

ESSAYS IN POLITICAL ECONOMY

by

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the hypothesis. In this structure despite the fact that they support projects from which all economic rents have been extracted, politicians are rationally reelected.

In the second chapter I examine how structural changes in the US steel industry affect the voting behavior of House Representatives on trade related bills. The hypothesis is that Representatives face opposing incentives after the PBGC bailed out the pension plans of major steel firms. Representatives have an incentive to vote less for protectionist policies, because the bailout makes the steel firms more competitive. But the Representatives also have an incentive to yield to the demands of affected steel workers, who favor more protection after the bailout. The data set underlying this study is a panel including votes on trade related bills over 9 years. The results obtained using fixed effects techniques support the hypothesis.

In the third chapter, I develop a theoretical model of the dissolution of countries. I model a society with two different groups of citizens, who have different preferences over public goods, to analyze under which political regime the dissolution of these groups into separate countries is most likely. Differentiating between revolutions and civil wars allows me to look at the effects of both forms of political violence. I find that while the threat of a revolution can induce oligarchies to increase the franchise, the threat of a civil war can induce a country to dissolve peacefully. The model predicts that peaceful dissolution is more likely in democracies, whereas oligarchies are more likely to risk civil war to stay united.

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CHAPTER I

INTRODUCTION

The following essays address three different important political economy issues.

The first chapter is concerned with the effect of lobby groups on an economy. The model introduced in this chapter provides an answer to the question why governments choose to support special interest groups inefficiently long. Anecdotal evidence for this hypothesis comes from the agricultural and military industries in the US and in Europe.

The US steel industry is an example of an industry that keeps receiving government support, in form of trade protection, even though evidence suggests that the existing protection has not been able to solve the structural problems of the industry. In the second chapter, the demand for protection of the steel industry is analyzed empirically. Even though a large share of the US steel firms has become more competitive after the Pension Benefit Guaranty Corporation bailed out the pension plans of major steel firms during the last decade, it is argued in this paper that this bailout might not decrease the demand for protection of the industry.

In the third chapter, a theoretical model of the dissolution of countries is developed. In this model, society consists of two different groups of citizens, who have different preferences over public goods. This setup is used to analyze under which political

regime the dissolution of these tribes into separate countries is most likely. The result of this third chapter is that while the threat of a revolution can induce oligarchies to increase the franchise, the threat of a civil war can induce a country to dissolve peacefully. The model predicts that peaceful dissolution is more likely in democracies, whereas oligarchies are more likely to risk civil war to stay united.

CHAPTER II

POLICY PERSISTENCE AS A SOURCE OF ECONOMIC RENT SEEKING

Introduction

Most economists agree that special interest groups can influence policy and the allocation of economic resources.¹ But in the strand of the literature that focuses on the impact of special interest groups on economic well-being there is disagreement on whether or not these effects are beneficial. Indicative of this conflict are the contributions of Putnam (1994) and Olson (1982). Analyzing data across Italian regions, Putnam attributes the more effective governments of the northern regions largely to their high levels of “civic engagement”. He argues that special interest groups increase solidarity and cooperation, attributes necessary for the resolution of collective action problems.² Olson, on the other hand, expresses the opposite opinion, and argues that special interest groups may limit growth possibilities. He observes that they have an incentive to lobby for socially inefficient policies which benefit

¹Hillman et al (1988) model how foreign and domestic producers can influence the trade related policy decisions of a political decision maker. Grossman et al. (1994) use a similar framework and strengthen the role of the voters such that the reelection of a politician depends on both the utility of the average voter and the amount of campaign contributions.

²“Civic engagement”, according to Putnam, includes all groups that form in a society because their members share a common interest. This definition includes community level groups (for example bird watching groups) as well as organizations on a national level (for example trade unions).

themselves but are costly to society. In either case it is always assumed that the nature of the special interest groups remains constant over time.

The hypothesis of this paper is that rent seeking opportunities for special interest groups have elements of both the Putnam and Olson arguments as they evolve over time. We argue that even if all projects are assumed to start off as being socially desirable, they will cease to be so at some point in the future. However different projects become socially undesirable after different intervals of time. It then becomes possible that a government will support a project longer than is socially desirable.

There are numerous examples of government agencies that have been accused of supporting certain projects proposed by lobby groups beyond the point at which all productive rents have been exhausted. A recent example of such a project is the US F-22 Raptor fighter jet. It was developed in the 1980s to shoot down the latest Soviet combat planes. Even today, the Raptor is described as technological marvel, and at over a quarter of a billion Dollars per plane it is the most expensive fighter jet ever built. As of June 2008, 122 Raptors were in service of the United States Air Force and another 65 had been ordered.³ Hence, as the New York Times put it, “Americans can now feel reassured that if the Soviet Union ever springs back to life, restarts the Cold War and designs a new MIG fighter more advanced than anything now in the skies, the United States Air Force is ready.”⁴ Unfortunately, today's foes are very

³Source: Airforce-technology.com, last seen on 11/03/09

⁴Source: New York Times: <http://query.nytimes.com/gst/fullpage.html?res=9B0DE6D9133DF93AA15753C1A9629C8B63>, last seen on 11/03/09

different from whose the Raptor was designed to fight. In Iraq and Afghanistan, the US Army is fighting a highly motivated low-tech enemy, who blend in and out of urban civilian populations or hide in remote mountain areas and caves. The Raptor is useless in such an environment, and hence, the F-22 has never been used in a war. In July 2009, the US Senate stopped a bill that would have authorized funds for an additional seven Raptors. President Obama praised the Senate's decision, saying that any money spent on the fighter was an "inexcusable waste".⁵

Another example of a military project that was once beneficial but has been continued too long is the German Leopard 2 tank. This tank was developed during the Cold War to fight an enemy approaching Germany across the North German plain. But even the latest version of the Leopard 2 is too big to be useful for breaking up civil wars such as in the Balkan Mountains. In fact, the Bundeswehr does not even have a cargo plane large enough to transport the Leopard 2. The latest version has been in active service since 2001. In 2004, the German Bundeswehr still had 1552 battle tanks of the type Leopard 2 waiting for an enemy to attack.⁶ In 2008, the Bundeswehr reduced the number of active Leopard 2's to 400.⁷

There is no doubt that the F-22 Raptor and the Leopard 2 were good investments

⁵Source: New York Times: <http://www.nytimes.com/2009/07/22/business/22defense.html>, last seen on 11/03/09

⁶Source: Otfried Nassauer for the Berlin Information Center for Transatlantic Security, October 30 2004.

⁷Source: Wikipedia

- good “projects” - during the Cold War. But support for these projects continued after their purpose for existence disappeared.

Agricultural subsidies in the US and in Europe provide similar examples. Theodore Roosevelt introduced farm subsidies in the US in the 1930s in response to a massive farm depression and the effects of a concurrent drought. These were according to Secretary of Agriculture Henry Wallace “a temporary solution to deal with an emergency”. In Europe, agricultural subsidies started after WW2 within independent European nations. The EU took over these national programs in the 1950s and 1960s. The initial reason for these programs in Europe was to encourage increased food production. After the EU took over, these programs were continued to ensure that European countries did not come into conflict over scarce foodstuffs. Today neither of these reasons hold yet the programs remain in place and prices received by farmers in the EU and agricultural producer prices in the US are 33% and 15% respectively above world levels.⁸ There is evidence that the EU and the US would be better off without agricultural protection.⁹

The examples above suggest that, as in Putnam, special interest groups initially communicate to a government the existence of opportunities to create productive rents which initially increase social welfare. However, just as Olson argues, once the

⁸The base year for these statistics is 2001. For more detail see Tokarick (2003).

⁹See for example Anderson (1998), Baxter (1992), Tokarick (2005).

productive rents from an opportunity have been fully extracted the special interest groups may switch to pure rent-seeking behavior, to the detriment of social welfare.

Whenever the presence of lobby groups leads to Pareto-dominated policies, the question arises of why voters tolerate such policy choices. The existing literature has focused only on one side of the answer to this question, on the explanation of inefficient short term biases in public spending. Coate et al. (1999) model how special interest groups can “buy” policy decisions from politicians, but the politician is not then reelected. They suggest that voters prefer forgoing support for policies that would provide temporary efficiency improvements, if they anticipate that these policies will persist once they have been implemented. Aidt et al. (2007) find that growth in government eventually leads to a bias in public expenditure towards short term projects and argue that this can be explained by a desire on the part of the electorate to check frequently on the performance of politicians.

But the anecdotal evidence discussed above suggests that there are cases in which voters tolerate inefficient *long-term* biases in support for public projects. A main contribution of our model is that it displays an equilibrium which rationalizes these observations. Politicians may be rationally reelected even if they pursue policies that persist “too long” , because if they did not then the quality of the pool of new projects would deteriorate. This deterioration arises because of an adverse selection effect under which the lobbies offering the best projects would choose not to join the pool if they cannot be assured of future support. The difference between the

adverse selection effect here and the one developed by Le Breton et al. (2003) is that, according to the latter, the reason for adverse selection is direct competition between the lobbies, whereas in the model developed in this paper, adverse selection is caused by information asymmetries between the lobbies and the government.

The simple model developed in this paper follows the tradition of formal political economy models; we intend to develop a systematic understanding of complex social phenomena and abstract from much of the detail. Hence, the model is useful to explain basic patterns of interaction between political decision makers, lobbies and voters, but not to literally describe reality.

A Model of Lobbying

The economy consists of an electorate, a set of politicians, and a set of lobbying firms. In each period the electorate must choose a politician to act as the government, the politician elected must in turn choose which productive projects to pursue from a set of alternatives offered to them by the lobbying firms. The electorate are infinitely lived. Each lobbying firm lives for at most two periods, and offers a single potential project to the government in its first period of life. Politicians may hold office for a maximum of two periods. In every period there are potentially present in the economy "old" lobbies, (O), in the second period of their lives, and "young" lobbies, (Y), in their first. Hence the life of a lobby may coincide with the period in office of a single politician or overlap the terms of two.

There are two different types of lobby groups in the economy: low, (L), and high, (H), which occur in the proportions α and $1 - \alpha$ respectively. High type lobbies promote projects that are socially productive for two periods. Low type lobbies promote projects that are only socially productive for a single period. It is therefore natural to assume that the fixed up-front costs of a project are higher for high types. This might be due to something as simple as the buildings and plant required to continue production of a product for several years need to more durable, longer-lived, and therefore more costly than those required only to last for a short time span.¹⁰

Following Besley (2006) there are two types of politicians who may form the government; good, (G), and bad, (B), who occur in the population of potential politicians with frequencies π and $1 - \pi$ respectively.¹¹ Good politicians act in the interests of voters. Bad politicians maximize their own private rents. The electorate choose a politician to select projects on their behalf. In periods in which the incumbent is ineligible for reelection this takes the form of selecting a random replacement from the pool of potential candidates. In periods where the incumbent is eligible for reelection the selection is determined by majority voting.

There is a pool of potential lobbies in the polity. In each period, every potential

¹⁰Relaxing this assumption would not change the equilibrium of the baseline model. But it would alter the results of the extension to the baseline model: even good governments would be more likely to support low type lobbies inefficiently long, and there would not be an adverse selection effect.

¹¹For a positive theory of public expenditure, a benevolent politician is, as Aidt et al. (2007) puts it, “a myth”. But if some politicians are marginally “better” than others (in a sense that they are more idealistic or more altruistic than others) then the notation of good and bad politicians suffices to model such differences.

lobby must decide whether or not to become active and join the pool of lobbies from which the government selects its projects.

Timing and Information Structure

The timing of the agents' decisions is illustrated in *Figure 2.1*. In any period the sequence of events is as follows: First lobbies of either type must choose whether to join the pool from which projects are selected. Next the electorate choose the politician to run the government for that period. If an incumbent is eligible for reelection the electorate base their voting decisions on observations of the politician's previous choices and the payoffs they, the electorate, enjoyed. If the incumbent is ineligible the politician is selected by random draw. The selected politician then simultaneously draws a potential project to realize from the pool promoted by the lobbies, and whether or not to continue supporting any previously selected projects.¹²

The politician knows the type of the old project but only learns the type of the new project after it is selected. The projects, potentially both new and old, are realized and the electorate receive their payoffs. The game repeats in the next period.

For simplicity we shall subsequently assume that the politician selects at most one

¹²There is a large body of literature that deals with competition between lobby groups and the process of how governments choose one lobby group over another. Following Potters et al. (1992) it is assumed that the informational value of a lobby's signal to the government about its type is not the content of the message sent but the resources spent on sending the message. Since all lobbies have the same amount of initial resources in this model, they cannot signal their type to the government.

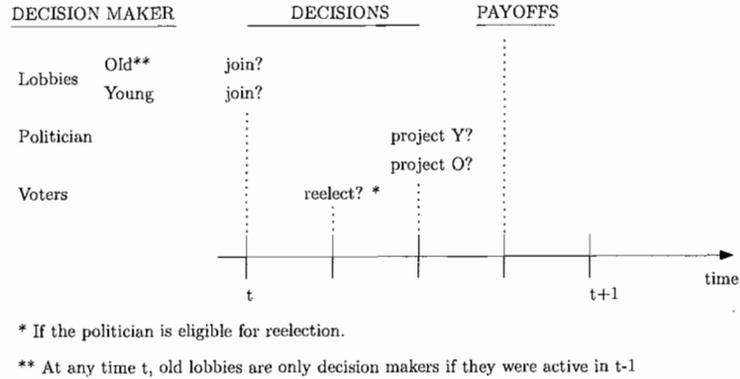


Figure 2.1. Timing

new project per period, that all agents discount the future using the common discount factor $\beta < 1$, and are risk neutral.

Payoffs

Politicians

Politicians of both types receive a combination wage and ego rent from holding office denoted E . Bad politicians may also in principle receive side-payments of R from any lobbies they support in a period. Good politicians also care about the net social benefits enjoyed by the electorate X . Hence

$$P(j) = \begin{cases} E + R & \text{if the politician is bad} \\ E + X & \text{if the politician is good} \end{cases} \quad (\text{II.1})$$

where $j = G, B$ is used to indicate the politicians type.

Lobbies

Lobbies may be young or old and of high or low type (their members are also assumed to be voters and to receive any payments given to voters). All lobby types supported by the government receive a per-period subsidy of k . The lobbies costs depend upon their type and are denoted a_s where $s \in \{L, H\}$. The payoffs to the lobbies depend on the type of politician (G,B) they face. The incremental payoffs to a young lobby in the first period if the politician is good may be written

$$P(Y, G, s, e) = \begin{cases} k - a_s > 0 & s = L \quad e_Y = 1 \\ k - a_s < 0 & s = H \quad e_Y = 1 \\ -a_s < 0 & e = 0 \end{cases} \quad (\text{II.2})$$

Where e is an indicator variable taking the value 1 if the lobby receives government support and 0 otherwise. Hence, only if the incumbent politician chooses to realize a young lobby's project ($e_Y = 1$), will the lobby receive support. The first-period payoff from lobbying is positive if the lobby is a low type and is negative if the lobby is a high type, reflecting the high types greater up-front fixed costs. This implies that a high type lobby will not join the pool if it cannot obtain support in its second period.

The incremental payoffs to a young lobby in the first period if the politician is bad may be written

$$P(Y, B, s, e) = \begin{cases} k - a_s - R = 0 & s = L & e_Y = 1 \\ k - a_s < 0 & s = H & e_Y = 1 \\ -a_s < 0 & & e = 0 \end{cases} \quad (\text{II.3})$$

Hence, bad politicians extract maximum private rents from the lobbies, which implies that the payoff of young, low type lobbies is zero if a bad politician is in office.¹³

If a good politician is in office, the incremental payoff for an old lobby O at time t is written

$$P(O, G, e) = \begin{cases} k & e_O = 1 \\ 0 & e_O = 0 \end{cases} \quad (\text{II.4})$$

where k is interpreted as before.

If a bad politician is in office, the incremental payoff for an old lobby O at time t is written

$$P(O, B, e) = \begin{cases} k - R = 0 & e_O = 1 \\ 0 & e_O = 0 \end{cases} \quad (\text{II.5})$$

where R is again a private side-payment from the lobby to the politician.

¹³It is assumed that bad politicians cannot make the lobbies borrow against future earnings.

Electorate

The electorate receive a per-person net social benefit of x from all projects that are socially productive. This includes the projects adopted from all young lobbies plus the projects of any remaining old high type lobbies. Should the government support an old low type lobby this yields a net social cost to the electorate.¹⁴

Hence, in every period, the voters receive a payoff of

$$X = x(e_Y) + x_s(e_O) \quad (\text{II.6})$$

where

$$x(e_Y) \begin{cases} > 0 & e_Y = 1 \\ = 0 & \end{cases} \quad (\text{II.7})$$

and no identifier is required for the payoffs received by the electorate from young types, also

$$x_s(e_O) \begin{cases} > 0 & e_O = 1 & s_O = H \\ < 0 & e_O = 1 & s_O = L \\ = 0 & e_O = 0 \end{cases} \quad (\text{II.8})$$

This simply spells out that only high type projects are socially productive in their second period of life.

Equilibrium

¹⁴All projects are financed through taxes. Hence, the payoffs voters receive are the benefits from the projects minus the tax imposed to finance them.

The equilibrium consists of a strategy for each player defined on the appropriate action space, plus beliefs for each player that are updated appropriately using Bayes rule such that the conditions for a perfect Bayesian equilibrium are satisfied. In each period nature moves first and selects which potential lobbies are low and high types with probabilities α and $1 - \alpha$, these probabilities are known to all the players but only the potential lobbies know their own type. Each type of lobby has a plan that involves first whether or not to enter the initial pool from which the politician makes a selection, and then if selected whether to lobby for one or two periods. As with lobbies nature moves first in the selection of a politician's type, choosing good and bad types with probabilities π and $1 - \pi$ respectively. Again these probabilities are known to all the players, but only the politicians observe their own type. Politicians of either type formulate a plan involving, randomly choosing a new young lobby from the pool, then whether or not to support lobbies of either type in either period and whether or not to demand any side-payments. The electorate know the values of π and α and update their beliefs appropriately after observing their own per-period payoffs. In periods where an incumbent politician is eligible they choose whether or not to reelect them. In periods when an incumbent is not eligible for reelection they select a new politician randomly from the pool.

Given that politicians cannot be reelected after their second period in office, the agents' optimal strategies can be found by using backward induction.¹⁵

¹⁵Having term limits does affect policy choices, as empirically shown by Besley et al. (1995). In this model, the absence of term limits would exclude the possibility of lame duck politicians. This

Suppose that the incumbent is a good type, by definition they do not demand side payments and do not support old low type lobbies as this reduces the net social benefits enjoyed by the electorate.¹⁶ They do support all young lobbies and high types in the second period of the types life. Alternatively, suppose the incumbent is a bad type, in their second period in office they demand side-payments in return for supporting either high or low type lobbies. In the first period a bad politician is in office they choose between mimicking the good type, which we will refer to as “pooling” behavior, or separating from the good type. If they choose to pool, for purposes of reelection and the consequent future payments, they must support only old high types. If they separate they support both old high and low types, are revealed to be bad and are not reelected.

Bad politicians extract the maximal private rent from the lobbies. Hence, when they demand side-payments, they require $R(B, i, j)$ from each active lobby, depending both on whether the lobby is young or old ($i = \{Y, O\}$) and on whether it is a high type or a low type ($j = \{H, L\}$). The side-payments from low type lobbies are written

$$R(B, i, L) = \begin{cases} k - a_L & \text{if } i = Y \\ k & \text{if } i = O \end{cases} \quad (\text{II.9})$$

would be welfare improving in this framework since bad politicians would be more likely to pool with good types.

¹⁶This results from the active lobbies being part of the electorate, as described above.

And the side payments bad politicians receive from high type lobbies are

$$R(B, i, H) = \begin{cases} 0 & \text{if } i = Y \\ 2k - a_H & \text{if } i = O \end{cases} \quad (\text{II.10})$$

We may now characterize when bad politicians engage in pooling or separating behavior in their first periods in office by comparing the appropriate expected payoffs. Recalling that both good and bad politicians support old high type lobbies and hence pooling is automatic, we need only to give conditions for pooling and separating when the old lobby is a low type, viz.

Proposition 1. (1) *If the old lobby in period 1 is a low type and the young lobby is a high type, then a bad politician chooses to pool if $E \geq \frac{k}{\beta} - (2k - a_H) - \alpha(k - a_L)$*
 (2) *If both the young and the old lobby in period 1 are low types, then a bad politician pools if $E \geq \left(\frac{1 - \alpha\beta}{\beta}\right)(k - a_L) + k\left(\frac{1 - \beta}{\beta}\right)$.*

The proof of this and all subsequent propositions may be found in the appendix.

These pooling conditions imply that the probability that a bad politician pools in period 1 increases in the politician's ego rent E . This follows because pooling ensures reelection and the receipt of the second period ego rent. Bad politicians are also more likely to pool if they are more patient, i.e., when the discount factor β is high, simply because they then place a higher value on the second period payoffs associated with reelection. A high α , i.e., a large share of low type lobbies in the pool of potential

lobbies also increases the probability that a bad politician pools, because a high share of low type lobbies increases the expected payoff to the politician in the second period.

The pooling condition in the case that the young lobby is a low type is more restrictive if $k - a_L + \beta(k - a_H) > 0$, i.e., if the payoff a low type lobby receives in its first period is larger than the discounted loss of a high type lobby in its first period.

Both low and high type lobbies always join the pool of lobbies. Low type lobbies are able to cover their costs in the first period and high type lobbies know that any type of politician keeps supporting them in their second period.

Proposition 2. *Pooling is socially desirable.*

This follows immediately from noting that a side payment is just a transfer from one agent to another as is financial support from a government to a lobby of any type. Hence the social desirability of pooling hinges on the spillovers generated by lobbies. If there is an old low type and young high type then with separating behavior old low type lobbies are supported by bad politicians giving negative spillovers, with pooling these are avoided. When there is an old low type and young low type then there will be negative spillovers in the current period under separating behavior and potentially negative spillovers in the next period if a new bad type politician replaces the current bad one. Under pooling behavior there will only be negative externalities in the next period, hence both discounting and the possibility of electing a new bad politician make this socially superior.

The equilibrium strategies can be summarized as follows. Bad politicians pool with good ones if the conditions of *Proposition 1* hold. This tends to occur if the discount factor β and the share of low type lobbies α are high. Bad politicians are reelected in this case. If bad politicians choose to separate from good ones, they reveal their types and as a consequence, they are not reelected. But if there are no reelection concerns, which is the case in a politician's second period, then bad politicians support old low type lobbies if they picked a low type from the pool in period 1. The politicians' actions only differ with respect to their decision to continue old projects. All politicians choose to support young lobbies in equilibrium and both types of lobbies join the pool.

The model provides two explanations for the problem initially discussed, that is lobbies that are no longer socially desirable continue to receive government support. First, old low type lobbies may receive support from lame-duck politicians in return for side-payments. Second, young bad-type politicians may choose to separate from good-type ones so as to receive side payments from current old low type lobbies. Applying this model to the decision of the US government to continue funding the F-22 Raptor would suggest that President Obama's statement that continued funding was an "inexcusable waste" indicates that the Raptor had been funded by a lame duck politician before.

But this model is too simplistic to explore such issues as which lobbies choose to

enter the pool of potential lobbies, and what allows bad-type politicians to engage in socially undesirable support for lobbies in successive periods yet remain in office. Agricultural subsidies, for example, have been in place for decades. The baseline model cannot explain why good governments would rationally subsidize the agriculture industry, knowing that the country as a whole would be better off without these subsidies, and yet, the voters accept their choice and reelect them.¹⁷ This last question is of particular interest with respect to term limit effects. The behavior of a lame duck politician is driven by term limits. In the next section we explain situations in which politicians engage in undesirable support for lobbies and yet are reelected, a result that is independent of term limits.

To investigate these issues we next reduce the information available to politicians, specifically we assume a lobby's type is no longer directly observable by a politician. This allows both good and bad politicians to potentially support old low type lobbies. But this implies that the electorate cannot perfectly deduce a politician's type from observing payoffs, potentially allowing bad types that support old low type lobbies to gain reelection.

The Model with Unobservable Lobby Types

In the baseline specification above it was assumed that a politician knows a lobby's type as soon as the latter is picked from the pool of potential lobbies. In the following

¹⁷See for example Anderson (1998), Baxter (1992), Tokarick (2005)

extension we consider the case in which the lobbies' types are no longer observable by the politician. This is important because in reality it is often difficult for governments to foresee the exact impact a project has on voter welfare. Agricultural subsidies are an example where it is questionable whether the national governments exactly know at what point continued support ceased to be beneficial. It is also not straight forward to determine how long military projects are beneficial, given that the relationship of a country to potential enemies does not change discretely. Hence, in the following, we modify the model above by assuming that politicians cannot distinguish between high and low type lobbies until after the projects are completed.

Equilibrium

As in the baseline specification, the agents' optimal strategies can be found by using backward induction. Good politicians support all young lobbies, and they would like to support old high types but not old low types. Since they cannot distinguish between the lobby types, politicians support old lobbies as long as long as this maximizes expected voter welfare. The necessary condition for supporting old and young lobbies is given by *Proposition 3*.

Proposition 3. *Good politicians support both lobby types as long as $\alpha \leq \frac{1}{2}$.*

This condition implies that good politicians will support all old lobbies if there are at least as many high type lobbies as low type lobbies in the pool of potential lobbies.

Alternatively, suppose the incumbent is a bad type, in their second period in office they demand side-payments in return for supporting either high or low type lobbies. In the first period a bad politician is in office they choose between pooling with or separating from the good types. Pooling is automatic if $\alpha \leq \frac{1}{2}$, i.e., if good politicians support both types of lobbies. If $\alpha > \frac{1}{2}$, bad politicians can choose to pool and only support young lobbies for purposes of reelection and the consequent future payments. If they separate and support both young and old lobbies, they are revealed to be bad types and are not reelected. Bad politicians engage in pooling behavior in their first periods in office if the condition in *Proposition 4* holds.

Proposition 4. *Bad politicians pool with good ones if $E \geq \left(\frac{1}{\beta} - 2\right) \alpha k + \left(\frac{1}{\beta} - 1\right) (1 - \alpha)(2k - a_H) + \alpha a_L$.*

This implies that bad politicians are more likely to pool if the fraction of low type lobbies in the pool of potential lobbies is small since this implies that the probability of receiving side payments from old low type lobbies in the politician's first period is small. Bad politicians are also more likely to pool if they are more patient, i.e., when the discount factor β is high, simply because they then place a higher value on the second period payoffs associated with reelection. The effect of the per-period subsidy k on a bad politician's decision about whether or not to pool with good types is positive as long as $\alpha \leq (1 - \beta)2$, which implies that a high k makes pooling more likely if the discount factor is sufficiently high and the share of low types α is sufficiently small. This again hinges on the politician's valuation of future payoffs.

Unlike in the baseline model, not all lobbies always join the pool of potential lobbies. High type lobbies only join if the fraction of high type lobbies is sufficiently large, more precisely, when *Proposition 5* holds.

Proposition 5. *High type lobbies join the pool as long as $\alpha \leq \frac{1}{2}$.*

This is the case because high type lobbies only join the pool if they are supported by good politicians. The reason for this is that the expected payoff of high type lobbies is negative if only bad politicians support them in the lobbies' second period. If high type lobbies do not join the pool of potential lobbies, then bad politicians pool if

$$E > k \left(\frac{1}{\beta} - 2 \right) + a_L$$

which implies that pooling is more likely if there are only low type lobbies in the pool.

Comparing the pooling conditions of this extension to the ones of the baseline model shows that the latter are more restrictive.

Proposition 6. *Pooling is more likely if the politician cannot observe the types of the lobbies than it is in the baseline model.*

In the baseline model, the only uncertainty about a bad politician's payoff in the second period is the type of the new lobby in period 2. In the extension to this model, politicians have no information about the two lobbies they can choose to support. This makes separating behavior more risky and therefore pooling more attractive.

If politicians cannot observe the types of the lobbies, high type lobbies would like to change the information structure and signal their type to the government - in which case they would be supported for sure. Following Potters (1992) it can be assumed that the informational value of the signal is not the content of the message sent but the resources spent on sending the message. Since all potential lobbies in the pool are assumed to have the same amount of resources, low type lobbies are able to signal the exact same way as high types. This implies that high types cannot distinguish themselves from low types by signaling.

As in the baseline model, pooling is socially desirable if politicians cannot observe the lobbies' type.

Proposition 7. *Pooling is socially desirable.*

The social desirability of pooling hinges on the expected spillovers generated by lobbies, just as in the baseline model. Whether bad politicians pool with or separate from good types, the expected voter payoff is always higher in the baseline model. The reason for this is that politicians have more information to base their decisions on in the baseline model.

The equilibrium strategies can be summarized as follows. Bad politicians pool with good ones if $\alpha \geq \frac{1}{2}$ and if the condition in *Proposition 4* holds, which tends to occur if the share of low type lobbies is high. Bad politicians are reelected in this case. If bad politicians choose to separate from good ones, they reveal their types, and as

a consequence they are not reelected. But if there are no reelection concerns, which is the case in a politician's second period, then bad politicians always support old lobbies. The politicians' actions only differ with respect to their decisions to continue old projects. All politicians choose to support young lobbies in equilibrium. Low type lobbies always join the pool of lobbies, and high types only join if good politicians support them in their, the lobbies', second period, i.e., if $\alpha \geq \frac{1}{2}$.

The model with unobservable lobby types provides the same two explanations for the problem initially discussed as the baseline model. First, old low type lobbies may receive support from lame-duck politicians in return for side-payments. Second young bad-type politicians may choose to separate from good-type ones so as to receive side payments from current old low type lobbies. In addition, this specification addresses circumstances under which some lobbies are not willing to enter the pool of potential lobbies. This specification shows that if a politician cannot clearly observe a lobby's type, there are circumstances under which even a good politician provides support for low type lobbies in the second period. This gives bad-type politicians an additional opportunity to engage in socially undesirable support of lobbies in successive periods yet remain in office. Hence, if politicians cannot clearly observe a lobby's type, then there are cases in which voters are willing to accept a long run bias in public policies, i.e., reelect politicians even if they fear that some projects are supported inefficiently long.

Conclusion

The hypothesis of this paper is that a dynamic relationship exists between politicians and lobbyists. Anecdotal evidence of support for military projects and agricultural subsidies suggest that, as in Putnam, special interest groups initially exist to communicate to a government the existence of opportunities to create productive rents. Such lobbying activities may initially increase social welfare. However, just as Olson argues, once the productive rents from an opportunity have been fully extracted the special interest groups may switch to pure rent-seeking behavior, to the detriment of social welfare.

A theoretical framework is developed in which established (“old”) and new (“young”) lobbies overlap. There are two different types of lobby groups in the economy: low, and high. High type lobbies promote projects that are socially productive for two periods, and low type lobbies promote projects that are only socially productive for a single period.

A baseline specification provides two answers to the question; “why do politicians choose to support lobbies for an inefficiently long period of time?”. First, lobbies whose social benefits have been exhausted (old low type lobbies) may receive support in a pooling equilibrium from lame-duck politicians in return for side-payments. Since bad politicians maximize private rents and not welfare, and have an incentive to support such lobbies for as long as possible. Second, bad-type politicians may choose

to separate from good-type ones (welfare-maximizers) so as to receive side payments from current old low type lobbies. Bad politicians are not reelected if they engage in separating behavior.

In an extension to the model, politicians are not able to observe the types of the lobbies seeking support. This specification describes circumstances under which some lobbies are not willing to enter the pool of potential lobbies. This is the case if the lobbies cannot be assured of future support. Also, there are circumstances under which even a good politician chooses to support low type lobbies inefficiently long and is reelected anyways, because if they did not then the quality of the pool of new projects would deteriorate.

In the equilibria of both the baseline model and its extension, pooling is socially desirable, because it implies that bad politicians behave the same way as good ones. Pooling is also more likely if the discount factor is high, because the more patient politicians are, the more important is their expected future income for their decisions today, and the more likely they are to forego short term rents for future payoffs. Hence, the more patient bad politicians are, the more likely it is that they make choices that are aligned with the voters' preferences. The two model specifications differ according to the level of transparency. In the baseline model, the government has enough information to make choices that are aligned with the voters' preferences. Hence, voters can punish the government if it does not behave according to their

preferences. If the government does not know the type of the lobbies, and this is known by the voters, then the latter accept a long term bias in public spending.¹⁸

The model developed in this paper is not intended to describe a real world situation but to give a theoretic explanation why governments support lobbies beyond the point at which all productive rents have been extracted - and are still rationally reelected. The reasons why lobbies are supported inefficiently long can explain why some industries such as the agricultural and the defense industry have been able to receive continued support from US- and European governments in the last decades, even though it has been questionable whether continued funding is beneficial for a country as a whole.

¹⁸If the voters do not observe their payoff until after they have to choose whether or not to reelect the government, then the equilibrium suggests that the voters only reelect the government if it supports young lobbies. Hence, they accept a short term bias of public spending, which is similar to what Coate et al. (1999) find.

CHAPTER III

THE EFFECT OF THE PBGC BAILOUT ON VOTING FOR TRADE
PROTECTION - EVIDENCE FROM THE US STEEL INDUSTRYIntroduction

The US steel industry has undergone major changes in the last 50 years. Worldwide competition in the steel market has been increasing since the 1970s, but, unlike Europe and Japan, a large part of the US steel industry was slow to adapt newly available technologies.¹ In order to enable the industry to catch up, various protection measures have been put in place, and as a result, the steel industry has become one of the most protected industries in the US. But there is evidence that protection has not had the intended effect of allowing the industry to solve its structural problems.²

As a result, many steel firms have declared bankruptcy or have come close to bankruptcy during the last decade. To mitigate the social consequences for the affected steel workers, the Pension Benefit Guaranty Corporation (PBGC) bought out pension plans from a large share of those steel plants that faced bankruptcy. The consequences of the PBGC intervention are very different for the firms and the steel

¹See Warren (2002), page 258, for a description of the developments in the US steel industry.

²See Blonigen (2006), Brainard et al. (1997), Schuler (1996), Lenway et al. (1996).

workers. The bailouts drastically reduce the fixed costs of the steel firms, because the pension payments are a large share of the firms' labor costs. Bethlehem Steel, one of the largest steel firms in the US, for example, had one active employee for every 13 retirees in 2002.³ Hence, the steel firms become more competitive after their pension plans are bailed out.⁴ In the following, the effect of the PBGC bailout on the steel firms is referred to as the "firm effect". The retired steel workers affected by the bailout, on the other hand, are made worse off by the PBGC intervention. Even though they continue to receive the "base rate" of their pensions, they lose at least their health benefits. If the pension plans were underfunded before the bailout, then the PBGC covers the difference only partially.⁵ The practice of underfunding pension plans is very prevalent. Bethlehem steel, for example, had only funds for 45% of the pension payments at the time of the bailout. The effect of the PBGC intervention on the affected steel workers is referred to as the "worker effect" in the following analysis.

The question underlying this paper is how the PBGC intervention in the US steel industry affects the demand for trade protection of the industry. We approach the

³Source: [http : //globalag.igc.org/pension/us/private/steelworker.htm](http://globalag.igc.org/pension/us/private/steelworker.htm), (last seen on 11/23/08).

⁴See Daniel Ikenson, associate director of the Center for Trade Policy Studies (Cato Institute), on the structural changes in the US steel industry after the PBGC intervention: "The New Iron Age: Steel's Renaissance Beckons New Trade Policies", Cato Institute, [http : //www.freetrade.org/node/545](http://www.freetrade.org/node/545) (last seen on 04/11/09).

⁵PBGC statement on the Pension plan of Bethlehem steel: <http://www.pbgc.gov/media/news-archive/news-releases/2002/pr03-09.html> (last seen on 04/12/10).

question by analyzing the votes of House Representatives on trade related bills over nine years.⁶

The hypothesis is that Representatives face opposing incentives after the PBGC bailout. On the one hand, they have an incentive to vote less for protectionist policies, because the PBGC interventions make the steel firms more competitive. The reason is the following. If a firm considers lobbying as a substitute for costly adjustment, as suggested by Bhagwati (1982) and Brainard et al. (1997), then the intervention of the PBGC decreases the price of structural adjustments relative to lobbying. This implies that a steel firm has an incentive to lobby less, which in turn makes it more likely that a Representative votes for free trade.

On the other hand, the Representatives have an incentive to yield to the demand of affected steel workers, who favor more protection after the bailout. The worsened situation of the retired steel workers, and the decreased pension security of active steel workers signal that the situation of the industry worsened and therefore needs more trade protection. Furthermore, most retired steel workers still own houses and live in the same communities, and hence, even though their retirement depends less on the industry after the bailout, the value of their assets still depends on the steel industry.⁷ If a Representative's constituency consists of voters who are negatively

⁶I use the votes of House Representatives and not Senators because the votes of House Representatives are assumed to be closer proxies to voter preferences than the votes of senators. See Levitt (1996).

⁷See Scheve and Slaughter (2001) for a more detailed explanation of this relationship.

affected by the PBGC intervention, then they have an incentive to vote for more protectionist policies after the bailout.

Theory predicts that House Representatives voted in favor of protectionist policies before the PBGC intervened if there is a lot of steel industry in their district, because steel is a relatively less competitive industry. The question is whether and how the votes of House Representatives reflect the changes in the industry after the PBGC intervened. The results obtained using conditional logit techniques suggest that both, the “firm effect” and the “worker effect” exist for minimills.

In the following, we give an overview of purpose of the PBGC and its intervention in the steel industry, then we discuss literature related to this study. We introduce a theoretic framework underlying the empirical approach. Then the data employed and the empirical specifications are described and the results are presented. We end with a concluding section.

The Pension Benefit Guarantee Corporation (PBGC)

The PBGC was founded in 1974. The main purpose for the participating firms and their employees is to ensure the uninterrupted payment of pension benefits to participants and beneficiaries if bankruptcy occurs. Thus, the PBGC is a insurance for workers: Private firms pay fees and, in case of bankruptcy, the PBGC secures the (base rate of the) pension payments of the employees. The agency receives no funds

from general tax revenues. Operations are financed by insurance premiums paid by companies that sponsor pension plans and by the PBGC's investment returns.

In 1985, more than 112,000 American firms participated in the this system. Since then, the number of participants has plummeted to 30,000 in 2006.⁸ The decrease in members is a result of the incentives of this system, which creates an adverse selection problem with healthy firms leaving the system. In particular, the PBGC has rules in place to avoid participating companies underfunding their pension plans. But these rules are not strict, and there are multiple exceptions to them. Firms in financial "distress", for example, may defund their pension plans and, yet, are still eligible for all benefits in case of a bankruptcy. Ippolito (1989) points to the prevalence of the practice of underfunding pension plans. He finds that the practice is widespread and has been around for a long time.⁹

Many steel companies have been able to take advantage of the structural problems of the PBGC. The steel firms have had an incentive to devalue their pension plans and count on the PBGC when their situation worsened. This has become increasingly attractive after the decrease in active employees (through the decline of the whole sector) relatively increased the weight of the fixed cost of pension payments to retired

⁸Source: "Basics of the Pension Benefit Guaranty Corporation (PBGC)" Employee Benefit Research Institute", January 2007. ([http : //www.ebri.org/pdf/publications/facts/0705fact.pdf](http://www.ebri.org/pdf/publications/facts/0705fact.pdf), last seen on 02/02/09) and "Online extra:Q&A with the PBGC's Bradley Belt - the new executive director talks about the major reforms that need to be made to ensure the health of pension payments" ([http : //www.businessweek.com/magazine/content/0429/b3892020_mz001.htm](http://www.businessweek.com/magazine/content/0429/b3892020_mz001.htm), last seen on 02/02/09)

⁹See *Note A1* for a note about the observation of the ongoing underfunding - from 1977.

workers. Being able to exploit the loopholes of the PBGC, some steel firms were able to get the PBGC benefits before bankruptcy occurred. In this case they could drastically reduce their fixed costs.

The retired steel workers affected by PBGC bailouts, on the other hand, are made worse off. Even though they continue to receive the “base rate” of their pensions, they lost at least their health benefits. If the pension plans are underfunded before a bailout, as it has often been the case, then the PBGC covered the difference only partially.

The focus of this study is to look at the impact the PBGC intervention on the voting behavior of political Representatives. The structural problems of the PBGC and the strategic decisions of steel firms to devalue their pension plans are not further addressed, because the steel firms did not leave the cover of the PBGC and the PBGC is still able to insure pension plans in case bankruptcy occurs.

Related Literature

Trade between countries creates the potential for gains for all countries involved. But trade liberalization also has distributional consequences within any given country. In particular, less competitive sectors are likely to oppose free trade. The US steel industry has long sought and received trade protection, despite ample evidence that the existing trade protection has not been able to reverse the general downward trend the industry has been struggling with for the last 50 years.

Beamer et al. (2003) provide an explanation why the largest steel plants have become dependent on protection in the first place. They investigate how the relationship between the United Steelworkers of America (USWA) and steel-manufacturing firms shaped the political economy of the Rust Belt. The authors argue that institutional commitments (in form of rigid labor contracts) shaped deindustrialization in this area. According to their study, pensions and severance benefits motivated firm managers to sustain large, antiquated steel plants and close smaller and more efficient plants, which has made the industry less competitive and therefore dependent on trade protection. The authors see the steel firms' legacy payments as a main reason for the downturn of the industry. This strengthens the hypothesis of this paper that the demand for protection of the steel firms should decrease after the PBGC bailed out the pension plans.

Brainard et al. (1997) develop a model that rationalizes the persistence of protectionist policies. The authors argue that persistent protection arises whenever lobbying is an alternative to costly adjustment. With endogenous protection, the level of tariffs is an increasing function of past tariffs: the more an industry lobbies, the greater the current protection it receives, and the less the industry adjusts the more effective it is to lobby in the future. Schuler (1996) supports this reasoning by providing empirical evidence from the US steel industry. According to him, the largest firms have been the ones that have dominated the politics. The author also argues that the underlying reason for lobbying for protection was to postpone downsizing costs. Lenway et al.

(1996) even go a step further and argue that trade protection of the US steel industry rewards poor performance and reduces incentives to innovate. Morck et al. (2001) distinguish between habitual and occasional lobbyists and find that the steel industry's lobbying efforts for import protection are habit forming. Based on the argument that the lobbying activity of larger steel firms depends on past lobbying, Morck et al. conclude that granting protection for the steel industry leads to dependency of the industry on protection.

The previous studies suggest that the lobbying efforts of the steel firms explain the high levels of protection of the industry. In this paper, we argue that the PBGC intervention is another factor that increases the level of protection in the industry.

While there are explanations for the existence and the persistence of protectionist policies, there is justified doubt about the effectiveness of US steel protection. Blonigen et al. (2006), for example, investigate the effect of VRAs and antidumping duties on the US steel industry. They find that protection efforts were successful in restricting import levels, but that the effect on long-run trends in the US steel industry were small. The reason for this is that unfair import competition is only one amongst other problems of the industry, including combination of appropriation of rents by unions, slow adoption of new technologies, and the changing market conditions.

The recent involvement of the PBGC has drastically changed both incentives of steel firms (by reducing the fixed cost) and steel workers (by increasing uncertainty

about pension security). The question is to what extent these changes impact the the political decision makers' preferences towards free trade.

Given that public and political interests are not perfectly aligned, there is an opportunity for policy-makers to vote for different interests. Hence, it is important to distinguish between different incentives a politician might have when one is dealing with voting data. Grossman et al. (1994) describe political decisions in a way that incumbent politicians can maximize their own utility, which depends to some extent on social welfare. Hence, the politicians' decisions depend on how highly they value private rents compared to social welfare.

Peltzman (1984) empirically examines how much of the variation in legislators' voting behavior can be explained by "interest" and how much can be explained by "ideology". He argues that the tendency for legislators to shirk serving their constituents' interests in favor of their own preferences (ideology) seems more apparent than real. According to him, ideology measures can explain much legislative voting behavior statistically. But, they turn out to be proxies for something else: Peltzman finds that liberals and conservatives tend to appeal to voters with systematically different incomes, education, and occupations, and to draw contributions from different interest groups. These systematic differences point to, by and large, different voting patterns. Peltzman's finding that a legislator's ideology (or personal preference) is not a real determinant for their voting decision is controversial. Opponents of this view are Kalt et al. (1984, 1990). Examining votes on one specific issue (coal strip-mining

regulations) and not on an entire package of votes as Peltzman does, Kalt et al. show that Senators' ideologies are important to explain their votes on the issue. Stratman (2001) also tests the impact of ideology on congressional voting patterns. Controlling for the possibility that Senators trade votes, his findings confirms Peltzman's results.

Voting for Trade Protection - A Model

Peltzman (1984) develops a model in which a legislator's policy choice can be explained by "economic interest" of constituents in the outcome. The congressional voting model introduced in this section is similar to the one Peltzman used to motivate his empirical approach.

Suppose the legislators' objective is to maximize the expected share of popular vote or, equivalently, their probability of reelection. Then a legislator's expected vote share in the next election (M) can be expressed as

$$M = R(m) + T(1 - m) \tag{III.1}$$

where m is the share in the last election and R and T are fractions of those who voted for or against the legislator, respectively, last time, and who is expected to support the politician in the next election.

For simplicity suppose that following his election, the legislator votes on a number of bills which are all trade related. Assume that a "yes" vote on a bill is a vote for the protectionist policy. Each of these bills either helps or hurts voters according

to the sector (S) in which they work. Suppose that the people who voted for the legislator are employed in a sector benefitting from protection (S_F), and those who opposed them are employed in a sector that is hurt by protection (S_A). By choosing the number of bills to support, the legislator affects both T and R in two ways. First, there is a direct effect because voters either benefit or suffer from votes for protection depending on the sector in which they are employed. Second, there is an indirect effect because the number of bills supported impacts the amount of campaign contributions a legislator receives. This can be expressed:

$$R = R[v, X_R(v, S_F)] \quad (\text{III.2})$$

$$T = T[v, X_T(v, S_A)] \quad (\text{III.3})$$

where v is the number of protectionist votes and X are the expected campaign funds.

The first order condition for the problem, choose v to maximize M , is

$$M_v = 0 = (1 - m)(T_v + T_X X_{T_v}) + m(R_v + R_X X_{R_v}) \quad (\text{III.4})$$

In general, T_v and R_v will be related to S_A and S_F , respectively:

$$R_v = r(S_F) \quad (\text{III.5})$$

$$T_v = t(S_A) \quad (\text{III.6})$$

with $r_{S_F} < 0$ and $t_{S_A} < 0$. That is, the more competitive the environment of a voter group, the more who benefit from a pro trade vote, and hence, the less voters who are likely to reward the legislator in the next election. Furthermore, the number of

bills supported by the politician positively effects the level of campaign contributions from former supporters and negatively effects the level of contributions from former opponents, which can be expressed as

$$X_{R_v} = g(S_F) > 0 \quad (\text{III.7})$$

$$X_{T_v} = f(S_A) < 0 \quad (\text{III.8})$$

Using Bhagwati's (1982) and Brainard's approach and modeling lobbying and structural adjustments as substitutes, it can be assumed that both of the effects above decrease as a sector (A or F) becomes more competitive. This implies that the impact of campaign contributions on a politician's choice of the number of pro trade votes decreases as s sector becomes more competitive.

The implications of a change in the competitiveness of a sector can be shown with the following two expressions

$$\text{sgn } v_{S_F} = \text{sgn } m(r_{S_F} + g_{S_F}R_X) \quad (\text{III.9})$$

$$\text{sgn } v_{S_A} = \text{sgn } (1 - m)(t_{S_A} + f_{S_A}T_X) \quad (\text{III.10})$$

Hence, as soon as at least one sector becomes more competitive, the politician chooses to decrease the number of protectionist votes, because the opponents will now be more pleased and fewer of the supporters displeased by such votes.

The implication of this model for the effect of the intervention of the PBGC in the steel industry is the following: A Representative in a district with a lot of steel industry is likely to vote for protection before the PBGC intervened, because the steel

industry benefits from protection, and because steel firms have an incentive to lobby for protection. The PBGC intervention made the steel firms more competitive - and hence, the steel firms have an incentive to lobby less and hence, the Representative receives less contributions for protectionist votes. But if the constituency of the Representative consists of steel workers, who are negatively affected by the bailout, then they are not under the impression that the steel industry has become more competitive - on the contrary - and the Representative receives more support by voting for protectionist policies. Whether the PBGC intervention induces the Representative to vote for or against more protection depends on which of these two opposing effects is larger.

Data

The data on trade votes used in this study come from the Congressional Quarterly Almanacs for the 105th - 109th Congress. The criterion used to characterize votes relevant for this study is that a vote offered a clear choice of whether to raise or to lower trade barriers that affect the steel industry. We only use the votes on trade barriers, since barriers are the predominant form of trade protection that affects the steel industry.¹⁰ The data set includes the votes of House Representatives in all 435 congressional districts on 13 trade related bills in 9 years.¹¹ The vote of a

¹⁰See Table 1A: US Steel Trade Protection Events.

¹¹See Table 2A: Trade related bills Congress voted on between 1998 and 2006.

Representative in congressional district i in year t on bill j is a binary variable, where 1 indicates that the Representative voted for the free trade position and 0 indicates they voted against the free trade position. Trade votes are used as the dependent variable in the empirical specifications.¹²

Information on the steel plants whose pension plans were overtaken by the PBGC comes from the PBGC's press releases.¹³ The information from these data is the name of the steel firm whose pension plan was overtaken and the year when this happened.

Data about all major American steel plants used in this study comes from the Center for Industry Studies (CIS) at the University of Pittsburgh. This data set provides information about the number of firms, firm types, ownership and plant capacities. The main two types of steel mills in the US are minimills, which produce raw steel by recycling scrap, and integrated steel mills, which produce higher quality steel in mostly much higher quantity. Minimills operate more efficiently, but historically cannot produce as high quality of steel as the integrated mills. Another difference between these two types is that integrated firms are primarily unionized, whereas

¹²An issue with voting records is that they cannot be interpreted as a perfect representation of peoples' attitudes towards free trade, as it is possible with survey data. But, on the other side, voting records do not suffer from biases resulting from selection or sample size. Previous work that has empirically examined peoples' attitudes toward trade liberalization using survey data is often limited to a cross sectional analysis because many surveys were only conducted in one year. Mayda et al. (2005), for example, use data from the 1995 National Identity Module (ISSP), and Denslow et al. (1996) use data from the NAFTA telephone survey conducted in 1993. Scheve et al. (2001) and Blonigen (2008) both base their studies on data from the American National Election Studies (ANES).

¹³PBGC press releases for the years 1997-2006: <http://www.pbgc.gov/media/news-archive/news-releases/1997/> - <http://www.pbgc.gov/media/news-archive/news-releases/2006/>.

minimills are not. The number of steel plants and their capacities are used in the regressions as a proxy for the employment in the industry.

Other possible determinants for a Representative's attitude towards free trade are congressional district characteristics. Such data are available until 1998 from Adler.¹⁴ For later years, these data are available from the Census Bureau. We use the total population and the number of people above 65 to calculate the percentage of share of retired people in a congressional district. Since steel plants are most often the major employers in a congressional district, we use the fraction of retired people in a congressional district as a proxy variable for the ratio of retired to working employees in the steel industry.

To control for individual specific effects we include the political party affiliation of the Representatives.

The unit of observation in this data set is by congressional district by year. Congressional districts change every 10 years. In the time span from 1998-2006, this happened in 2003. We control for this change by assuming the new districts are different from the former districts and include 870 instead of 435 congressional district fixed effects.

See *Tables 3.1- 3.3* for an overview of the data employed.

¹⁴Prof. Scott Adler, University of Colorado.
Website:[http : //sobek.colorado.edu/ esadler/CongressionalDistrictData.html](http://sobek.colorado.edu/esadler/CongressionalDistrictData.html) (last seen: 04/26/10)

Table 3.1. Data Availability

Source	Data content	Years available
Congressional Quarterly Almanacs	trade votes	1998-2006
PBGC	PBGC	1998-2006
CIS	capacities	1998-2006
Adler, Census	cd specific controls	1998-2006*

* 1993-1998 from Adler, 1999-2006 from Census (2000 values as proxies for 01, 2003 for 02, and 1998 values as proxies for 1999)

Table 3.2. Variable Description

Variable	Description	Unit of obs.
cd	ID number of congressional districts accounting for the difference in districts between 2002-2003 (n: 1-870)	
Vote	trade votes	by bill by cd by year
PBGC	# of firms in a district whose pensions were bought out by the PBGC	by cd by year
PPD	# of steel plants in a district	by cd by year
Total Cap.	total capacity in short tons	by cd by year
Integrated Cap.	total capacity of integrated steel firms in short tons	by cd by year
Retired	% of population above 65	by cd by year
Republican	1 if the Representative is republican	by cd by year

Table 3.3. Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Vote*	0.555	0.497	0	1	5410
PBGC	0.079	0.354	0	3	5410
Plants per district	0.455	0.974	0	9	5410
Total Capacity**	0.728	3.705	0	69.19	5380
Integrated Capacity**	0.431	3.512	0	68.489	5380
Republican***	0.526	0.499	0	1	5410
Retired	0.123	0.03	0.041	0.311	5295
Year	2002.862	2.419	1998	2006	5410

*Votes other than "yes" or "no" are excluded.

** In 1000s of short tons.

*** Votes of independent Representatives are excluded.

Empirical Specification

In the introductory part of this paper, the argument was made that after the intervention of the PBGC, the steel firms are more competitive (“firm effect”), but the steel workers are made worse off (“worker effect”). The implication of this, according to the theoretical model introduced above, is that House Representatives have an incentive to vote more in favor of free trade after the PBGC intervened because of the increased competitiveness of the firm(s), but on the other hand, they have an incentive to vote more for protectionist policies if their constituency sees the PBGC intervention as a signal that the situation for the steel industry has worsened.

The effect of the PBGC bailout in a congressional district on the voting behavior of a Representative can be tested empirically by addressing both the effect on the firms and on the workers. In all the empirical specifications, the dependent variable is *Vote*, a binary variable capturing the vote of Representative *i* on bill *j* in year *t*. *Vote* = 1 if the Representative votes for the free trade position. We capture the *firm effect* by controlling for the number of firms in district *j* in year *t* whose pension plans were overtaken by the PBGC (*PBGC*). The worker effect is measured by interacting *PBGC* with the number of retired workers in district *i* in year *t* (*Retired*). Additional controls are characteristics of a congressional district and characteristics of the supporters of a Representative, as well as a time trend.

Hence, the empirical approach is the following

$$V_{ijt} = \gamma_1 PBGC_{it} + \gamma_2 (PBGC * Retired)_{it} \\ + \gamma_3 (Plants \text{ per district})_{it} + \gamma_4 Retired_{it} + \gamma_5 Republican_{it} + \gamma_6 Trend_{it} + \epsilon_{ijt}$$

Since the PBGC intervention made the steel firms more competitive, their incentive to lobby for protection is expected to decrease, which decreases the Representative's incentive to vote for protectionist policies. Hence, the expected sign of the coefficient of *PBGC* is positive. But the steel workers, especially the retired ones, who are affected by the PBGC bailout are worse off after the bailout, since they lose (at least) part of their pension payments. This effect is expected to increase the more workers are affected. This is why the expected sign of the interaction term of *PBGC* and *Retired* is negative.

The number of steel plants per district controls for the prevalence of steel industry in a district. The more steel industry there is, the more likely it is that a Representative votes in favor of protectionist policies. Peltzman (1984) finds that controlling for a Senator's party affiliation substantially increases one's information about a Senator's voting patterns. But if party affiliation is added to a whole list of the Senators' supporters' characteristics, then little more is gained than by ignoring it. This is why we include a control for House Representatives' party affiliation in the empirical specifications as a proxy for the characteristics for the Representatives' supporters' preferences.

Republican House Representatives (and their supporters) have been shown to

support free trade more than democratic Representatives (and their supporters), which is why one would expect the coefficient of *Republican* to be positive.¹⁵

A time trend is included to control for systematic differences between years.

This is the basic specification, where we address the effect of the numbers of steel plants and the numbers of bailouts. We use similar specifications where we include capacities and employment levels (instead of the numbers of firms and bailouts) as robustness checks.

Empirical Results

Table 3.4 presents the results of the basic specification, as it is explained in the previous section.¹⁶ Again, the dependent variable is *Vote*, a binary variable capturing the vote of Representative *i* on bill *j* in year *t*. *Vote* = 1 if the Representative votes for the free trade position. The variables of interest are *PBGC* and *PBGC*Retired*, where the *PBGC* captures the *firm effect* by controlling for the number of firms in district *i* in year *t* whose pension plans were overtaken by the PBGC, and the interaction term of *PBGC* and the number of retired workers in district *i* in year *t* (*Retired*) captures the *worker effect*. The coefficients of both of these variables are significant and have the expected sign. This implies that the more firms were bailed out in a district, the more likely is the Representative to vote in favor of free trade.

¹⁵See Peltzman (1994)

¹⁶To control for within-group correlation of the error terms, the error terms are clustered by congressional districts.

The coefficient of the interaction term has the expected negative sign, implying that the more workers are affected by the bailout, the less likely a Representative is to vote for free trade. As expected, a Representative is more likely to vote for free trade if she is affiliated with the republican party. A time trend is included to control for systematic differences over time, but this is not reported in the tables. The coefficient of *Retired* is insignificant, which indicates that the significance of the interaction term of *Retired* and PBGC is not driven by the preference of retired people for or against protection. The fact that *Plants per district* is not significant could be due to the fact that campaign contributions are mostly paid at the firm and not plant level. Hence, a Representative does not have an incentive to vote for protection if there are many steel plants in their district if the firms owning these plants are not the ones lobbying for protection.

The results shown in *Table 3.5* and *Table 3.6* show the differences between the effect of the PBGC bailout on integrated versus not integrated steel firms. *Table 3.5* suggests that the PBGC intervention in integrated firms had no effect on the voting behavior of Representatives, but that the effect is strong where the PBGC intervened in other steel plants (i.e., mainly Greenfield and Brownfield Minimills). A possible explanation for this is that most integrated steel firms are strongly unionized. This implies that the labor unions fought for pension benefits for the workers of integrated plants after the PBGC intervened, while the workers of Minimills who are mostly unorganized suffered the consequences. The unions of integrated firms also lobby

Table 3.4. Basic Specification: Number of Steel Plants per District

	Conditional Logit
PBGC	4.974 (2.77)***
PBGC*Retired	-35.584 (3.37)***
Plants per district	-0.145 (.058)
Retired	1.433 (0.52)
Republican	3.128 (10.57)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.325

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

strongly for protection, and since they represent the workers, they did not reduce lobbying expenditure after the PBGC intervention, which explains why there is no *firm effect* in *Table 3.5*.

Table 3.5. Number of Integrated Plants per District

	Conditional Logit
PBGC * Integrated plants per district	-3.338 (1.14)
PBGC * Integrated plants per district * Retired	19.405 (0.84)
Integrated plants per district	-0.530 (0.55)
Retired	0.074 (0.03)
Republican	3.050 (10.34)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.323

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.6. Number of Minimills per District

	Conditional Logit
PBGC * Not integrated plants	6.257 (3.39)***
PBGC * Not integrated plants * Retired	-38.051 (3.15)***
Not integrated plants per district	-0.157 (0.64)
Retired	1.240 (0.45)
Republican	3.190 (10.71)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.326

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.7 to *Table 3.9* present the results of similar specifications as in the tables above, with the difference that the variables *D PBGC* and *D PBGC*D Steel plants* are not the numbers of firms, but dummy variables capturing whether there is steel industry in a district and whether the PBGC intervened in a district. This captures the effect of the PBGC intervention without looking at the magnitude of the steel industry in a district, as a robustness check that supports the hypothesis that a higher number of steel plants does not necessarily increase a representative's incentive to vote for free trade. Whether a Representative votes in favor of free trade also depends on the plants' efficiency as well as on the amount of lobbying activity the firms engage in. But the results suggest that the results are robust if we only account for the presence of steel industry in a district.

Table 3.7. Districts with Steel Plants

	Conditional Logit
D PBGC	7.075 (3.35)***
D PBGC * Retired	-47.654 (3.77)***
D plants per district	-0.450 (1.44)
Retired	1.568 (0.57)
Republican	3.152 (10.64)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.327

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.8. Districts with Minimills

	Conditional Logit
D PBGC * D Not integrated plants	6.752 (4.35)***
D PBGC * D Not integrated plants*Retired	-39.369 (3.93)***
D Not integrated plants	-0.272 (0.91)
Retired	1.253 (0.45)
Republican	3.200 (10.75)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.327

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.9. Districts with Integrated Steel Plants

	Conditional Logit
D PBGC * D Integrated plants per district	-3.547 (1.16)
D PBGC * D Integrated plants per district *Retired	20.570 (0.87)
D Integrated plants	-0.564 (0.85)
Retired	0.050 (0.02)
Republican	3.050 (10.31)***
Observations	3845
Number of CDs	430
Pseudo R^2	0.323

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

The results shown in *Table 3.10* to *Table 3.13* show additional robustness checks. In *Table 3.10* to *Table 3.12*, the variable *plants per district* is replaced with capacities of the steel firms. Again, we distinguish between total capacities (*Table 10*), capacities of integrated steel plants (*Table 3.11*), and capacities of all other plant types (*Table 3.12*). For all capacity types, we find no effect of the PBGC bailout on the Representatives' votes. On the first look, this indicates that the capacities of steel plants are not correlated with the plants' lobbying activity and that the effect of the bailout on steel workers does not depend on the capacity of steel produced. But it is the case that large integrated firms - with high capacities - lobby most. But both the firms and the powerful unions engage in lobbying activity, which indicates that for integrated

firms, we do not find a *worker - or firm effect* for the same reason as before: the unions counteract these effects. But it is plausible that the capacities of minimills are not correlated with the plants' lobbying activity and that the effect of the bailout on steel workers of minimills does not depend on the capacity of steel produced, since the efficiency of minimills varies largely across plants, which is something we cannot control for with our data.

Table 3.10. Total Capacity of the Steel Plants in a District

	Conditional Logit
PBGC * Total capacity	0.000 (0.43)
PBGC * Total capacity * Retired	-0.003 (0.49)
Total capacity	-0.023 (0.29)
Retired	0.426 (0.16)
Republican	3.064 (10.33)***
Observations	3832
Number of CDs	428
Pseudo R^2	0.323

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.11. Integrated Capacity of the Steel Plants in a District

	Conditional Logit
PBGC * Integrated capacity	0.000 (0.74)
PBGC * Integrated capacity * Retired	0.002 (0.90)
Integrated capacity	-0.082 (1.23)
Retired	-0.051 (0.02)
Republican	3.049 (11.14)***
Observations	3832
Number of CDs	428
Pseudo R^2	0.323

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Table 3.12. Capacity of the Minimills in a District

	Conditional Logit
PBGC * Capacity of not integrated plants	0.006 (1.19)
PBGC * Capacity of not integrated plants * Retired	-0.034 (1.64)
Capacity of not integrated plants	0.074 (0.37)
Retired	0.597 (0.22)
Republican	3.143 (10.54)***
Observations	3832
Number of CDs	428
Pseudo R^2	0.324

Absolute value of t statistics in parentheses;

* significant at 10%; ** significant at 5%; *** significant at 1%

The error terms are clustered by congressional districts

Other specifications not included in the output tables include the following:

We control for changes in the ownership of the steel firms. If a steel firm is taken over (especially by a foreign firm), then one would expect lobbying expenditures to decrease and hence, voting for protection to decrease. We find this in the data but it does not change the crucial results.

We also check for the robustness of our dependent variable. Different criteria are used to determine whether a trade related bill is relevant for the steel industry. The more loose the criteria, the less significant are the results, which is what one would expect.

Furthermore, we exclude the congressional districts that changed from 2002 to 2003 due to the rearrangement of the congressional districts following the 2000 Census. But this includes most districts with steel industry, which is why the results become weaker.

Conclusion

The steel industry has become one of the most protected industries in the US over the course of the last 50 years. But there is evidence that protection has not had the intended effect of allowing the industry to solve its structural problems. As a result of these problems, many steel firms have declared bankruptcy or have come close to bankruptcy during the last decade, which is why the Pension Benefit Guaranty Corporation (PBGC) bought out the pension plans from a large share of those steel

plants. The involvement of the PBGC has drastically changed both incentives of steel firms (“firm effect”) and steel workers (“worker effect”). The question is to what extent these changes impact the the political decision makers’ preferences towards free trade.

The hypothesis of this paper is that Representatives face opposing incentives after the PBGC bailout. On the one hand, they have an incentive to vote less for protectionist policies, because the PBGC interventions drastically cuts the firms’ fixed cost, which increases the firms’ relative cost of lobbying for protection. On the other hand, the steel workers, i.e., the constituency of Representatives in steel districts, are made worse off by the bailout because they lose part of their pension plans - or the security of their pension plans, which is an incentive for Representatives to vote for more protection.

The results obtained using conditional logit techniques suggest that both, “firm effect” and “worker effect” exist for minimills, but not for integrated steel firms. We explain this finding with the argument that the integrated steel firms are more unionized and hence, the unions fight for the employees pension plans and keep lobbying for protection, counterbalancing the effects of the PBGC intervention. The minimills on the other hand are often part of major steel firms, and more often affected by the PBGC intervention than the integrated firms. But they do not have strong labor unions, and hence, we see an effect of the PBGC intervention on voting for trade protection in districts with many minimills.

This study could be improved by using more data. It would be very interesting to extend the data set for the years after 2006. Furthermore, to refine the variable capturing the worker effect, it would be interesting to be able to control for firms that went bankrupt to distinguish between the worker effect in case the PBGC intervened and in case this did not happen after a bankruptcy. In order to test whether the high degree of unionization counteracts the effect of the PBGC intervention in integrated steel plants, it would be very interesting to have data on unionization in the industry.

CHAPTER IV

A THEORY OF THE DISSOLUTION OF COUNTRIES

Introduction

A fundamental goal of research concerned with political economy issues is the determination of the factors that influence the institutions of political decision making. A natural distinction of such institutions is between democratic and nondemocratic institutions. Political institutions determine how well the government of a country represents the interests of its citizens. These interests are different depending on differences in the citizens' income and their preferences over public goods. The last 200 years have shown vast changes in the political landscape of most countries. While consolidated democracies have been established in some countries (US, Western Europe, Australia, New Zealand), others have remained persistent non-democracies for a long time (South Africa, Singapore). Transitions of political institutions can be peaceful (Britain, Czech Republic, Slovakia) or violent (Nicaragua, former Yugoslavia), sometimes they leave the borders of a country unaffected (Britain, Nicaragua), sometimes countries partition in the process (Slovakia, Croatia, Eritrea).

The focus of this paper is to determine why some countries stay united while other dissolve - either through civil war or peaceful partition. In order to examine

such political transition processes, it is important to understand what drives the different forms of political violence. We argue that revolutions and civil wars happen for different reasons and have very different effects on the political structure of a country.

In the existing economic literature, “civil war” is most often defined as “an armed conflict which (a) causes more than one thousand deaths (b) challenges sovereignty of an internationally recognized state (c) occurs within the recognized boundaries of that state (d) involves the state-claimants as a principal combatant (e) involves rebels with the ability to mount organized armed opposition to the state”.¹ According to this definition of “civil war”, there were 127 civil war events in the post World War II period. We criticize that this definition includes “revolutions” as well as “civil wars”. The critical difference between these two forms of civic violence is that in a revolution, one group of citizens (the poor) revolts with the goal to overthrow the government (the rich), whereas a “civil war” is a conflict between two groups of citizens, with rich and poor members in each group.

A recent example for a revolution is the social conflict in Nicaragua that peaked in 1979, when the Somoza dictatorship was overthrown. Social unrest had built in Nicaragua since the 1960s, mainly because of the extensive practice of nepotism and corruption in the Somoza regime, in which all political power in Nicaragua was restricted to family members of the Somosa clan. As a consequence, the demand

¹See Sambanis (2002).

for the right of political participation started to increase among peasants as well as among the the middle class, which finally resulted in a bloody coup d'etat. The Frente Sandinista de Liberacin Nacional (FSLN), who had led the revolution, formed the new government and extended the political rights of the poor.² This is an example of a conflict between the ruling class and the disenfranchised. Acemoglu and Robinson (2006) and Moore (1967) argue such a conflict can induce democratization processes, because the poor gain political participation after overthrowing the existing regime, as it was the case in Nicaragua. Acemoglu and Robinson go a step further: Even the threat of a revolution from the poor can incentivize the elites of a country to extend political power in order to avoid revolution. They argue that elites have no interest in redistribution of wealth, but they prefer redistribution to revolution. If current transfers from the elite to the poor do not ensure future transfers, but extension of suffrage changes future political equilibria, then democratization acts as a commitment to redistribution. Thus, political transition might be the only way to avoid revolution. The authors use Britain and South Africa as examples of countries that transitioned peacefully from autocratic to democratic regimes, because the ruling elites strategically extended the franchise to avoid revolution. They argue that in Britain, the ruling aristocracy started to increase the franchise gradually beginning in 1832. The concessions made were aimed at incorporating the previously

²Source: <http://www.stanford.edu/group/arts/nicaragua/discoveryeng/timeline/> (last seen on 05/15/10)

disenfranchised into politics because the alternative was seen to be social unrest, and possibly revolution. In South Africa, the apartheid regime maintained power through extensive repression and violence for a long time, until in 1994, the regime was forced to democratize rather than risk potentially worse alternatives.

While revolutions, and more important - even the threat of revolutions - can start democratization processes, civil wars have the tendency to induce autocratic systems.³ A recent example of civil conflict that falls under the category of conflict we define as a civil war is the conflict in Ethiopia, which resulted in the independence of Eritrea from Ethiopia. The initial conflict within Ethiopia had economic causes. The central government extracted resources from the part that is now Eritrea. Businesses, for example, were forced out of Eritrea. Both christians and muslims in Eritrea increasingly opposed the government, which acted primarily according to the interests of Ethiopia. After 30 years of civil war, Eritrea became independent in 1991. While Ethiopia became democratic (at least on paper), Eritrea has remained an autocratic regime.⁴ We explain the tendency that civil wars do not encourage the emergence of democratic systems with the incentives of the elites within the group that seeks the partition of a country. Civil wars empower these elites and may enable them to remain in power after the civil war is over. This was the case in Eritrea, where the

³For clarity of their main point, Acemoglu and Robinson (2006) model revolutions as always successful once they are started. We adopt this concept and apply the same idea to civil wars, i.e., model them as always successful once they are started. A “successful civil war” is defined as one in which the group that starts the war manages to break away from the rest of the country.

⁴Sources: [http : //www.onwar.com/aced/data/echo/eritrea1961.htm](http://www.onwar.com/aced/data/echo/eritrea1961.htm) (last seen on 05/15/10) and [http : //en.wikipedia.org/wiki/History_of_Eritrea](http://en.wikipedia.org/wiki/History_of_Eritrea) (last seen on 05/15/10)

Eritrean People's Liberation Front (EPLF) remained in power and changed into a purely political organization after the civil war was over.⁵ Our model predicts that civil war is more attractive for the elites starting these wars if they gain more in terms of political power. This is especially the case if the elites can break away from a democracy and establish an autocracy in a separate country, which is why the model predicts that civil wars are more likely in democracies. But we show that, especially in democracies, there is an alternative to civil wars: the peaceful dissolution of the country. A good example is the peaceful partition of Czechoslovakia. The growing interethnic conflict in the country between the Czechs and the Slovaks was resolved peacefully when the constituent republic of Czechoslovakia agreed to end the state and to dissolve in 1992. The question that logically follows is why the breakup of Yugoslavia, a country with a very similar past and source of conflict, dissolved through a violent civil war. Our model predicts that the expected gain for Serbia from trying to keep the country united was large enough not to agree to the independence demands of the republics, because the conflict in Yugoslavia was not only between two groups in the country, but between several republics.

The main goal of this paper is to develop a theoretical model of the dissolution of countries. In order to address social conflict within a country we model a society with two different groups of citizens (we call them tribes), who have different preferences over public goods. This allows us to analyze under which political regime the dissolution

⁵In 1994, the EPLF changed its name to People's Front for Democracy and Justice (PFDJ).

of these tribes into separate countries is most likely. Differentiating between revolutions and civil wars enables us to look at the effects of both forms of political violence separately. We find that while the threat of a revolution can induce oligarchies to increase the franchise, the threat of a civil war can induce a country to dissolve peacefully. Our model predicts that peaceful dissolution is more likely in democracies, whereas oligarchies are more likely to risk civil war to stay united. This model explains why the peaceful dissolution of Czechoslovakia was possible, and explains why most dissolutions after civil wars happened in countries with low democracy index.⁶

The simple model developed in this paper follows the tradition of formal political economy models; we intend to develop a systematic understanding of complex social phenomena and abstract from much of the detail. Hence, the model is intended to describe the broad patterns (not the details) of political decision makers' choices about public goods allocations, taxes, and independence.

Related Literature

Our theoretical framework is based on the static model developed by Acemoglu and Robinson (2006).⁷ This framework allows us to explain the creation and consolidation of democracy. In this model, the existing elites start democratization processes,

⁶Sambanis (2000) states that from 14 countries that dissolved after a civil war since WW2, the only separation of two countries with a high democracy index (which is measured using Jagger and Gurr's *Polity 98* data) are India and Kashmir.

⁷Acemoglu and Robinson (2000) and Acemoglu and Robinson (2001) explain the dynamic version of their model in more detail.

i.e., strategically extend the franchise, to prevent social unrest and revolution. The elites have no interest in redistribution of wealth, but they prefer redistribution to revolution. If current transfers from the elite to the poor do not ensure future transfers, but extension of suffrage changes future political equilibria, then democratization acts as a commitment to redistribution. Thus, political transition might be the only way to avoid revolution.⁸ Lizzeri and Persico (2004) investigate democratization processes in Europe and argue that an increased demand for public goods, rather than the demand for redistribution of taxes led to an increase of the franchise. Aidt, Dutta and Loukoinova (2006) empirically examine the patterns of government spending in England from 1830-1938 and find that spending increased mainly for security and long-term public services, which supports Lizzeri's hypothesis. We incorporate the evidence from Lizzeri and Persico (2004) and Aidt, Dutta and Loukoinova (2006) and model the demand for public goods, rather than the redistribution of taxes to the poor.

The economic literature on civil conflict is summarized by Sambanis (2002) and Blattman (2009). Factors that have been found to fuel civic conflict are low per capita income, slow economic growth, and geographic differences.⁹ Sambanis criticizes the lack of differentiation between different forms of civil violence, especially in empirical

⁸Moore (1967) also discusses the controversial hypothesis that revolutions can have a positive impact on a country's democratization process. He argues that even though the poor never profited from a revolution immediately, revolutions enabled industrialization and therefore benefited the poor in the long run.

⁹See for example Collier and Hoeffler (2004, 2009) and Reynal-Querol (2002).

approaches. He argues that the sources of civil conflict determine the incentives of the policy makers and hence, a better identification of the sources of civil violence is crucial for the understanding of social conflict. Blattman (2009) suggests to be cautious with the interpretation of the relationship between civil conflict and democracy based on correlations found using the Polity IV data set (which is the data set most empirical work is based on), because of identification problems due to the coding of the data.¹⁰ Blattman also addresses the importance of micro-level data in order to investigate the causes and effects of civil conflict. He notes that while there is agreement that civil wars start only if they are economically feasible, there is little explanation to why and how armed groups form and how they reach agreements to end civil wars in the absence of law.

Gurses and Mason (2008) look at the outcome of civil wars. They classify three possible outcomes. According to them, civil wars can end in rebel victory, government victory, or some form of negotiated settlement. The important link of this study to our model is that Gurses and Mason find that rebel victories are less likely to be associated with democratization, on the contrary, they are likely to result in an authoritarian regime that favors its supporters and excludes the supporters of the old regime. In our model, we follow Acemoglu and Robinson (2006), who model revolutions as always successful once they are economically beneficial for the group that starts it. We

¹⁰See Marshall and Jagers (2004) for the data set, Hegre and Gates (2001) and Reynal-Querol (2002) for studies using the Polity IV data and Vreeland (2008) for a critique of the data set.

apply this concept to civil wars: If a civil war starts, it is successful, i.e., leads to a separation of the country, which is what Gurses and Mason call a “rebel victory”. The results obtained in this study support Gurses and Mason’s finding that a successful civil war, or a rebel victory, is unlikely to induce democratization.

Gurses and Mason (2008) as well as Besley and Persson (2009) explicitly address repression as a form of civic violence. Since we focus on “successful civil wars”, we only implicitly take repression into account. In our model, a cost is associated with civil war. If a political system is highly repressive, then this implies in our model that the cost of civil war is very high.

Reynal-Querol (2002) finds that a proportional democracy has a lower probability of a group rebellion than majoritarian system. We model a majoritarian democracy. Extending the model to account for the differences found by Reynal-Querol (2002) would be a valuable addition to this paper. But since this paper focuses on the dissolution of countries, these differences are not the primary objective of this paper.

The focus of the existing literature that is concerned with the dissolution of countries is on dissolution as a solution to civil war (Sambanis (2000), Sambanis and Schulhofer-Wohl (2009)). Only Levy (2007) models partition and civil war as alternatives. He focuses on the consequences of partition for the consumption growth rates of the citizens, but does not account for the political structure of the country.

Modeling the Dissolution of Countries

In the following, we introduce our model environment, and the structure of the extensive form game developed to model the decision of countries to dissolve.

Our model is built on the framework developed by Acemoglu and Robinson (2006). We use the same mechanism for democratization processes, which is based on a conflict between the poor and the elites of a country. In this framework, the existing elites start democratization processes, i.e., strategically extend the franchise, to prevent social unrest and revolution. A key difference between our approach and Acemoglu's framework is that we model the citizens' demand for public goods, not their demand for tax redistribution. Furthermore, we model a society with heterogenous preferences over public goods, creating a tension not only between the poor and the elites, but also between different groups of a society. The purpose of this is to show that while the tension between the poor and the elites can induce democratization of a country, the tension between two groups within a country can lead to a dissolution of the country.

In this static version of the model we introduce one game that starts out in oligarchy, and one that starts out in democracy. Analyzing the differences between these games allows us to compare whether the dissolution of countries is more likely in oligarchy or in democracy and why.¹¹

¹¹In a dynamic version of the model, we can then combine these two games.

Model environment

The society consists of two tribes, $i \in \{L, S\}$. Tribe L has more members than tribe S. The members of these tribes differ according to their preferences over two public goods l and s . Both tribes value only one of the public goods, and are indifferent about the other one. The utility of the members of tribe L increases only in public good l , and the utility of the members of tribe S increases only in s . We assume that the individuals' utility over the public goods follows a strictly concave function, i.e., that $f(0) = 0$, $f'(\cdot) > 0$, and $f''(\cdot) < 0$.

Both tribes consist of two types of individuals: rich with fixed income $y_r^i = y_r^L = y_r^S$ and the poor with income $y_p^i = y_p^L = y_p^S$. The size of the large tribe L is δ^L and the size of the small tribe S is δ^S , with $\delta^L > \delta^S$. Both tribes consist of poor and rich people ($j \in \{p, r\}$), according to the fractions δ_p^i and δ_r^i , where $\delta_p^i > \delta_r^i$. We assure that the median voter is a poor member of the large tribe, i.e., that at least 50 percent of the population are poor members of the large tribe, or $\delta_p^L \geq 0.5$.¹² There is the same fraction of rich people in each tribe, i.e., $\frac{\delta_r^L}{\delta_p^L} = \frac{\delta_r^S}{\delta_p^S}$. To economize on notation, total population is normalized to 1. Hence, $\sum_i \sum_j \delta_j^i = 1$. Mean income is denoted by \bar{y} .

In the following, we define the indirect utility functions of the individuals, depending on whether the country stays together or dissolves.

¹²This ensures that in a democracy, the median voter is a member of the large tribe.

Public goods provision with two tribes in one country

If the country stays together, then there is a common tax rate for the members of both tribes to finance the public goods. This is a simple way to have different groups treated differently given the implied public good provision levels. The government budget constraint is

$$T = \tau \sum_i \sum_j \delta_j^i y_j^i = \tau \bar{y} \quad (\text{IV.1})$$

where τ is the tax rate. A fraction α of the government revenue T is spent on public good l , and $(1 - \alpha)T$ is spent on s .

We assume that the individuals have quasi-linear preferences. When the tax rate is τ and the fraction of the government revenue spent on public good l is α , the indirect utility of a member of tribe L is

$$\begin{aligned} V_j^L(y_j^L | \tau, \alpha) &= (1 - \tau)y_j^L + f(l(\alpha, \tau)) \\ &= (1 - \tau)y_j^L + f(\alpha\tau\bar{y}) \end{aligned} \quad (\text{IV.2})$$

and the indirect utility of a member of tribe S is

$$\begin{aligned} V_j^S(y_j^S | \tau, \alpha) &= (1 - \tau)y_j^S + f(s(\alpha, \tau)) \\ &= (1 - \tau)y_j^S + f((1 - \alpha)\tau\bar{y}) \end{aligned} \quad (\text{IV.3})$$

The indirect utility function is conditioned on the policy variables α and τ . We also condition on y_j^i because individuals also make economic choices depending on the policy variables. It is straightforward to derive each individual's ideal tax rate and

preferred allocation of government revenue from these indirect utility functions, since they are the values for τ and α that maximize $V_j^i(y_j^i|\tau, \alpha)$. Under the assumptions made about $f(l)$ (and $f(s)$, accordingly), $V_j^i(y_j^i|\tau, \alpha)$ is strictly concave and twice continuously differentiable. The optimal tax rate can then be found simply from an unconstrained maximization problem, so we need to set the derivative of $V_j^i(y_j^i|\tau, \alpha)$ with respect to τ equal to zero. In other words, τ_j^i needs to satisfy the first order conditions:

$$f'(l) = \frac{y_j^L}{\alpha \bar{y}} \quad (\text{IV.4})$$

$$f'(s) = \frac{y_j^S}{(1 - \alpha) \bar{y}} \quad (\text{IV.5})$$

$$(\text{IV.6})$$

These conditions imply that the rich always prefer a lower tax rate than the poor, as long as they receive a positive amount of their preferred public good. From the indirect utility functions of the two tribes we also know that for members of tribe L $\alpha = 1$ is optimal and that $\alpha = 0$ is optimal for members of tribe S.

Public goods provision after the country dissolves

If the tribes split up and form two separate countries, then α is not a choice variable, because the tribes spend all government revenue only on the public good they receive positive utility from. Another difference is the size of the government

revenue, which is now for each country ($i \in \{L, S\}$) given by

$$T^i = \tau \sum^j \delta_j^i y_j^i = \delta^i \tau \bar{y} \quad (\text{IV.7})$$

where τ is the tax rate again.

The indirect utility of a citizen of country L is

$$\begin{aligned} V_j^L(y_j^L | \tau) &= (1 - \tau)y_j^L + f(l(\tau)) \\ &= (1 - \tau)y_j^L + f(\delta^L \tau \bar{y}) \end{aligned} \quad (\text{IV.8})$$

and the indirect utility of a citizen of country S is

$$\begin{aligned} V_j^S(y_j^S | \tau) &= (1 - \tau)y_j^S + f(s(\tau)) \\ &= (1 - \tau)y_j^S + f(\delta^S \tau \bar{y}) \end{aligned} \quad (\text{IV.9})$$

Again, we need to set the derivative of $V_j^i(y_j^i | \tau)$ with respect to τ equal to zero to find the optimal tax rate.

$$f'(l) = \frac{y_j^L}{\delta^L \bar{y}} \quad (\text{IV.10})$$

$$f'(s) = \frac{y_j^S}{\delta^S \bar{y}} \quad (\text{IV.11})$$

$$(\text{IV.12})$$

As before, these conditions imply that the rich always prefer a lower tax rate than the poor as long as they receive a positive amount of their preferred public good. The first order condition for S and L as two separate countries also imply that the optimal tax rate is higher in the larger country L, since $f'(l) < f'(s)$.

A static model of the dissolution of countries

The timing of the basic extensive-form game between the elites and the poor of the two tribes is depicted in the game tree in *Figure 4.1* and *Figure 4.2*. We compare two scenarios; one, in which the elites initially have political power and one where the poor have political power in the beginning of the game. This allows us to investigate whether dissolution of countries is more likely in oligarchies or in democracies.

When the game starts in oligarchy (*Figure 4.1*), the large elite first decides whether to dissolve the country or to stay with the small tribe. If the country dissolves, then the elites of the two tribes (now countries) choose the political structure of the countries as well as the tax rate and the allocation of the public goods in the countries. In the figure, this is referred to as Ag^L and Ag^S , where “Ag” stands for Acemoglu-game, which is a subgame modeling the decision of the elites to introduce democracy. We refer to this part of the game as “Acemoglu-game”, since this is the framework introduced in Acemoglu and Robinson (2006), with the difference that we model the provision of public goods and not the redistribution of taxes. All the Acemoglu games are explained in detail below. If the country stays together, then Nature moves next and determines the cost of civil war, which can be γ_H or γ_L , where γ_H indicates a high cost, and γ_L a low cost of civil war. With probability q , the cost of civil war is high, and with probability $1 - q$, the cost of civil war is low. We assume that γ_H is high enough to prohibit civil war.¹³ Given the cost of civil war, the small elite

¹³This is a simplification that has no impact on the crucial results in the static version of the game.

then decide whether to start a civil war or not. It is assumed that every civil war is successful, i.e., results in a separation of the tribes into two countries. Civil war is assumed to destroy a fraction γ of the resources of both countries.

If there is a civil war, then the elites of the two tribes (now countries) choose the political structure of the countries, the tax rate and the public good allocation, i.e., the small elites play the subgame $Ag2$. If there is no civil war, then the large elite chooses the political structure of the country and the allocation of the public goods, which is explained in detail as $Ag1$.

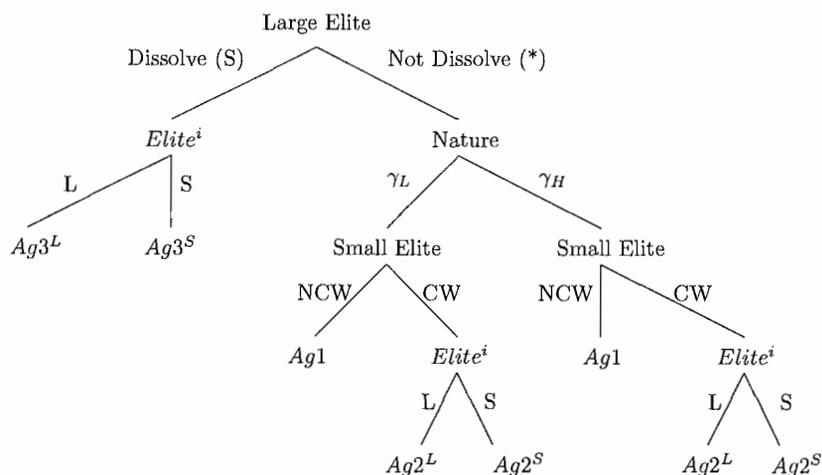


Figure 4.1. Game starting from oligarchy

When the game starts in democracy (*Figure 4.2*), the median voter, who is a poor agent of the large tribe, first decides whether to dissolve the country or to stay with the small tribe. If the country dissolves, then the poor of the large tribe remain in a democracy. The political structure of the small country is uncertain, but since

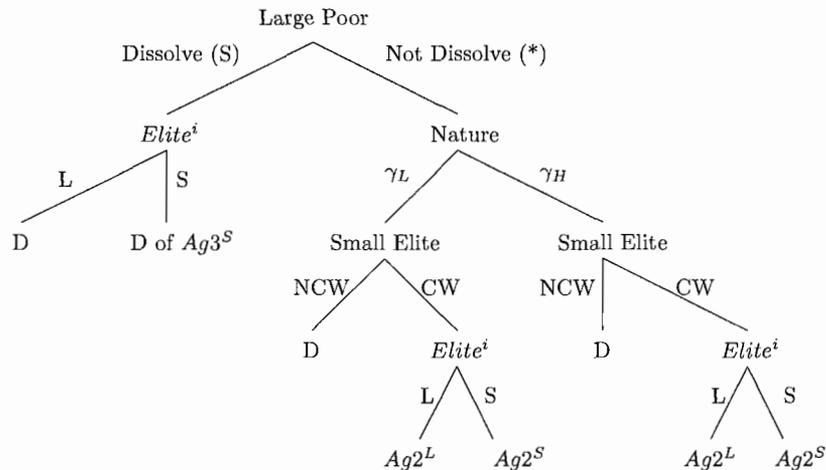


Figure 4.2. Game starting from democracy

the small elite is not involved in the first decision to dissolve or not, the political structure of the small country after dissolution is irrelevant for the rest of the game. If the country stays together, then Nature moves next and sets the cost of civil war to either γ_H or γ_L . Given the cost of civil war, the small elite then decides whether to start a civil war or not. If there is a civil war, then the elites of the two tribes (now countries) choose the political structure of the countries, the tax rate and the public good allocation, i.e., the small elites play the subgame $Ag2$. If there is no civil war, then the median voter chooses the political structure of the country, which means that the country stays democratic.

The equilibrium of both games described above can be solved using backward induction. In the following, we find the equilibria of all subgames, then introduce the equilibrium of each the games depicted in *Figure 4.1* and *Figure 4.2*, before we

compare the equilibria of both games to determine whether dissolution is more likely, i.e, happens for larger ranges of parameter values, in democracy or oligarchy.

Revolution constraints

We use the static game of democratization described in Acemoglu and Robinson (2006) to model the decision of the elites in a country whether or not to introduce democracy. In this approach, transitory political power for the disenfranchised comes from a revolutionary threat from the poor. The elite has no interest in redistribution of wealth, but they prefer redistribution to revolution. If current transfers from the elite to the poor do not ensure future transfers, but extension of suffrage changes future political equilibria, then democratization acts as a commitment to redistribution. Thus, political transition might be the only way to avoid revolution.

The timing of the basic extensive-form game between the elites and the citizens is depicted in the game tree in *Figure 4.3*. Initially, the elites have political power and move before the poor. They first decide whether to create a democracy or not. We denote the tax rate set by the elites in a nondemocracy by τ_r and use the notation τ_p to refer to the tax set in democracy by the median voter. If the large elites choose D, democracy is established and the median voter sets the tax rate and α , the fraction of government revenue that is spent on public good l . If they do not democratize, then the tax rate and α are determined by the elite. Following these policy decisions,

the citizens decide whether to initiate revolution. With probability $1 - p$, the rich can then reset the taxes and α .

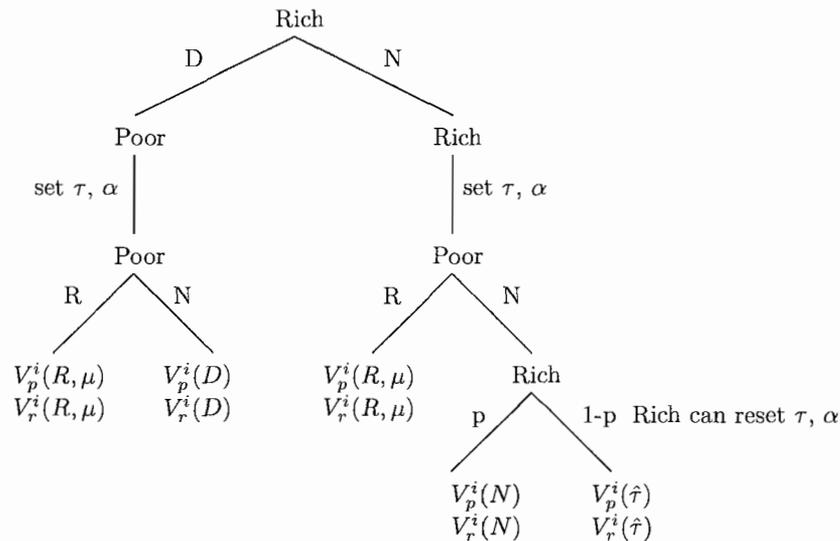


Figure 4.3. Acemoglu's game of democratization

Two tribes in one country

As in Acemoglu and Robinson (2006), we assume that during a revolution, the poor take all the resources from the rich. A fraction μ of the resources of society are destroyed during the revolution and the remainder can be divided among the citizens. A revolution leaves the elites with a payoff of zero. The timing of the extensive-form game between the elites and the citizens of both tribes is as in the Acemoglu game described above. The game tree is shown in *Figure 4.4*.

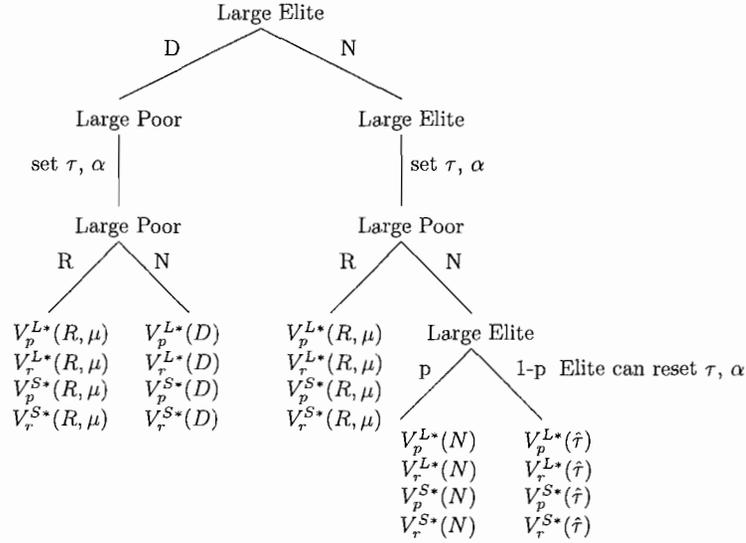


Figure 4.4. Acemoglu game in one country: Ag1

After a revolution, each poor agent receives a net income of

$$V_p^{i*}(R, \mu) = \frac{(1 - \mu)\bar{y}}{\delta_p} \quad (\text{IV.13})$$

and each rich citizen receives

$$V_r^{i*}(R, \mu) = 0 \quad (\text{IV.14})$$

The notion $V_j^{i*}(R, \mu)$ denotes the value of to the citizen in a post-revolutionary society conditional on μ . The star indicates that this is the payoff when the country does not dissolve. It is assumed that for a revolution to start, both the poor of the small and the large tribe have to be made better off through a revolution. Since α is always set by members of the large tribe, it will always be set equal to one, i.e., all government revenue will be spent on the public good benefitting the large tribe. This implies that the poor of the large tribe are always better off than the poor of the small tribe.

Hence, the poor of the large tribe are always less likely to revolt, which means that we have to compare the payoffs of the poor of the large tribe in case there is no revolution with their payoff after a revolution to find the conditions under which a revolution can be avoided. Following Acemoglu and Robinson (2006) we will refer to these conditions as the revolution constraints.

If the large elites set their preferred tax rate, then the payoff to the poor of the large tribe is

$$V_p^{L^*}(N^*) = (1 - \tau_r^{L^*})y_p^L + f(\tau_r^{L^*}\bar{y}) \quad (\text{IV.15})$$

Hence, there is never a revolution if $V_p^{L^*}(\tau_r^{L^*}) > V_p^{L^*}(R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p}{\bar{y}} \left((1 - \tau_r^{L^*})y_p^L + f(\tau_r^{L^*}\bar{y}) \right) == \mu_1^* \quad (\text{IV.16})$$

If the large elites promise redistribution, i.e., set a tax rate $\hat{\tau}^*$, then they can reset the tax rate with a probability $(1 - p)$. The payoff to the poor of the large tribe is then

$$V_p^{L^*}(\hat{\tau}^*) = y_p^L + p(f(\hat{\tau}^*\bar{y}) - \hat{\tau}^*y_p^L) + (1 - p)(f(\tau_r^{L^*}\bar{y}) - \tau_r^{L^*}y_p^L) \quad (\text{IV.17})$$

The promise of redistribution avoids revolution as long as $V_p^{L^*}(\hat{\tau}^*) > V_p^{L^*}(R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p}{\bar{y}} \left(y_p^L + p(f(\hat{\tau}^*\bar{y}) - \hat{\tau}^*y_p^L) + (1 - p)(f(\tau_r^{L^*}\bar{y}) - \tau_r^{L^*}y_p^L) \right) == \mu_2^* \quad (\text{IV.18})$$

In a democracy, the payoff of the poor of the large tribe is

$$V_p^{L^*}(D^*) = (1 - \tau_p^{L^*})y_p^L + f(\tau_p^{L^*}\bar{y}) \quad (\text{IV.19})$$

and hence, democracy avoids revolution if $V_p^{L^*}(D^*) > V_p^{L^*}(R, \mu)$, or,

$$\mu > 1 - \frac{\delta_p}{\bar{y}} \left((1 - \tau_p^{L^*}) y_p^L + f(\tau_p^{L^*} \bar{y}) \right) == \mu_3^* \quad (\text{IV.20})$$

From these conditions, we know that $\mu_3^* < \mu_2^* < \mu_1^*$. This implies that the smaller μ , the cost of revolution, the more pronounced is the threat of a revolution, and hence, the more attractive is democratization as a way to avoid revolution. *Proposition 8* summarizes the conditions under which revolution is avoided and the political outcomes.

Proposition 8. *If the country does not dissolve, then there is a unique subgame perfect equilibrium $\{\tilde{\sigma}_p^L, \tilde{\sigma}_r^L, \tilde{\sigma}_p^S, \tilde{\sigma}_r^S\}$ in the game described above, (Ag_1) , which is such that $\alpha = 1$ and*

- *If $\mu > \mu_1^*$, the large elite set their preferred tax rate, and there is no revolution.*
- *If $\mu < \mu_1^*$*
 1. *but $\mu > \mu_2^*$, then the large elite set the tax rate $\hat{\tau}^*$ so that $\mu = \mu_2^*$, and there is no revolution.*
 2. *If $\mu_2^* > \mu > \mu_3^*$, then the large elite chooses democracy, and there is no revolution.*
 3. *If $\mu < \mu_3^*$, there is a revolution.*

After civil war

We assume that during a civil war, a fraction γ of the resources of society are destroyed. If a revolution happens after a civil war, an additional fraction μ of the remaining resources is lost. After a civil war, both tribes form separate countries. Now we have to look at the revolution constraints for both countries separately. The timing of the extensive-form game between the elites and the citizens of both countries is as in the Acemoglu game described above. The game tree is shown in *Figure 4.5*.

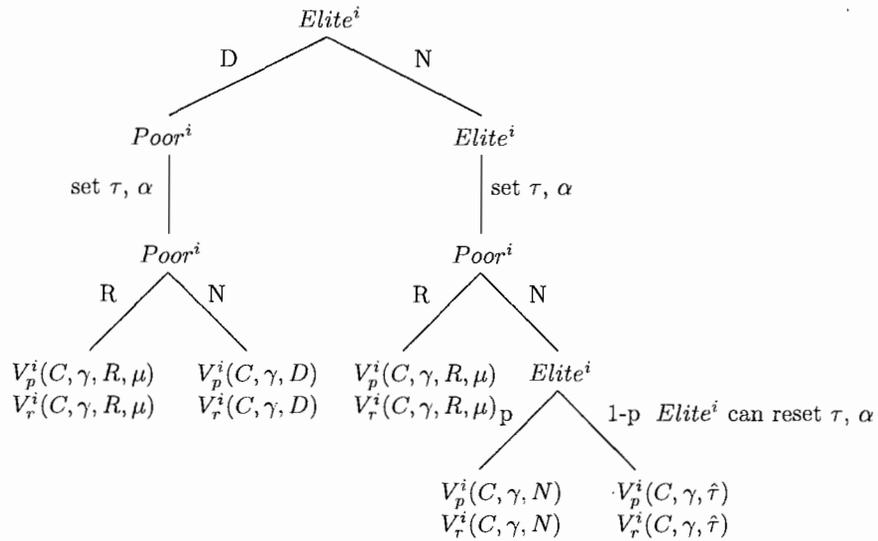


Figure 4.5. Acemoglu game in each country after a civil war: $Ag2^i$

After a revolution, each poor agent of country i receives a net income of

$$V_p^i(C, \gamma, R, \mu) = \frac{(1 - \mu)(1 - \gamma)\bar{y}\delta^i}{\delta_p^i} \quad (\text{IV.21})$$

and each rich citizen receives

$$V_r^i(C, \gamma, R, \mu) = 0 \quad (\text{IV.22})$$

The notion $V_j^i(C, \gamma, R, \mu)$ denotes the value of to the citizen in post-revolutionary country i after a civil war, conditional on μ and γ . (i.e., the revolution constraints).

If the elites set their preferred tax rate, then the payoff to the poor is

$$V_p^i(C, \gamma, N) = (1 - \tau_r^i - \gamma)y_p^i + f(\tau_r^i \bar{y} \delta^i) \quad (\text{IV.23})$$

Hence, there is never a revolution if $V_p^i(C, \gamma, N) > V_p^i(C, \gamma, R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}(1 - \gamma)\delta^i} \left((1 - \tau_r^i - \gamma)y_p^i + f(\tau_r^i \bar{y} \delta^i) \right) == \mu_1^C \quad (\text{IV.24})$$

If the elites promise redistribution, i.e., set a tax rate $\hat{\tau}^i$, then the payoff to the poor is

$$V_p^i(C, \gamma, \hat{\tau}^i) = (1 - \gamma)y_p^i + p(f(\hat{\tau}^i \bar{y} \delta^i) - \hat{\tau}^i y_p^i) + (1 - p)(f(\tau_r^i \bar{y} \delta^i) - \tau_r^i y_p^i) \quad (\text{IV.25})$$

The promise of redistribution avoids revolution as long as $V_p^i(C, \gamma, \hat{\tau}^i) > V_p^i(C, \gamma, R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}\delta^i(1 - \gamma)} \left((1 - \gamma)y_p^i + p(f(\hat{\tau}^i \bar{y} \delta^i) - \hat{\tau}^i y_p^i) + (1 - p)(f(\tau_r^i \bar{y} \delta^i) - \tau_r^i y_p^i) \right) == \mu_2^C \quad (\text{IV.26})$$

In a democracy, the payoff of the poor is

$$V_p^i(C, \gamma, D) = (1 - \tau_p^i - \gamma)y_p^i + f(\tau_p^i \bar{y} \delta^i) \quad (\text{IV.27})$$

and hence, democracy avoids revolution if $V_p^i(C, \gamma, D) > V_p^i(C, \gamma, R, \mu)$, or,

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}(1-\gamma)\delta^i} \left((1 - \tau_p^i - \gamma)y_p^i + f(\tau_p^i \bar{y} \delta^i) \right) == \mu_3^C \quad (\text{IV.28})$$

From these conditions, we know that $\mu_3^C < \mu_2^C < \mu_1^C$. This implies that the smaller μ , the cost of revolution, the more pronounced is the threat of a revolution, and hence, the more attractive is democratization as a means to the elites to avoid revolution.

Proposition 9 summarizes the conditions under which revolution is avoided and the political outcomes.

Proposition 9. *If the country does dissolve, then there is a unique subgame perfect equilibrium $\{\tilde{\sigma}_p^i, \tilde{\sigma}_r^i\}$ in the game described above, (Ag₂), which is such that*

- *If $\mu > \mu_1^C$, the elite of country i set their preferred tax rate, and there is no revolution in country i .*
- *If $\mu < \mu_1^C$,*
 1. *but $\mu > \mu_2^C$, then the elite of country i set the tax rate $\hat{\tau}^i$ so that $\mu = \mu_2^C$, and there is no revolution in country i .*
 2. *If $\mu_2^C > \mu > \mu_3^C$, then the elite of country i chooses democracy, and there is no revolution in country i .*
 3. *If $\mu < \mu_3^C$, there is a revolution in country i .*

After dissolution

If a revolution happens after a the country dissolves, a fraction μ of the resources is destroyed. After dissolution, both tribes form separate countries. Now we have to look at the revolution constraints for both countries separately. The game is shown in *Figure 4.6*

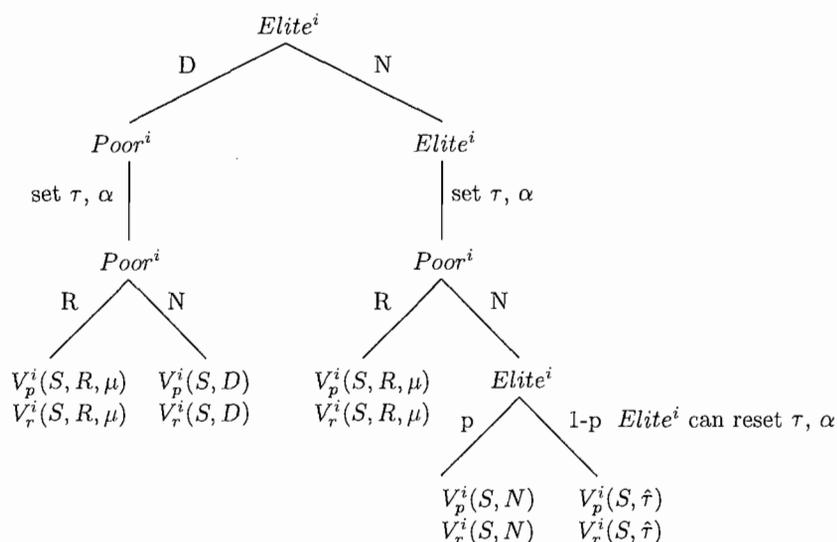


Figure 4.6. Acemoglu game in each country after dissolution: $Ag3^i$

After a revolution, each poor agent of country i receives a net income of

$$V_p^i(S, R, \mu) = \frac{(1 - \mu)\bar{y}\delta^i}{\delta_p^i} \quad (\text{IV.29})$$

and each rich citizen receives

$$V_r^i(S, R, \mu) = 0 \quad (\text{IV.30})$$

The notion $V_j^i(S, R, \mu)$ denotes the value of to the citizen in post-revolutionary country i , conditional on μ .

If the elites set their preferred tax rate, then the payoff to the poor is

$$V_p^i(S, N) = (1 - \tau_r^i)y_p^i + f(\tau_r^i\bar{y}\delta^i) \quad (\text{IV.31})$$

Hence, there is never a revolution if $V_p^i(S, N) > V_p^i(S, R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}\delta^i} \left((1 - \tau_r^i)y_p^i + f(\tau_r^i\bar{y}\delta^i) \right) \quad (\text{IV.32})$$

If the elites promise redistribution, i.e., set a tax rate $\hat{\tau}^i$, then the payoff to the poor is

$$V_p^i(S, \hat{\tau}^i) = y_p^i + p(f(\hat{\tau}^i\bar{y}\delta^i) - \hat{\tau}^iy_p^i) + (1 - p)(f(\tau_r^i\bar{y}\delta^i) - \tau_r^iy_p^i) \quad (\text{IV.33})$$

The promise of redistribution avoids revolution as long as $V_p^i(S, \hat{\tau}^i) > V_p^i(S, R, \mu)$, i.e., as long as

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}\delta^i} \left(y_p^i + p(f(\hat{\tau}^i\bar{y}\delta^i) - \hat{\tau}^iy_p^i) + (1 - p)(f(\tau_r^i\bar{y}\delta^i) - \tau_r^iy_p^i) \right) \quad (\text{IV.34})$$

In a democracy, the payoff of the poor is

$$V_p^i(S, D) = (1 - \tau_p^i - y_p^i + f(\tau_p^i\bar{y}\delta^i)) \quad (\text{IV.35})$$

and hence, democracy avoids revolution if $V_p^i(S, D) > V_p^i(S, R, \mu)$, or,

$$\mu > 1 - \frac{\delta_p^i}{\bar{y}\delta^i} \left((1 - \tau_p^i - y_p^i) + f(\tau_p^i\bar{y}\delta^i) \right) \quad (\text{IV.36})$$

From these conditions, we know that $\mu_3^S < \mu_2^S < \mu_1^S$. This implies that the smaller μ , the cost of revolution, the more pronounced is the threat of a revolution, and hence, the more attractive is democratization as a means to the elites to avoid revolution.

Proposition 10 summarizes the conditions under which revolution is avoided and the political outcomes.

Proposition 10. *If the country does dissolve, then there is a unique subgame perfect equilibrium $\{\tilde{\sigma}_p^i, \tilde{\sigma}_r^i, \mu\}$ in the game described above, (Ag_3) , which is such that*

- *If $\mu > \mu_1^S$, the elite of country i set their preferred tax rate, and there is no revolution in country i .*
- *If $\mu < \mu_1^S$*
 1. *but $\mu > \mu_2^S$, then the elite of country i set the tax rate $\hat{\tau}^i$ so that $\mu = \mu_2^S$, and there is no revolution in country i .*
 2. *If $\mu_2 > \mu > \mu_3^S$, then the elite of country i chooses democracy, and there is no revolution in country i .*
 3. *If $\mu < \mu_3^S$, there is a revolution in country i .*

Comparative statics

We can now compare the equilibria of the subgames determining the political structure of one country, two countries after civil war and two countries after dissolution, depending on the cost of revolution. For all these subgames we found that the higher the cost of revolution, the more “unlikely” it is that the elites introduce democracy, in a sense that it happens for a smaller range of parameter values of μ . We can also compare the critical values of μ , the cost of revolution across subgames, which shows that $\mu_1 > \mu_3$ and $\mu_2 > \mu_3$, which implies that revolution is most likely if the country separates. Whether revolution is more likely after a civil war or in one united country

depends on γ , the cost of a civil war. As long as γ is large enough, revolution is most unlikely if the country remains united. The critical value for the cost of civil war is

$$\gamma > 1 - \frac{f(\delta^L \tau_r^L \bar{y}) - \tau_r^L}{f(\tau_r^{L*} \bar{y}) + \tau_r^{L*}}$$

We assume in the following that that this is the case.

Civil war constraints

The next subgame starts with the small elite deciding whether to violently break away from the large tribe through a civil war. A civil war can only make the small tribe better off, because the large tribe decides about the public goods allocation and always profits from being able to extract taxes from the members of the small tribe. This is why the elite of the small tribe make the civil war decision.

In the following, we first examine the conditions under which the small elite does not start a civil war, given that the game starts from a democracy. Then we examine the “civil war conditions” for the game that starts out with an oligarchy.

Consider the game that starts out with a democracy (See *Figure 4.7*, a subgame of the extensive form game depicted in *Figure 4.2*). The outcome after the civil war depends on μ , the cost of a revolution. But if there is no civil war, then the outcome is certain: the country just remains democratic. Hence, in order to find out when the small elites start a civil war, we have to compare the payoff they receive after a civil war (when the small tribe forms an own country) with their payoff in a democracy, in which they are together with the large tribe.

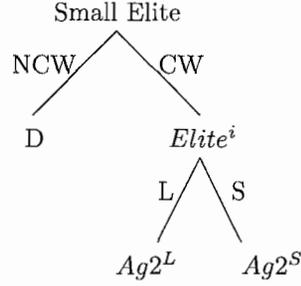


Figure 4.7. Subgame: The small elites' decision - starting from democracy

If $\mu > \mu_1^C$ holds, i.e., μ is large enough so that the small elites can set their preferred tax rate after a civil war, then the small elites are better off without a civil war as long as $V_r^{S*}(D) > V_r^S(C, \gamma, \tau_r^S)$. This is the case as long as

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_r^S) y_r^S + f(\delta^S \tau_r^S \bar{y}) - (1 - \tau_p^{L*}) y_r^S \right) == \gamma_1^D \quad (\text{IV.37})$$

If $\mu_1^C > \mu > \mu_2^C$, the small elites promise redistribution after a civil war to avoid revolution. In this case civil war is avoided as long as $V_r^{S*}(D) > V_r^S(C, \gamma, \hat{\tau})$, or if

$$\gamma > \frac{1}{y_r^S} \left(p((1 - \hat{\tau}) y_r^S + f(\delta^S \hat{\tau} \bar{y})) + (1 - p)((1 - \tau_r^S) y_r^S + f(\delta^S \tau_r^S \bar{y})) - (1 - \tau_p^{L*}) y_r^S \right) == \gamma_2^D \quad (\text{IV.38})$$

If $\mu_2^C > \mu > \mu_3^C$, then the small elites have to introduce democracy after a civil war to avoid a revolution. In this case, there is no civil war as long as $V_r^{S*}(D) > V_p^S(C, \gamma, D)$, or if

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_p^S) y_r^S + f(\delta^S \tau_p^S \bar{y}) - (1 - \tau_p^{L*}) y_r^S \right) == \gamma_3^D \quad (\text{IV.39})$$

If none of the revolution constraints holds in the Acemoglu game after a civil war,

then the small elites would never start a civil war, knowing that this would result in a revolution.

From these conditions, we know that $\gamma_3^D < \gamma_2^D < \gamma_1^D$. This means that these conditions are more restrictive the more power the small elite has after a civil war. Civil war is more “likely”, i.e., happens for a larger range of parameter values, if the small elites have more political power after the civil war. This implies that the higher μ , the cost of revolution, the more pronounced is the threat of a civil war.

Proposition 11 summarizes these civil war constraints.

Proposition 11. *If the game starts with a democratic country, the small elites choose to avoid a civil war*

- *If the small elite sets their preferred tax rate after a civil war (i.e., $\mu > \mu_1^C$) and $\gamma > \gamma_1^*$*
- *If $\mu < \mu_1^C$ does not hold and*
 1. *the promise of redistribution avoids revolution after a civil war and $\gamma > \gamma_2^*$*
 2. *If the elites choose to democratize after a civil war and $\gamma > \gamma_3^*$.*
 3. *If there would be a revolution after a civil war.*

Now consider the game that starts out with an oligarchy (See *Figure 4.8*, a subgame of the extensive form game depicted in *Figure 4.1*). Here we have to compare the

payoff of the small elite in the case of a civil war (Ag2) with the payoff the small elite receives in the one country case (Ag1), conditional on μ , the cost of revolution.

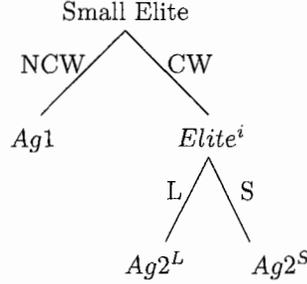


Figure 4.8. Subgame: The small elites' decision - starting from oligarchy

First, we define the civil war conditions for γ , given that $\mu > \mu_1^*$, i.e., that the costs of revolution are high enough to ensure that the large elite can set their preferred tax rate if the country remains united.

If $\mu > \mu_1^*$ and $\mu > \mu_1^C$, i.e., μ the small elites are better off without a civil war as long as $V_r^{S*}(\tau_r^{L*}) > V_r^S(C, \gamma, \tau_r^S)$. This is the case as long as

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_r^S) y_r^S + f(\delta^S \tau_r^S \bar{y}) - (1 - \tau_r^{L*}) y_r^S \right) == \gamma_1^N \quad (\text{IV.40})$$

If $\mu > \mu_1^*$ and $\mu_1^C > \mu > \mu_2^C$, then the small elites have to promise redistribution after a civil war to avoid revolution. In this case civil war is avoided as long as $V_r^{S*}(\tau_r^{L*}) > V_r^S(C, \gamma, \hat{\tau})$, or if

$$\gamma > \frac{1}{y_r^S} \left(p((1 - \hat{\tau}) y_r^S + f(\delta^S \hat{\tau} \bar{y})) + (1 - p)((1 - \tau_r^S) y_r^S + f(\delta^S \tau_r^S \bar{y})) - (1 - \tau_r^{L*}) y_r^S \right) == \gamma_2^N \quad (\text{IV.41})$$

If $\mu > \mu_1^*$ and $\mu_2^C > \mu > \mu_3^C$, then the small elites have to introduce democracy

after a civil war to avoid a revolution. In this case, there is no civil war as long as

$V_r^{S*}(\tau_r^{L*}) > V_p^S(C, \gamma, D)$, or if

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_p^S) y_r^S + f(\delta^S \tau_p^S \bar{y}) - (1 - \tau_r^{L*}) y_r^s \right) \equiv \gamma_3^N \quad (\text{IV.42})$$

If $\mu > \mu_1^*$, but none of the revolution constraints holds in the Acemoglu game after a civil war, then the small elites would never start a civil war, knowing that this would result in a revolution. From comparing the conditions on γ so that civil war is avoided we know that $\gamma_3^N < \gamma_2^N < \gamma_1^N$. This implies again that civil war is more likely if the small elites have more political power after the civil war.

Proposition 12 summarizes these civil war constraints.

Proposition 12. *If the game starts out of oligarchy, and $\mu > \mu_1^*$, i.e., the large elites set their preferred tax rate if the country remains united, then the small elites choose to avoid a civil war*

- *If the small elites set their preferred tax rate after a civil war (i.e., $\mu > \mu_1^C$) and*

$$\gamma > \gamma_1^N$$

- *If $\mu < \mu_1^C$ does not hold and*

1. *The promise of redistribution avoids revolution after a civil war and $\gamma > \gamma_2^N$*

2. *If the elites choose to democratize after a civil war and $\gamma > \gamma_3^N$.*

3. *If there would be a revolution after a civil war.*

Now we can employ the same logic to define the conditions on γ that avoid civil war for the case that $\mu_1^* > \mu > \mu_2^*$, i.e., the large elites have to promise redistribution to avoid revolution if the country remains united. It is impossible that $\mu_1^* > \mu > \mu_2^*$ and $\mu > \mu_1^C$, because the parameter values for μ that avoid revolution are more restrictive after a civil war than if the country remains united.

If $\mu_1^* > \mu > \mu_2^*$ and $\mu_1^C > \mu > \mu_2^C$, the small elites promise redistribution after a civil war to avoid revolution. In this case civil war is avoided as long as $V_r^{S*}(\hat{\tau}^*) > V_r^S(C, \gamma, \hat{\tau})$, or if

$$\begin{aligned} \gamma > \frac{1}{y_r^S} \left(p((1 - \hat{\tau})y_r^S + f(\delta^S \hat{\tau} \bar{y})) + (1 - p)((1 - \tau_r^S)y_r^S + f(\delta^S \tau_r^S \bar{y})) - \right. \\ \left. p((1 - \hat{\tau}^*)y_r^S) - (1 - p)(1 - \tau_r^{L*})y_r^S \right) == \gamma_2^{\hat{\tau}} \end{aligned} \quad (\text{IV.43})$$

If $\mu_1^* > \mu > \mu_2^*$ and $\mu_2^C > \mu > \mu_3^C$ then the small elites have to introduce democracy after a civil war to avoid a revolution. In this case, there is no civil war as long as $V_r^{S*}(\hat{\tau}^*) > V_p^S(C, \gamma, D)$, or if

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_p^S)y_r^S + f(\delta^S \tau_p^S \bar{y}) - p((1 - \hat{\tau}^*)y_r^S) - (1 - p)(1 - \tau_r^{L*})y_r^S \right) == \gamma_3^{\hat{\tau}} \quad (\text{IV.44})$$

If $\mu_1^* > \mu > \mu_2^*$, but none of the revolution constraints holds in the Acemoglu game after a civil war, then the small elite would never start a civil war, knowing that this would result in a revolution.

From comparing the conditions on γ so that civil war is avoided we know that $\gamma_3^{\hat{\tau}} < \gamma_2^{\hat{\tau}}$. This implies again that civil war is more likely if the small elite has more political power after the civil war.

Proposition 13 summarizes these civil war constraints.

Proposition 13. *If the game starts out of oligarchy, and $\mu_1^* > \mu > \mu_2^*$, i.e., the large elite promises redistribution if the country remains united, then the small elite chooses to avoid a civil war*

1. *The promise of redistribution avoids revolution after a civil war and $\gamma > \gamma_2^{\hat{}}$*
2. *If the elite chooses to democratize after a civil war and $\gamma > \gamma_3^{\hat{}}$.*
3. *If there would be a revolution after a civil war.*

Now we need the conditions on γ that avoid civil war in case that the large elites have to introduce democracy to avoid revolution if the country remains united, i.e., if $\mu_2^* > \mu > \mu_3^*$. If $\mu_2^* > \mu > \mu_3^*$, then $\mu_2^C > \mu > \mu_3^C$, because the conditions on μ that avoid a revolution are more restrictive if the country stays together.

Hence, if $\mu_2^* > \mu > \mu_3^*$ and $\mu_2^C > \mu > \mu_3^C$, then the small elite also has to introduce democracy after a civil war to avoid a revolution. In this case, there is no civil war as long as $V_r^{S^*}(D) > V_p^S(C, \gamma, D)$, or if

$$\gamma > \frac{1}{y_r^S} \left((1 - \tau_p^S) y_r^S + f(\delta^S \tau_p^S \bar{y}) - (1 - \tau_p^{L^*}) y_r^S \right) \equiv \gamma_3^D \quad (\text{IV.45})$$

If $\mu_2^* > \mu > \mu_3^*$, but none of the revolution constraints holds in the Acemoglu game after a civil war, then the small elite would never start a civil war, knowing that this would result in a revolution.

Proposition 14 summarizes these civil war constraints.

Proposition 14. *If the game starts out of oligarchy, and $\mu_1^* > \mu > \mu_2^*$, i.e., the large elite promises redistribution if the country remains united, then the small elite chooses to avoid a civil war*

1. *If the elite chooses to democratize after a civil war and $\gamma > \gamma_3^D$.*
2. *If there would be a revolution after a civil war.*

Finally we need the conditions on γ that avoid civil war for the case that $\mu < \mu_3^*$, i.e., the large elites cannot avoid if the country remains united. If revolution is the sure outcome if the country stays together, then the small elites never start a civil war, since the revolution constraint is more restrictive in after a civil war than if the country stays united.

Proposition 15. *If the game starts out in oligarchy, and $\mu < \mu_3^*$, then the small elites never start a civil war.*

Comparative statics

From the discussion of the civil war conditions above, we know that given the revolution constraints after a civil war (the constraints on μ in Ag2), the parameter values of γ , the cost of civil war, are more restrictive if the small elites have more political power after a civil war. Hence, the small elites are more “likely” to start a civil war if they can increase their political power - and therefore their payoffs - by doing so. This is only the case in democracies, and hence, civil war is more likely

in democracy.¹⁴ We can also compare the civil war conditions, depending on the revolution constraints in the united country, given the revolution constraints for the separate countries after a civil war. This yields $\gamma_t^N < \gamma_t^{\hat{r}} < \gamma_t^D$ for $t \in \{1, 2, 3\}$. This implies that civil war is more “likely” if the poor have more political power in the united country.

The decision to dissolve the country under democracy

If the game starts out in a democracy (*Figure 4.2*), then the median voter, a poor member of the large tribe, decides whether the two tribes stay together in one country or if the country dissolves. If the tribes stay together, then nature moves next and sets the cost of a civil war, γ_H or γ_L . γ_L indicates a low cost of civil war, which happens with probability q . With probability $1 - q$, the cost of civil war is high. To keep the analysis focused on the key points, we assume that γ_H is high enough to avoid civil war in general. This means

$$\gamma_H > \frac{1}{y_r^S} \left((1 - \tau_r^S) y_r^S + f(\delta^S \tau_r^S \bar{y}) - (1 - \tau_p^{L*}) y_r^S \right) \quad (\text{IV.46})$$

The country will stay together if the median voter, a poor member of the large tribe, expects a higher payoff from staying together than from dissolving. The median voter always chooses not to dissolve if the civil war constraints do not bind. If they bind, i.e., the small elites choose civil war if nature chooses γ_L , then median voter decides to separate in the following three cases.

¹⁴If $\mu > \mu_1^C$, then (37) is more restrictive than (40). If $\mu_1^C > \mu > \mu_2^C$, then (38) is more restrictive than (41) and (43) and if $\mu_2^C > \mu > \mu_3^C$, then (39) more restrictive than (42) and (44) and (45).

If $\mu_1^C > \mu$ and $\gamma < \gamma_1^D$ the median voter chooses separation of the countries if

$$qV_p^L(C, \gamma, N) + (1 - q)V_p^{L*}(D) < V_p^L(S, D) \quad (\text{IV.47})$$

If $\mu_1^C < \mu < \mu_2^C$ and $\gamma < \gamma_2^D$ the country is separated if

$$qV_p^L(C, \gamma, \hat{\tau}) + (1 - q)V_p^{L*}(D) < V_p^L(S, D) \quad (\text{IV.48})$$

If $\mu_2^C > \mu > \mu_3^C$ and $\gamma < \gamma_3^D$ the the median voter decides to dissolve the country if

$$qV_p^L(C, \gamma, D) + (1 - q)V_p^{L*}(D) < V_p^L(S, D) \quad (\text{IV.49})$$

These conditions imply that the more a civil war pays off for the small elite, the more likely it is that dissolution is chosen as a measure to avoid a civil war.

Proposition 16 summarizes these civil war constraints.

Proposition 16. *If the game starts out in democracy, then the median voter, a poor member of the large tribe, chooses to dissolve the country if*

1. *If $\mu_1^C < \mu$, $\gamma < \gamma_1^D$ and $qV_p^L(C, \gamma, N) + (1 - q)V_p^{L*}(D) < V_p^L(S, D)$*
2. *If $\mu_1^C < \mu < \mu_2^C$, $\gamma < \gamma_2^D$ and $qV_p^L(C, \gamma, \hat{\tau}) + (1 - q)V_p^{L*}(D) < V_p^L(S, D)$*
3. *If $\mu_2^C > \mu > \mu_3^C$, $\gamma < \gamma_3^D$ and $qV_p^L(C, \gamma, D) + (1 - q)V_p^{L*}(D) < V_p^L(S, D)$*

The decision to dissolve the country under oligarchy

If the game starts out in a oligarchy (*Figure 4.1*), then the large elites decide whether the two tribes stay together in one country or if the country dissolves.

The country will stay together if the large elite expects a higher payoff from staying together than from dissolving. They always choose not to dissolve if the civil war constraints do not bind. If they bind, i.e., the small elite chooses civil war if nature chooses γ_L , then the median voter decides to separate in the following cases.

First, we define the conditions for the dissolution of the country given that $\mu > \mu_1^*$, i.e., that the costs of revolution are high enough to ensure that the large elites can set their preferred tax rate if the country remains united.

If $\mu > \mu_1^*$, $\mu > \mu_1^C$, and $\gamma < \gamma_1^N$, the conditions for dissolution depend on the payoff after dissolution, which depends on μ , the cost of revolution. Hence, if $\mu > \mu_1^S$, which implies that the elites set their preferred tax rate if the country dissolves., then the large elites choose to dissolve if

$$qV_r^L(C, \gamma, N) + (1 - q)V_r^{L*}(N) < V_r^L(S, N) \quad (\text{IV.50})$$

If the elites have to promise redistribution after the country dissolves, i.e., $\mu_1^S > \mu > \mu_2^S$, the large elite chooses dissolution if

$$qV_r^L(C, \gamma, N) + (1 - q)V_r^{L*}(N) < V_r^L(S, \hat{\tau}) \quad (\text{IV.51})$$

If $\mu_2^S > \mu > \mu_3^S$ and the elites have to introduce democracy after dissolution, then the large elite dissolves if

$$qV_r^L(C, \gamma, N) + (1 - q)V_r^{L*}(N) < V_r^L(S, D) \quad (\text{IV.52})$$

These conditions imply that more power the elites have after dissolution, the more likely they are to dissolve.

If $\mu > \mu_1^*$, $\mu_1^C < \mu < \mu_2^C$, $\gamma < \gamma_2^N$, and $\mu_1^S > \mu > \mu_2^S$, then the country dissolves if

$$qV_r^L(C, \gamma, \hat{\tau}) + (1 - q)V_r^{L*}(N) < V_r^L(S, \hat{\tau}) \quad (\text{IV.53})$$

If $\mu_2^S > \mu > \mu_3^S$, then dissolution is chosen if

$$qV_r^L(C, \gamma, \hat{\tau}) + (1 - q)V_r^{L*}(N) < V_r^L(S, D) \quad (\text{IV.54})$$

Again, it is the case that the more power the elites have after dissolution, the more likely they are to dissolve.

If $\mu_1^C < \mu < \mu_2^C$, $\gamma < \gamma_3^D$ and $\mu_2^S > \mu > \mu_3^S$, then the country dissolves if

$$qV_r^L(C, \gamma, D) + (1 - q)V_r^{L*}(N) < V_r^L(S, D) \quad (\text{IV.55})$$

Comparing the conditions above with respect to the cost of revolution after a civil war shows that the less power the elites have after a civil war, the more likely it is that the large elite chooses to dissolve the country.

If $\mu_2^C < \mu < \mu_3^C$, $\mu_1^C < \mu < \mu_2^C$, and $\gamma < \gamma_2^{\hat{\tau}}$, then the country dissolves if $\mu_1^S > \mu > \mu_2^S$

$$qV_r^L(C, \gamma, \hat{\tau}) + (1 - q)V_r^{L*}(\hat{\tau}^*) < V_r^L(S, \hat{\tau}) \quad (\text{IV.56})$$

and if $\mu_2^S > \mu > \mu_3^S$, the country dissolves if

$$qV_r^L(C, \gamma, \hat{\tau}) + (1 - q)V_r^{L*}(\hat{\tau}^*) < V_r^L(S, D) \quad (\text{IV.57})$$

If $\mu_2^C < \mu < \mu_3^C$, and $\gamma < \gamma_3^{\hat{r}}$, and $\mu_2^S < \mu < \mu_3^S$, then the country dissolves if

$$qV_r^L(C, \gamma, D) + (1 - q)V_r^{L*}(\hat{r}^*) < V_r^L(S, D) \quad (\text{IV.58})$$

If $\mu_2^* > \mu > \mu_3^*$, $\mu_2^C < \mu < \mu_3^C$, and $\gamma < \gamma_3^D$, then the country dissolves if

$$qV_r^L(C, \gamma, D) + (1 - q)V_r^{L*}(D^*) < V_r^L(S, D) \quad (\text{IV.59})$$

The large elites never choose to dissolve the country if $\mu < \mu_3^S$, i.e., if there would be a revolution after dissolution.

Comparing the conditions above with respect to the cost of revolution if the country stays united shows that the more power the elites have in a united country, the less likely it is that the large elites choose to dissolve the country.

Comparative statics and results

We can now compare the conditions under which an oligarchy dissolves with the ones under which a democracy dissolves to find out under which political system the dissolution of a country is more likely.

There are three cases. First, consider the situation that a civil war is certain and $\mu > \mu_1^C$, i.e., the elites set their preferred tax rate after a civil war. In this case, a democracy dissolves if (47) holds. Whether an oligarchy dissolves or not depends on which political system is established after dissolution, which in turn depends on μ , the cost of revolution. The more political power the elites have after dissolution, the more attractive is dissolution in oligarchy (compare (50), (51), and (52)). But

even if the elites are able to keep their political power after dissolution, which means that an oligarchy dissolves if (50) holds, condition (47) still is less restrictive than condition (50), implying that if $\mu > \mu_1^C$, dissolution is more “likely” in a democracy, i.e., happens for a larger range of parameter values of q , γ , and μ .

If $\mu_1^C > \mu > \mu_2^C$ and a civil war is certain, then a democracy dissolves if (48) holds. Again, the decision of an oligarchy to dissolve depends on the cost of revolution. Hence, we have to compare conditions (53), (54), (56), and (57) with (48) to determine under which system dissolution is more likely, given that $\mu_1^C > \mu > \mu_2^C$. (56) is the condition under which dissolution is most likely in an oligarchy. Comparing (56) with (48) shows that again, dissolution is more likely in a democracy.

If $\mu_2^C > \mu > \mu_3^C$ and a civil war is certain, the a democracy dissolves if (49) holds. An oligarchy dissolves if (55), (58), or (59) hold. Again, which of these conditions we have to compare with (49) depends on the cost of revolution. Dissolution is most likely in case (59) holds, but again, (59) is more restrictive than (49), implying that dissolution is more likely for democracies.

These results can be summarized as follows

Proposition 17. *A democratic country is more likely to dissolve than an oligarchy.*

In democracy the threat of a civil war, which is the possibility that the elites gain political power as a result of the civil war, induces dissolution. In an oligarchy, on the other side, the threat of a revolution is least pronounced if the country stays together, which makes it more likely that an oligarchy is not dissolved.

Ethiopia, for example, was an autocratic system when Eritrea first demanded independence. The Ethiopian government chose to stay united, because the threat of a revolution is smallest if the country stays united. Hence, potentially risking a civil war was the lesser of two evils for the ruling elites in Ethiopia. Czechoslovakia dissolved peacefully because in this democracy, dissolution was seen as the preferred alternative compared to potentially facing a civil war. Even though Yugoslavia had a similar past as Czechoslovakia, the important difference between the dissolution of these two countries is that while Czechoslovakia consisted of two republics, Yugoslavia included eight different territories. The gain for Serbia from keeping Croatia, Bosnia-Herzegovina, Montenegro, Kosovo, Macedonia, and Slovenia part of a united Yugoslavia was large enough and the payoff after dissolution small enough to deny the independence demands of the republics.

Conclusion

The focus of this paper is to determine why some countries stay united while other dissolve - either through civil war or peaceful partition. In order to examine such political transition processes, it is important to understand what drives the different forms of political violence. We argue that revolutions and civil wars happen for different reasons and have very different effects on the political structure of a country. A revolution, on the one hand, happens if a group of citizens revolts and overthrows the government. Most often this is a conflict between the poor against

the elites of a country. A “civil war”, on the other hand, is more precisely defined as a conflict between two groups of citizens.

In this paper, we develop a theoretical model of the dissolution of countries. We model a society with two different groups of citizens (we call them tribes), who have different preferences over public goods, to analyze under which political regime the dissolution of these tribes into separate countries is most likely. Differentiating between revolutions and civil wars allows us to look at the effects of both forms of political violence separately. We find that while the threat of a revolution can induce oligarchies to increase the franchise, the threat of a civil war can induce a country to dissolve peacefully. Our model predicts that peaceful dissolution is more likely in democracies, whereas oligarchies are more likely to risk civil war to stay united. The mechanism for this result is that in democracy, the threat of a civil war, which is the possibility that the elites gain political power as a result of the civil war, induces dissolution. In an oligarchy, on the other side, the threat of a revolution is least pronounced if the country stays together, which makes it more likely that an oligarchy stays united.

This model explains why the peaceful dissolution of Czechoslovakia was possible, because the median voter chose dissolution over civil war. In Yugoslavia, on the other side, the median voter chose to “gamble”, because the expected payoff of staying

was larger than the payoff from separating. This model also explains why most dissolutions after civil wars happened in countries with low democracy index.¹⁵

The simple model developed in this paper follows the tradition of formal political economy models; we intend to develop a systematic understanding of complex social phenomena and abstract from much of the detail. Hence, the model is intended to describe the broad patterns (not the details) of political decision makers' choices about public goods allocations, taxes, and independence.

An important issue for further research is to address and model the impact of third parties on civil conflicts. Countries not directly involved in such conflicts often influence the outcome of civic conflicts by providing funds for one of the parties directly involved. Modeling the incentives and the influence of third parties is crucial for testing this model empirically.

¹⁵Sambanis (2000) states that from 14 countries that dissolved after a civil war since WW2, the only separation of two countries with a high democracy index (which is measured using Jagger and Gurrs *Polity 98* data) are India and Kashmir.

CHAPTER V

CONCLUSION

The three chapters of this dissertation address the impact of special interest groups on economic decision making processes.

The hypothesis of the first essay is that there exists a dynamic relationship between politicians and lobby groups. Politicians may choose to support “projects” proposed to them by lobbies because they yield clear economic benefits. However, governmental support may continue after these benefits have been exhausted, implying a cost to society and yielding rents to the lobbies. A theoretical framework is developed to model the incentives a government might have to behave in a manner consistent with the hypothesis. In this structure despite the fact that they support projects from which all economic rents have been extracted, politicians are rationally reelected.

In the second chapter I examine how structural changes in the US steel industry affect the voting behavior of House Representatives on trade related bills. The hypothesis is that Representatives face opposing incentives after the PBGC bailed out the pension plans of major steel firms. Representatives have an incentive to vote less for protectionist policies, because the bailout makes the steel firms more competitive. But the Representatives also have an incentive to yield to the demands of affected steel workers, who favor more protection after the bailout. The data set

underlying this study is a panel including votes on trade related bills over 9 years.

The results obtained using fixed effects techniques support the hypothesis.

In the third chapter, I develop a theoretical model of the dissolution of countries. I model a society with two different groups of citizens, who have different preferences over public goods, to analyze under which political regime the dissolution of these groups into separate countries is most likely. Differentiating between revolutions and civil wars allows me to look at the effects of both forms of political violence. I find that while the threat of a revolution can induce oligarchies to increase the franchise, the threat of a civil war can induce a country to dissolve peacefully. The model predicts that peaceful dissolution is more likely in democracies, whereas oligarchies are more likely to risk civil war to stay united.

APPENDIX TO CHAPTER II

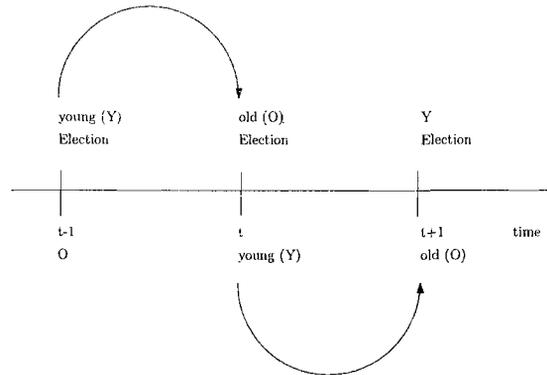


Figure A1: Incumbencies of lobbies overlap

Proof 1. If the old lobby in period 1 is a low type and the young lobby is a high type: Bad politicians receive $E + k$ in period 1 if they support both lobbies. This reveals them as bad politicians, which implies that they are not reelected and hence, do not receive any payments in their second period. If bad politicians choose to support only the young lobby in period 1, i.e., if they choose to pool, they receive E in period 1. In this case, bad politicians are reelected and receive expected payments of $\beta E + \beta(2k - a_H + \alpha(k - a_L))$ in their second period. Hence, if the old lobby is a low type and the young lobby is a high type, then bad politicians pool if

$$E + k \leq E + \beta E + \beta(2k - a_H + \alpha(k - a_L))$$

or

$$E \geq \frac{k}{\beta} - (2k - a_H) - \alpha(k - a_L)$$

If both lobbies in period 1 are low types: Bad politicians receive $k + k - a_L + E$ if they separate and an expected payoff of $E + \beta E + \beta(k + \alpha(k - a_L))$ if they pool with good politicians. Hence, bad politicians pool if

$$E + \beta E + \beta(k + \alpha(k - a_L)) \geq k + k - a_L + E$$

or

$$E \geq \left(\frac{1 - \alpha\beta}{\beta} \right) (k - a_L) + k \left(\frac{1 - \beta}{\beta} \right)$$

□

Proof 2. If the old lobby in period 1 is a low type and the young lobby is a high type: The expected spillovers to the voters are $x + \beta 2x$ if bad politicians pool. If bad politicians separate from good ones, the expected benefit is $\beta 2x$. If both lobbies in period 1 are low types: The expected spillovers to the voters is x if bad politicians pool. If bad politicians separate from good ones, the expected voter benefit is Πx . Hence, voter welfare increases if bad politicians choose to pool with good ones. □

Proof 3. Good politicians support both lobby types if the expected voter welfare from doing that is higher than the expected voter welfare from supporting only young lobbies, i.e., if

$$(1 - \alpha)^2 2x + \alpha(1 - \alpha)0 + \alpha(1 - \alpha)2x + \alpha^2 0 \geq x$$

which can be simplified to the condition

$$\frac{1}{2} \geq x$$

□

Proof 4. Bad politicians pool with good ones if the expected payments they receive from pooling are larger than the expected payments if they separate. The expected payments from pooling are

$$E + \alpha(k - a_L) + \beta k \alpha + \beta(1 - \alpha)(2k - a_H) + \beta \alpha(k - a_L) + \beta E$$

And the expected payments from separating are given by

$$E + \alpha(k - a_L) + k \alpha + (1 - \alpha)(2k - a_H)$$

Hence, pooling is optimal if

$$E \geq \left(\frac{1}{\beta} - 2\right) \alpha k + \left(\frac{1}{\beta} - 1\right) (1 - \alpha)(2k - a_H) + \alpha a_L$$

□

Proof 5. As long as good politicians support old lobbies, the expected payoff of high type lobbies is positive. If good politicians do not support old lobbies, the expected payoff of high type lobbies becomes negative and they do not join the pool of potential lobbies.

□

Proof 6. Both pooling conditions of the baseline model are more restrictive than the pooling conditions of the extension of the model. Three cases are possible:

(1) If the old lobby in period 1 is a low type and the young lobby is a high type and $\frac{1}{2} < \alpha \leq 1$, the pooling condition of the baseline model is more restrictive if

$$\frac{k}{\beta} - (2k - a_H) - \alpha(k - a_L) > \left(\frac{1}{\beta} - 2\right) \alpha k + \left(\frac{1}{\beta} - 1\right) (1 - \alpha)(2k - a_H) + \alpha a_L$$

which is the case since the expression above can be simplified as

$$a_H(\alpha\beta - \alpha + 1) > k(1 - \alpha - 4\beta - \alpha\beta)$$

where the inequality has to hold because $a_H > k$ and $(\alpha\beta - \alpha + 1) > (1 - \alpha - 4\beta - \alpha\beta)$.

(2) If both lobbies are low types and $\frac{1}{2} < \alpha \leq 1$, the pooling condition of the baseline model is more restrictive if

$$\left(\frac{1}{\beta} - \alpha\right)(k - a_L) + k\left(\frac{1}{\beta} - 1\right) > \left(\frac{1}{\beta} - 2\right)\alpha k + \left(\frac{1}{\beta} - 1\right)(1 - \alpha)(2k - a_H) + \alpha a_L$$

This expression can be simplified as follows

$$\left(\frac{1}{\beta} - \alpha\right)(k - a_L) + \alpha(k - a_L) > (1 - \alpha)\left(\frac{1}{\beta} - 1\right)(k - a_H)$$

The inequality holds because the left hand side of the equation is positive and the right hand side is negative.

(3) If both lobbies are low types and $\alpha = 1$, the pooling condition of the baseline model is more restrictive if

$$\left(\frac{1}{\beta} - \alpha\right)(k - a_L) + k\left(\frac{1}{\beta} - 1\right) > k\left(\frac{1}{\beta} - 2\right) + a_L$$

which is the case since

$$k > a_L$$

□

Proof 7. The expected payoff to the voters is $x + \beta(1 - \alpha)2x$ if bad politicians pool. If bad politicians separate from good ones, the expected payoff to the voters is $(1 - \alpha)2x +$

$\beta\Pi x + \beta(1 - \Pi)(1 - \alpha)2x$. As long as $\alpha < \frac{1}{2}$, without which pooling is automatic, the expected payoff if bad politicians pool is larger than the one if bad politicians separate from good ones. Hence, voter welfare increases if bad politicians choose to pool with good ones. \square

APPENDIX TO CHAPTER III

Note B1: Early observation of the ongoing underfunding

~~JOHN~~ -

OUT OF 1644 FIRMS STUDIED BY
IMS INC., 1321 REPORTED DATA ON
UNFUNDED VESTED BENEFITS. OF
THESE, 43 HAD UNFUNDED VESTED
BENEFITS IN EXCESS OF 30% OF
NET WORTH. OF THESE, 11 ARE
IN THE STEEL INDUSTRY. APPARENTLY,
THIS IS THE ONLY INDUSTRY TO FOLLOW
THE PRACTICE VIRTUALLY ACROSS THE
BOARD OF POOR FUNDING OF PENSION
BENEFITS. THESE 11 COMPANIES HAVE
A COMBINED EXPOSURE TO PBGC OF
\$964.9 MILLION. IF WE WERE TO
HAVE A CATASTROPHE RESERVE, THE
EVENT WHICH WOULD BE A MAJOR
CATASTROPHE FOR PBGC WOULD BE
IF THE STEEL INDUSTRY WENT SOUR.

FOES
8-3-77

SOURCE: Note from Robert Klein to John Hirschmann

Source: Ippolito (1989)

Table B1: US Steel Trade Protection Events

1996-1974	Voluntary Restraint Agreements (VRA's) with Japan and the EC.
1977-1981	Trigger Price Mechanism applied to all imports.
1982	Antidumping (AD) and countervailing duty (CVD) cases filed against EC countries. Subsequently terminated for VRAs on EC imports.
1984	AD and CVD cases filed against non-EC countries. Subsequently terminated for comprehensive VRAs.
1984-1989	Comprehensive VRAs with all significant import sources.
1989-1992	Extension of VRAs.
1992-1993	AD and CVD cases filed against significant import sources after VRAs expire. AD and CVD remedies applied to only subset of products.
1998-2000	Multiple AD and CVD cases against Japan and other Asian countries.
2002-2003	Safeguard remedies in form of tariffs placed on steel imports, excluding FTA partners and developing countries.

Source: Blonigen et al. (2006)

Table B2: Trade related bills Congress voted on between 1998 and 2006

Year	Bill	Roll Call #
1998	steel import ban	532
1999	steel quotas	56
2001	recommit tpa (trade promotion authority, former fast track)	447
	tpa house passage	481
2002	tpa final passage	370
2003	singapore fta free trade agreement)	432
	chile fta	436
2004	australia fta	375
	morocco fta	413
2005	dr-cafta implementation act	443
	bahrain fta	616
2006	oman fta	392
	vietnam ntr	519

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