^3_+$ that is efficient, $\sum_{i \in N} x_i = g(N) = 24.16$. For example, the one giving all the players their free trade endowments: $x = (15.16, 1.16, 7.84)$. Then player M can make an offer to the government to form a coalition with G, leaving X out, and having payoffs $x' = (12.22, 1555 - \varepsilon, 7.84 + \varepsilon)$ for some small ε. Player X can then propose a counteroffer: form a coalition with G to support free trade and get payoffs $x'' = (15.16 - 2\varepsilon, 1.16, 7.84 + 2\varepsilon)$. To that M can propose a counteroffer and so on. Does the process goes on forever? No, the alternative is to use another solution.

Here the solution is the Aspiration Bargaining Set. Why use this solution concept? A common objection to the cooperative approach is that by definition the solution concepts are efficient (all gains from trade are realized) and impose a coalition structure at the outset. The Aspiration Bargaining Set has none of these features. The equilibrium coalition structure is determined through the play of the game, by the solution concept itself. For this very reason, even in superadditive games the resulting coalition structure need not lead to an efficient outcome. The aspirations solution concepts have other desirable properties but these are the more relevant to the question at hand.[38]

To define the ABS, the concept of a Generating Collection is introduced. If the players were to demand a certain payoff in exchange for being part of a coalition, which coalitions could afford them? Formally, pick $x \in \mathbb{R}^n$, then its *Generating Collection* is a set

$$GC(x) = \{S \subseteq N | \sum_{i \in S} x_i \leq g(S)\}.$$

Let $GC_i(x) = \{S \in GC(x) | i \in S\}$. Player i *is vulnerable to* j *at* x if

$$GC_i(x) \subsetneqq GC_j(x).$$

If a player is vulnerable, it means that it always needs to be in a coalition with another player to obtain its demanded payoff, but the other player does not. She has an outside option. To avoid situations like this the solution concept will choose payoff demands that leave no player vulnerable.

[38]For more on the aspiration solutions see Bennett, 1984 an 1985.

The *Aspiration Bargaining Set ($\mathcal{ABS}$)* of an arbitrary cooperative game $v : 2^N \to \mathbb{R}$ is the set of payoff vectors $x \in \mathbb{R}^n$ such that

1. $\forall S \subseteq N$, $\sum_{i \in S} x_i \geq v(S)$. (No surplus)

2. $\forall_i \in N$, $\exists S$, $i \in S$ s.th. $\sum_{k \in S} x_k \leq v(S)$. (Feasibility)

3. No player is vulnerable at x. (Partnered)

The set $\mathcal{ABS}$ is non-empty for arbitrary cooperative games with side-payments.[39]

The intuitive idea behind aspirations is that the players will select their prices before any coalition is formed. Once a set of prices is determined, some of the feasible coalitions will form. Rather than starting with a coalition structure and finding robust sets of payoffs for deviations in that coalition structure, aspiration solution concepts find price vectors that are fixed regardless of which coalitions end up forming.

For g the $\mathcal{ABS}$ contains only one aspiration $\hat{x} = (14.96, 1.36, 8.04)$ with generating collection $GC(\hat{x}) = \{(X, M), (X, G), (M, G)\}$. Note that $\hat{x}$ is indeed in $\mathcal{ABS}$ as it satisfies no surplus, feasibility and no vulnerability. So suppose that the coalition of (M, G) has formed. Given that the players have chosen to demand $\hat{x}$ in order to enter a coalition, M cannot threaten to disrupt the coalition if not given a higher payoff since G can just form a coalition with X which gives her \$8.04. This is symmetrical for all players, all the coalitions in $GC(\hat{x})$ are "stable" in that sense.

[39] This was shown by Albers and Bennett. The aspiration approach is described in Bennett 1984 and 1985.

To fix ideas let $\mathcal{C}(g)$ denote the set of core points, $\mathcal{E}(g)$ the set of efficient allocations and $\mathcal{ABS}(g)$ the aspiration bargaining set of g. The above discussion shows that $\mathcal{C}(g) = \emptyset$, $\mathcal{E}(g) \neq \emptyset$ and as shown by Albers and Bennett $\mathcal{ABS}(g) \neq \emptyset$.[40]

For the game g, and given the solutions of the $\mathcal{ABS}$, an *equilibrium outcome* is a vector of payoffs $\pi \in \mathbb{R}_+$ and a partition $\mathcal{P}$ of the set of players if there is $x \in \mathcal{ABS}(g)$ such that

$$\pi_i = \begin{cases} x_i & \text{if } i \in S \\ \psi_i(P) & \text{if } \sum_{i \in S} \psi_i(P) > \sum_{i \in S} \psi_i(FT),\ i \notin S \\ \psi_i(FT) & \text{if } \sum_{i \in S} \psi_i(P) \leq \sum_{i \in S} \psi_i(FT),\ i \notin S \end{cases}$$

where S is the (unique) winning coalition in $GC(x) \cap \mathcal{P}$.

The outcome $(\pi, \mathcal{P})$ is *efficient* if $\sum_{i \in N} \pi_i = g(N)$, it is *efficient* when $\sum_{i \in N} \pi_i < g(N)$. An equilibrium outcome defines simultaneously a coalition and a payoff structure.

The discussion above showed that in this case the $\mathcal{ABS}$ predicts the protectionist coalition being stable. What can be said in general? The result that follows shows that all empty core games have at least one inefficient equilibrium outcome. The converse is also true.

THEOREM *A game g as defined above has a non-empty core if and only if, under the $\mathcal{ABS}$, all of its equilibrium outcomes are efficient. Additionally, if g has a non-empty core, the set of equilibrium outcomes is a subset of the core.*[41]

[40] Alternatively, since g has an empty core and is superadditive then $\mathcal{E}(g) \cap \mathcal{C}(g) = \emptyset$.

[41] For the proof please see Sánchez-Mier, *op cit.*

That is, if g has an empty core then there is at least one equilibrium outcome in which the inefficient policy (P in this case) is chosen. If the core is non-empty then the $\mathcal{ABS}$ will produce an efficient equilibrium with payoffs in the core of the game. The solution concept therefore extends the core to cases in which it is empty and provides a unified framework of analysis.

The equilibrium outcomes of g are in Table 3.5, and as predicted contains one inefficient outcome in which player M joins G in a coalition that supports the protectionist status quo. This was indeed the case in Mexico until the mid-80's.

TABLE 3.5

Equilibria Before Tax Reform

Coalitions	Policy Chosen	Payoffs (X, M, G)
$\{(X, G), (M)\}$	Free Trade	$(14.96, 1.16, 8.04)$
$\{(M, G), (X)\}$	Protectionism	$(12.22, 1.36, 8.04)$

Billions of Dollars of 1996

As explained above, neither of the two equilibrium outcomes is in the core. While the equilibrium with protectionism is not efficient, the one where free trade is chosen is. It is likely that the particulars of the historical development of business organizations in Mexico led to the choice of the "protectionist" equilibrium. This interpretation agrees with previous studies of business organizations in Mexico.[42] The emptiness of the core played could have a fundamental role in the failed trade reforms of the 70's, when the free trade interests were unable to disrupt the "protectionist"

[42]Flores Quiroga (1998), Schneider (2002) and Thacker (2000).

coalition.

3.4 After Tax Reform

With the new endowments, what equilibrium outcomes are predicted? First the new game g' is displayed in Table 3.6.

TABLE 3.6

GAME AFTER TAX REFORM

$g'(X) = 12.22$	$g'(X, M) = 16.32$	
$g'(M) = 1.16$	$g'(X, G) = 24.32$	
$g'(G) = 9.16$	$g'(M, G) = 10.32$	$g'(X, M, G) = 25.48$

Billions of Dollars of 1996

The game g' has a non-empty core. In fact, it has only one core allocation. The $\mathcal{ABS}$ picks it as the unique equilibrium outcome in Table 3.7.

TABLE 3.7

EQUILIBRIA AFTER TAX REFORM

Coalition	Policy Chosen	Payoffs (X, M, G)
$\{(X, M, G)\}$	Free Trade	$(15.16, 1.16, 9.16)$

Billions of Dollars of 1996

In the game g' the protectionist firms are unable to form a coalition with the government that cannot be disrupted, the "grand coalition" forms. The increased endowment for the government after the tax reform gives it a higher stake in the

choice between P and FT. In the equilibrium of g' no side payments are made and all the players receive their endowments under free trade as their payoff. The model therefore accurately predicts the qualitative change in trade policy. In fact, for games with non-empty cores, the $\mathcal{ABS}$ is always a subset of the core.[43]

Naturally, some assumptions were made in the calculation of parameters that can be contested. The results of the model depend on the way that the endowments are calculated. I believe this "non-robustness" shows that small changes in interest groups' endowments can produce major qualitative changes in policy.

4 Concluding Remarks

A cooperative model of policy choice and coalition formation, parameters matched to the data, correctly predicts the trade policy changes that took place in Mexico. The change in tax policy leads to different endowments for the government and an induced non-empty core game.

The degree to which the government internalizes the benefits and costs of its policy choices is directly linked to the aggregate efficiency of them. In this case, the tax reform strengthens the link between government revenue and the size of the economy. The government has a bigger stake in economic efficiency.

The results do not depend on assumptions of transaction costs or coalition structure. Efficiency does not impede the use of the cooperative approach when there

[43]See Sánchez-Mier, *op cit.*

is endogenous coalition formation. Something must be said about the choice of a cooperative framework. While non-cooperative models of multilateral bargaining are available, small changes in the specification of player's strategies and beliefs result in radically different outcomes. This raises the question of what specification is the right one. The cooperative approach avoids this problem and allows negotiation to be modeled in a concise tractable model.

To the best of my knowledge, this approach is new. The theory reveals alternative avenues of research in economic development and may prove useful in studying similar instances of policy choice.

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