

The Politics of Co-optation and
the Origin of the Welfare State *

Graziella Bertocchi

Dipartimento di Economia Politica, Università di Modena
Viale Berengario 51, I-41100 Modena, Italy, bertocchi@unimo.it
and CEPR

Jody Overland

Department of Economics, University of Colorado-Denver
Box 181, 1380 Lawrence Street, Denver, CO 80204, USA
joverlan@carbon.cudenver.edu

Michael Spagat

Department of Economics, Royal Holloway, University of London
Egham, Surrey TW20 OEX, UK, M.Spagat@rhbc.ac.uk

Preliminary and incomplete
January 1998

*This draft was prepared for presentation at the 1998 Winter Meetings of the Econometric Society in Chicago. We thank Robert Tamura for a very useful discussion. Graziella Bertocchi gratefully acknowledges financial support from CNR.

ABSTRACT

By promoting some of the poor into the middle class and thereby co-opting them into the system, a self-interested elite reduces the threat of political instability and the risk of being overthrown. Co-optation is accomplished through the transfer of resources to some of the poor, enabling them to enter the middle-class - a group with sufficient income to make the overthrow of the existing order a dominated choice. The resulting dynamic model captures the early evolution of the welfare state, society's class structure and political stability. A more elitist economy, i.e., one beginning with a larger elite and poor class, and a smaller middle class, exhibits larger transfers and a steady state with fewer poor than does an economy that begins with a larger middle class. The more poverty stricken are the poor, the smaller will be the steady-state poor class. Improvements in revolutionary technology decrease the size of the steady-state poor class.

JEL Classification Numbers: D7, E6, H1.

Key Words: Co-optation, Welfare State, Politics, Revolution, Growth, Redistribution, Transfers.

1 Introduction

In this paper we analyze the determinants of the modern welfare state and its historical origins. The modern welfare state originated in Western Europe during the last two decades of the nineteenth century. By modern welfare state, we mean general government intervention in the form of redistributive transfers, that is, social security, pensions, health and unemployment benefits, and provisions for public education. Most historians rank the social legislation introduced by Bismarck in the 1880s, which included workers' accident, sickness and old age insurance, as a decisive turning point in modern social history, one which marks the advent of the modern welfare state (Tampke, 1981). Together with the United Kingdom, Germany is therefore viewed as a pioneer in the creation of the modern welfare state¹. These sorts of alterations in the social contract were not limited to the United Kingdom and Germany. Indeed, for the majority of the countries of Western Europe, as well as North America, this period was characterized by fundamental social reforms that saw the role of government in the economy increase to unprecedented levels (Flora and Alber, 1981).

This period was characterized by an intense process of capitalistic reorganization and industrialization (Flora, 1981), which generated increasing demands for economic security and social equality and was therefore associated with intensified class struggle and distributive conflict. This in turn led to a rapid advance in the process of mobilization of the working class and the organization of workers movements through trade unions and political parties. The same period also witnessed the gradual development of mass democracy, even though the franchise was not completely extended until much later. In this context, those emerging forces which were hostile to the prevailing system could be neutralized with the aid of resources offered by the state. It has therefore been suggested that it was this understanding, on the part of the ruling elites, which motivated the take-off for the modern welfare state, which was initially almost exclusively directed at the working class in an effort to co-opt it into the prevailing political order.

There is substantial agreement among historians about the interpretation of the growth of the modern welfare state as a response to the diffusion of capitalism and the associated socio-political developments (Flora, 1981). Moreover, the same view is also shared both by the political sociology in the

¹However, recent findings by Lindert (1994) point to a more important role for Denmark and Norway in the early development of the welfare state.

tradition of de Tocqueville and Weber, and by the political economy in the Marxist tradition (Flora and Heidenheimer, 1981). The former describes the development of the welfare state as the gradual emergence of a new system of domination consisting of distributing elites and social clienteles. The latter has stressed the role of welfare policies as an effort to integrate the working classes without creating any fundamental challenge to the preexisting social order and the privileges of the elites². Our model can be interpreted as representing either point of view. According to these interpretations, Bismarck is therefore regarded as the representative of a self-interested elite which was forced to grant innovative welfare programs because a well-organized labor movement was pressing for it. In other words, his interest in social insurance was motivated by reactionary intentions, under the belief that modest concessions on the grounds of redistribution would preempt the social democrats from gaining broader support and pursuing more radical goals. These considerations demonstrate that, at this historical stage, there is no contradiction between the existence of generous redistributive policies and situations of high inequality and low democracy.

Turning to a comparative analysis of different countries, it becomes clear that the different forms assumed by welfare policy were determined by the varying social and political contexts found in each nation. For instance, within Western Europe, important differences distinguished Germany from the Scandinavian countries, with the UK and France as intermediate cases and the Mediterranean countries as laggards. However, most of the discussions on the development of the welfare state have stressed the much deeper differences between the experience of Western Europe as a whole and that of the US. In this respect, the commonplace claim is that in the US the development of programs found elsewhere was significantly delayed and achieved a more limited coverage. For example, public policy insurance and some other kinds of income maintenance programs were introduced in the US with about a one generation lag behind Europe (Heidenheimer, 1981)³. Various factors have been cited as determining these differences. The absence, in the US, of feudalism, together with the existence of a democratic political system that emerged prior to a large working class, with a relatively

²Both views can be contrasted, on the other hand, with Durkheim's solidaristic approach, which could be taken as a more accurate description of postwar developments in the UK and in Scandinavia, where the further growth of working class power forced a formerly unsolidaristic bourgeoisie to reconsider its positions (Baldwin, 1990).

³However, the US were pioneers in subsidizing education. See Trow (1967), Muller, Ringer and Simon (1977), Shavit and Blossfeld (1993) and Goldin (1994) for a discussion.

low level of status differentiation, and with a higher income level, most certainly played a major role (Kudrle and Marmor, 1981): in short, perhaps counterintuitively but - as we will show - in agreement with our model's results, the characteristic of the US as a less elitist society can be viewed as the main factor that explains the smaller size of government intervention at the outset.

In this paper, we focus our attention on this crucial first stage in the development of welfare policies, and in particular on the historical foundations of the modern welfare state as an instrument for the creation of social consensus within a more general defensive policy of integration and stabilization. We construct a theoretical framework that illustrates how a self-interested elite strategically uses co-optation through redistribution in order to control the threat of a revolution. The resulting dynamics capture the development of the welfare state together with the evolution of the society's class structure and its political stability, in a context which endogenously allows the expansion of the middle class. The size of government, aggregate income growth and wealth inequality are also governed by the same process.

To treat redistribution as the outcome of the elite's optimization problem distinguishes our approach from the majority of political economy models in which the size of government intervention is determined democratically through voting. Like ours, most of these models deliver the result that social conflict may lead to extensive redistribution. Our model, however, represents a more convincing description of the historical origins of the welfare state, because this institution was implemented well before full democratic participation was reached.

To capture the issues described above, we build a model with non-overlapping generations of individuals who are divided into three social classes: elite, a middle class and a poor class. The size of the elite is assumed to be constant over time, while the relative size of the middle and poor classes can be affected by redistributive transfers. All individuals are endowed with a positive amount of capital, which can be interpreted as a combination of physical, human and social capital, the endowments of which are highest for members of the elite and lowest for the poor. For simplicity, we will refer to these endowments as "capital". Capital is the only factor of the production process. All individuals maximize a utility function that depends on their own consumption and on the amount of capital bequeathed to their children. At each time t , there is a positive probability that a revolution will overthrow the existing social order. The probability of a revolution is a function of the proportion of the poor to total population.

The parameter which relates the size of the poor class to the probability of a revolution measures the strength and organization of the poor class. In the event a revolution takes place, all capital will be appropriated by the poor and the corresponding output, minus a fraction which is lost due to the disruptions of the revolutionary events, will be divided equally among them.

Without a welfare state, i.e., without redistributive policy and co-optation, each class will display a constant income growth rate. Convergence of income among social classes is therefore precluded. The probability of revolution asymptotes to a constant as time goes to infinity, however this probability may be slight. If there are many poor people the probability of an early revolution is quite high. This fact is a strong motivation for the elite to implement a welfare state in order to reduce the probability of a revolution.

Through redistributive transfers which are financed with self-imposed taxation, the elite can decrease the number of poor by promoting some of them into the middle class. The elite manages this process by solving an optimization problem, subject to a government balanced-budget constraint and to incentive compatibility constraints for individuals who are offered the option of middle class membership. The solution generates a sequence of government transfers that affect the evolution of the class structure and political stability of the society. The dynamic properties of the resulting system will depend on the parameters of the model and, in particular: the initial distribution of income, as captured by the relative mass of each class; the discrepancies in the initial levels of capital endowments; the proportion of output which is lost in a revolution; and the parameter that links the probability of a revolution to the size of the poor class.

Our main analytical results are the following: For any given set of initial condition, the size of the poor class declines over time, while the size of the middle class increases. The economy converges to a steady state in which the size of each social class is constant over time. In this steady state the economy's growth rate and the probability of revolution are also constant over time.

Given the complex analytical structure of the model, we continue to explore its implications through computational techniques. We find that convergence to the steady state is fast, in the sense that it occurs within a few periods. Given that one period here represents one lifetime, the dynamics generated by the model are consistent with the historical stylized facts.

While in equilibrium the transfers to the elite will be negative and the transfers to the newly-co-opted poor will be positive, the transfers to the

individuals who already belong to the middle class can in principle be either positive or negative: in other words, under some circumstances the elite can decide that is not necessary to bribe the middle class, and that instead it can also be asked to contribute to the funding of the redistributive program. Computational results indeed show that when the middle class is relatively wealthy, it is initially taxed to support the co-optation of the poor. If the middle class is relatively poor, then transfers to them will be positive.

In a steady state, transfers to the middle class tend to zero. Moreover, since a steady state is characterized by a constant number of poor, none of the poor is any longer offered to join the middle class. Government outlays are therefore zero in the steady state. To reconcile this result with today's evidence, we observe that today's welfare state has different motivations separate from that of deterring revolution which had originally determined the take-off of the welfare state. Nevertheless, many welfare state programs that were created for one purpose have proven difficult to eliminate now that their original purpose no longer obtains. Thus, we can view today's large entitlement programs as having roots in a different era when preventing revolution was a serious concern.

Comparative static exercises show that raising inequality by increasing both the proportion of the poor and the elite, at the expense of the middle class, tends to raise the level of the transfers to the newly-co-opted poor and lower the steady state size of the working class. Note that the number of poor in the steady state depends, rather surprisingly, on the initial class structure in the society, i.e., initial conditions have permanent effects. Thus, the existence early on of a relatively large middle class can work as a buffer for the elite, which then feels less pressed to co-opt the poor. This is consistent with the historical facts with respect to the comparison between Europe and the US. A society which, like the US at the end of last century, has a smaller elite, generates a smaller government. In addition, the same comparative statics exercise can be employed in order to compare the behavior of elites in different historical circumstances. For example, in pre-industrial revolution Europe, when the elite included a very small fraction of the population, transfers were also minimal. It is only with the industrial revolution and the increase in the size of the elite that sizeable transfer policies are introduced.

Interesting insights can also be gained by varying the initial levels of capital endowments. For example, higher initial capital levels for the poor imply higher transfers, but a smaller proportion of co-opted poor. This shows that transfer policy is not attuned to the needs of the poor in any meaningful sense. Rather, the relationship reflects the higher price of co-

opting a relatively less desperate working class. Again, this conclusion can be related to the historical evidence. Lindert (1994) has suggested that the smaller size of government in the US can be linked to the greater relative economic distance between the poor and the middle class in this country, if compared to most others.

Finally, we study the impact of changing what might be called the technology of revolution. Raising the loss attached to a revolution has the predictable effect of lowering both the transfer to the newly-co-opted poor and the stationary proportion of the poor – since a revolution becomes worthless, the bribe decreases and the proportion of co-opted rises, since it is cheaper for the elite to co-opt the poor. As the strength and organization of the poor increase, the primary impact is on the stationary size of the working class, which decreases: as revolution becomes more likely, the elite pushes for broader co-optation to reduce risk.

Our work is related to the growing literature on political economy, which has modeled the determinants and the evolution of government intervention. Olson (1965) and North (1981) provide early general discussions. Roemer (1985) first models the possibility of a revolution. Grossman (1991, 1994) and Grossman and Noh (1994) analyze related phenomena such as appropriation and insurrection in a static setup. Various forms of political instability have been considered by Alesina and Tabellini (1990), Bertocchi and Spagat (1997a) and Overland and Spagat (1997). Benhabib and Rustichini (1996), Verdier and Ales (1996), Acemoglu and Robinson (1996) and Bertocchi and Spagat (1997b) develop dynamic analyses of the behavior of self-interested elites. A related stream of the literature has focused on voting equilibria within democratic societies. In the spirit of Meltzer and Richard (1981), Lambertini and Azariadis (1996) study the determinants of large governments within a strategic setup. The link between inequality and the voting outcome has been explored, among others, by Alesina and Rodrik (1994) and Persson and Tabellini (1994), who have shown that more inequality leads to more transfers, while the opposite is true in models by Saint-Paul (1995) and Benabou (1996) and in the empirical investigation in Perotti (1993). Finally, our work also contributes to the literature on income inequality and social mobility (see Banerjee and Newman, 1991; Galor and Zeira, 1993; Benabou, 1993; Durlauf, 1996; and Galor and Tsiddon, 1997).

The rest of the paper is organized as follows. In section 2 we describe the model. In section 3 we derive a solution. In section 4 we present analytical and numerical results. Section 5 draws some conclusions.

2 The Model

2.1 Classes

Time is counted off at discrete intervals, $t = 0, 1, 2, \dots$. There is a continuum of individuals $[0, 1]$ at each point in time that is divided into three classes. The number of “elite”, “middle” and “poor” at time t are denoted η_t, μ_t and π_t respectively, where $\eta_t + \mu_t + \pi_t = 1$ for all t and with η_0, μ_0 and π_0 given. Note that the size of the elite does not change over time so there is no need for time subscripting.

Each agent has a quantity of capital that can be usefully thought of as either physical, human or social capital. We assume homogeneity of capital within classes so that at the beginning of period t each elite, middle and poor class member has h_t^e, h_t^m and h_t^p units of capital respectively. h_0^e, h_0^m and h_0^p are given with $h_0^e > h_0^m > h_0^p$.

2.2 Production

The total quantity of capital in the economy at time t is denoted $H_t \equiv \eta h_t^e + \mu h_t^m + \pi h_t^p$. Production takes place using a constant-returns-to-scale production function given by

$$Y_t = AH_t \quad (2.1)$$

where $A > 1$.

2.3 Individuals

There are non-overlapping generations of agents, each living one period. They divide their income between personal consumption and bequests. The utility function for each individual takes the Cobb-Douglas form $u(C_t, h_{t+1}) = (C_t)^\beta (h_{t+1})^{1-\beta}$ where $0 < \beta < 1$, C_t is personal consumption and h_{t+1} is his capital bequest to his child at time t . The facts that all individuals have the same utility function and that members of the same class have identical capital allotments ensure that, within a class, consumption and bequests will be homogeneous.

We assume there is a combination of sufficiently high saving and good technology so that $1 \leq (1 - \beta)A$.

2.4 Transfers

There will be income transfers between classes. The motive for these transfers is to decrease a threat of revolution, emanating from the poor, by bringing poor people into the middle class, a position from which they cease to pose a threat. We denote transfers by θ_t^e , θ_t^m and θ_t^p for the elite, middle and that portion of the poor that is co-opted into the middle class respectively. A positive θ indicates that individuals receive money while a negative θ means the opposite. The transfers must satisfy the budget balance constraint

$$\eta\theta_t^e + \mu_t\theta_t^m + (\pi_t - \pi_{t+1})\theta_t^p = 0 \quad (2.2)$$

Note that θ_t^p is multiplied by $\pi_t - \pi_{t+1}$ rather than π_t . The idea is that all poor who accept a transfer in period t become co-opted and join the middle class in period $t + 1$. Thus, $\pi_t - \pi_{t+1}$ gives the size of the poor who are directly affected by the elite's co-optation policy.⁴ In principle, θ_t^m can turn out to be either positive or negative depending on whether the middle class is taxed to support the transfer policy or whether the middle class also must be further co-opted themselves. This outcome will depend on the actual mechanics of revolutions in our model, a subject to which we turn next.

2.5 Revolution

If a revolution occurs then all the current output of the economy that has not been destroyed by the revolutionary process is shared equally by the non-co-opted poor. Specifically if there is a revolution at time t then all the non-co-opted poor, π_{t+1} , receive income $\frac{(1-\delta)y_t}{\pi_{t+1}}$ where $0 < \delta < 1$ is the fraction of output that would be destroyed in the course of a revolution.

In period t there is an endogenous probability of revolution given by $\rho(\pi_{t+1}) = (\pi_{t+1})^\alpha$ where $0 < \alpha < 1$ measures the strength and organization of the poor. This function has the property that it is increasing at a decreasing rate in the number of beneficiaries if a revolution is successful. The probability of revolution is independent across periods.

⁴All agents in the economy are indirectly affected by the co-optation policy's impact on the probability of revolution.

2.6 Incomes

We must specify for all three classes their incomes in two cases: "revolution" and "no revolution". In doing so we must be careful to distinguish the co-opted poor from the non-co-opted poor. First, consider no-revolution incomes at time t defined by each person receiving his marginal product plus his (possibly negative) transfer. For the elite and middle classes these are $y_t^{i,N} = Ah_t^i + \theta_t^i$ for $i = e, m$. For the co-opted poor we have $y_t^{c,N} = Ah_t^p + \theta_t^p$ and for the non-co-opted poor income is $y_t^{p,N} = Ah_t^p$. In the revolution case $y_t^{e,R} = y_t^{m,R} = y_t^{c,R} = 0$ while $y_t^{p,R} = \frac{(1-\delta)y_t}{\pi_{t+1}}$.

Budget constraints at time t are defined in the obvious way with $C_t^{i,J} + h_{t+1}^i \leq y_t^{i,J}$ for $i = e, m, c, p$ and $J = N, R$.

3 Analysis of the Model

3.1 Consumption and Bequest Choices

Maximization of the Cobb-Douglas utility function subject to the appropriate budget constraint implies that at any time t

$$h_{t+1}^i = (1 - \beta)y_t^{i,J} \quad (3.1)$$

for $i = e, m, c, p$ and $J = N, R$. Also $C_t^{i,J} = \beta y_t^{i,J}$ for $i = e, m, c, p$ and $J = N, R$. Plugging this solution back into the utility function we can define an indirect utility function $V(y) = ky$ where $k = \beta^\beta (1 - \beta)^{1-\beta}$, which gives the maximum utility achievable at any point in time by an agent with income y . We can simplify further by dividing by k and simply taking as our indirect utility function, $W(y) = y$. Thus, in what follows we can simply use income as an equivalent substitute for utility.

3.2 Co-optation Policy

Transfers to the poor must satisfy an incentive constraint which requires that individuals voluntarily agree to be co-opted. A key to the incentive constraint is a "revolutionary threshold", which is the income that poor people must reach if they are to be at least as well off accepting co-optation into the middle class as they are remaining poor while retaining an option to benefit from a revolution if one occurs. An individual would be indifferent between co-optation and non-co-optation if

$$[1 - (\pi_{t+1})^\alpha] y_t^{e,N} = (\pi_{t+1})^\alpha y_t^{p,H} + [1 - (\pi_{t+1})^\alpha] y_t^{p,N} \quad (3.2)$$

The left hand side is the expected utility of accepting a co-optation offer while the right hand side is the expected utility of rejecting the offer. Note that both of these sides are conditioned on the number of un-co-opted poor in the period $t + 1$ being π_{t+1} . Solving (3.2) for θ_t^c yields

$$\theta_t^c = \frac{Y_t(1-\delta)(\pi_{t+1})^{\alpha-1}}{1 - (\pi_{t+1})^\alpha} \quad (3.3)$$

which is the minimum transfer necessary at time t to get poor people to accept entry into the middle class when the number of poor not entering the middle class is π_{t+1} . The revolutionary threshold at time t is defined as

$$y_t^r = Ah_t^p + \theta_t^c \quad (3.4)$$

A similar incentive constraint governs the transfers to or from the middle class. In particular, middle class people are either taxed down to or receive transfers up to the revolutionary threshold so that

$$\theta_t^m = y_t^r - Ah_t^m \quad (3.5)$$

The logic is obvious. If the middle class were above the revolutionary threshold then they could be taxed until $\theta_t^m + Ah_t^m = y_t^r$ without switching to the side of the revolution. If they would be below the threshold without transfers then they must be co-opted just like the poor, although they do not require as much money as the poor would for this purpose.

Finally, θ_t^c is determined by θ_t^c , θ_t^m and the budget balance condition (2.2) so that

$$\theta_t^c = \frac{-(\pi_t - \pi_{t+1})\theta_t^c - \mu_t\theta_t^m}{\eta} \quad (3.6)$$

3.3 The Elite's Problem

The elite at time t solves the problem

$$\max_{\theta_t^c, \theta_t^m, \theta_t^e, \pi_{t+1}} \{1 - (\pi_{t+1})^\alpha\} y_t^{e,N} \quad (3.7)$$

subject to (3.3), (3.5), and (3.6) and given $\pi_t, \mu_t, h_t^p, h_t^m$ and h_t^e . Building the constraints into the maximand and doing some simple manipulations yields the equivalent problem

$$\max_{\pi_{t+1}} [1 - (\pi_{t+1})^\alpha] A[\eta h_t^e + \mu_t(h_t^m - h_t^p)] + (\pi_{t+1} - \pi_t - \mu_t) Y_t(1-\delta)(\pi_{t+1})^{\alpha-1} \quad (3.8)$$

Taking the first-order-condition on this problems and solving it for π_{t+1} gives

$$\pi_{t+1} = \frac{(\mu_t + \pi_t)(\alpha - 1)Y_t(1-\delta)}{\alpha Y_t(1-\delta) - \alpha A[\eta h_t^e + \mu_t(h_t^m - h_t^p)]} \quad (3.9)$$

It is straightforward to verify that the second order condition will be satisfied so that this will be a global solution whenever π_{t+1} is between zero and one.

Equation (3.9) gives the optimal size of the poor class, from the elite's point of view, for period $t + 1$, given the state of society in period t . This expression takes full account of the transfer policy that will need to be implemented in order to induce poor and middle class agents to make the required choices.⁵

4 The Dynamics of the Model

4.1 A Benchmark Model

Before analyzing the dynamics of the full model it is useful to consider a simplified version in which we rule out mobility between classes. In this case there will be no transfers since co-optation, which is the only motive for transfer policy in the full model, is not allowed. This implies that the number of people in each class and the probability of revolution will remain constant over time. Human capital dynamics, when there is no revolution, are given by

$$h_{t+1}^i = (1 - \beta)Ah_t^i \quad (4.1)$$

for $i = e, m, p$ and $t = 0, 1, \dots$

Therefore,

$$h_{t+1}^i > h_t^i \iff (1 - \beta)A > 1 \quad (4.2)$$

⁵Note that the elite defines both π_{t+1} and the transfer policy. It does not simply set the co-optation transfer and then live with whatever number of poor people might choose to accept the offer. Such a policy might require the elite to pay much more in transfers than it would voluntarily choose.

for all t and $i = e, m, p$. We have several results summarized in the following proposition.

Proposition 4.1 1) h_t^i grows at the rate $(1 - \beta)A - 1$ for $i = e, m, p$; 2) since $h_0^e > h_0^m > h_0^p$ and the capital of all classes grows at the same rate, the Gini coefficient of this society will remain constant over time, i.e., there is never any process of convergence or equalization; 3) the probability of revolution is constant and positive over time.

The proof is omitted as trivial. The last point implies that a revolution will eventually occur with certainty. Moreover, if the poor are large in number an early revolution is quite likely. This creates an incentive for the elite to develop a welfare state - expanding the middle class and preserving its privileged position.

4.2 Analytical Results for the Full Model

The full model shares some properties of the benchmark model as made clear by the following proposition.

Proposition 4.2 1) $\pi_t \downarrow \pi^*$ and $\mu_t \downarrow \mu^*$ for some $0 \leq \pi^*, \mu^* < 1$, i.e., there is a steady-state class structure; 2) in the steady state Y grows at the rate $(1 - \beta)A - 1$; 3) the probability of revolution is constant in the steady state.

Proof. 1) The model has been set up so that there can only be upward mobility. Therefore, the size of the poor is not increasing and the size of the middle class is not decreasing over time. Since the sequences $\{\pi_t\}_{t=0}^{\infty}$ and $\{\mu_t\}_{t=0}^{\infty}$ are both bounded between zero and one, they must converge. 2) Co-optation is the only motivation for transfers to the poor. Since there is no co-optation in the steady state, the poor receive no transfers; their income grows at the rate $(1 - \beta)A - 1$. If there were no transfers between the elite and the middle class they too would be growing at that same rate. However, in principle there might continue to be transfers that vary over time between them in the steady state. Nevertheless, since members of each class always bequeath the fraction $1 - \beta$ of their incomes such transfers would not affect the accumulation rate in the economy which remains $(1 - \beta)A - 1$. 3) This is an obvious property of a steady state.

4.3 The Computational Procedure in the Full Model

Since we get closed form solutions for all variables in the model it is easy to compute the dynamics for a very wide range of parameter values. The procedure works as follows.

1. At time zero we are given $\eta, \pi_0, \mu_0, h_0^e, h_0^m, h_0^p, A, \alpha, \beta, \delta$ and $t = 0$.
2. From equation 2.1 we compute Y_t .
3. From equation 3.9 we compute π_{t+1} .
4. From equation 3.3 we compute θ_t^e .
5. From equation 3.5 we compute θ_t^m .
6. From equation 3.6 we compute θ_t^p .
7. From equation 3.1 we compute h_{t+1}^e, h_{t+1}^m and h_{t+1}^p .
8. Set $\mu_{t+1} = 1 - \eta - \pi_{t+1}$.
9. Set $t = t + 1$ and go back to step 2.

The computations are conducted around the set of baseline parameters given in Table 1. These numbers are chosen for their realism in our opinion, although there is certainly room for disagreement here. However, we can report that all of the results that follow hold for a very wide range of parameter values.

Table 1 - Baseline Parameters

Parameter	Value
δ	.7
A	2
β	.5
α	.7
η	.1

4.4 Convergence to the Steady State

Result 4.1. For a wide range of parameter values the model will reach the steady state within two periods.

Remember that we are working within an intergenerational model so that convergence in two periods is not extremely rapid convergence. It is, in fact, more or less consistent with actual episodes of societies neutralizing revolutionary threats.

Result 4.2. Total transfers converge to zero.

Actually what happens is that $\theta_t^m \rightarrow 0$ and $\theta_t^e (\pi_t - \pi_{t+1}) \rightarrow 0$. The latter fact is an artifact of how we have defined the incentive constraint for the poor (3.3). In the steady state θ_t^e is the transfer that the elite would have to offer to a poor individual to co-opt him. However, in the steady state the elite is not making any co-optation offers so no money actually flows to the poor. In this case computing θ_t^e becomes an accounting exercise.

4.5 Dependence on Initial Inequality

Next we consider the effect of the following method for increasing the initial inequality in the economy. Starting from initial conditions π_0, μ_0, η we create a new starting point $\pi_0 + \Delta, \mu_0 - 2\Delta, \eta + \Delta$. If $\Delta > 0$ this constitutes a mean-preserving spread on the original class structure while if $\Delta < 0$ we have a mean-preserving squeeze.

Result 4.3. Suppose that economy A and economy B are identical except that the initial class structure for B is a mean-preserving spread of the class structure for A. Then: 1) economy B will exhibit larger transfers to the poor than A; 2) B's steady state will have fewer poor than A's.

The first point suggests that more inequality leads to more transfers. This makes sense because revolution is a serious threat in a highly unequal society so rapidly diffusing this ominous threat should be a high priority for the elite. The second point is rather unexpected. First, it shows that initial conditions have permanent effects in this model. Second, it shows that societies that begin with more inequality end up with less inequality, at least in terms of the number of poor people. The converse is that societies that begin with a large middle class end up with a relatively large poor class. The primary reason that the less equal economy (B) winds up with fewer poor in steady state is that it is less costly *per capita* for a larger elite to graduate its poor and the potential gains to each of the poor in the event of revolution are greater. This stems from the fact that for a typical parameter set, with the initial size of the poor class greater than the elite, an absolute increase of Δ to both the poor and elite increases the ratio of elite to poor. Conversely, a large complaisant middle class obviates the requirement that the elite graduate many poor in order to gain stability as well as decreases each poor persons potential gains from revolution.

Now we consider a different inequality experiment.

Result 4.4. Suppose that economy A and economy B are identical except that the initial capital level of the poor in economy B is less than the

poor's initial capital in economy A. Then; 1) economy B will exhibit lower transfers to the poor than A; 2) B's steady state will have less poor than A's.

The idea here is that transfers are tailored to the outside options of poor rather than their real level of poverty. If the poor are very poor, then they can be co-opted easily with small transfers and the elite chooses to graduate many of them into the middle class. If the poor are not so poor, then it is attractive to them to retain the option to benefit from a possible revolution. This makes them expensive to co-opt and the elite graduates fewer of them.

4.6 Dependence on the Technology of Revolution

The technology of revolution is characterized by the parameters α and δ . The former measures how the number of poor people translates into the probability of a revolution and the latter measures how effectively revolutionaries can capture the fruits of a successful revolution. We have the following results.

Result 4.5. Increasing δ decreases transfers to the poor and lowers the steady-state number of poor. Increasing α increases transfers to the poor and lowers the steady-state number of poor.

The first exercise involves worsening revolutionary technology (a greater proportion of national income is destroyed if revolution takes place) while the second increases the likelihood of successful revolution given any proportion of poor. It is not immediately obvious which way one would expect the results to go. On the one hand, as this technology improves (higher α and lower δ), the elite are more threatened so they should become more inclined toward an aggressive co-optation policy. On the other hand, improvements in revolutionary technology increase the price of co-optation because they make the poor more reluctant to sell their revolutionary options. However, on balance the result comes out in favor of more co-optation.

5 Conclusion

We have emphasized the development of the welfare state in Europe and the United States because there is considerable historical evidence on these cases and because we believe that our model is highly illuminating of these

REFERENCES

situations. However, we also think that our co-optation story has a much wider range of potential applicability to more contemporary societies. For example, many of the privatization processes conducted in Eastern Europe and the former Soviet Union in the 1990s can be viewed as attempts to build an active constituency in favor of the transition from central planning to the market. In this light one does not necessarily have to view co-optation negatively. On the other hand, co-optation often amounts to little more than a dictator using corruption to hang onto power, as in Daniel arap Moi's Kenya.

Finally, there is an interesting connection between this paper and Overland and Spagat (1997). In the present paper growth helps the elite stabilize its power because growth increases the resources it can channel into co-optation. On the other hand, the elite has no control over the economy's growth rate which will be $(1 - \beta) A - I$ independent of co-optation policy. In the latter work it is simply assumed that growth increases stability, with no attempt made to model co-optation. However, Overland and Spagat (1997) allow the elite to affect growth and uncover two interesting scenarios. Under the first, due to the politically stabilizing effects of growth, the elite demands faster growth rates than a social planner would implement. Under the second, the elite allows the country's capital to deteriorate, consuming heavily while it retains power. These scenarios rely on assumptions for which the present paper provides micro foundations. Therefore, although this work by itself says little about growth rates in societies dominated by a self-interested elite, it is closely connected with other work that does. Thus, we have made a start on the largely unexplored subject of the political economy of growth in non-democratic regimes.

- Acemoglu, D. and Robinson, J., 1996, Why Did the West Extend the Franchise? Democracy, Inequality and Growth in Historical Perspective, mimeo.
- Alesina, A. and Rodrik, D., 1994, Distributive Politics and Economic Growth, *Quarterly Journal of Economics* 109, 465-490.
- Alesina, A. and Tabellini, G., 1990, A Positive Theory of Fiscal Deficits and Government Debt, *Review of Economic Studies* 57, 403-414.
- Baldwin, P., 1990, *The Politics of Social Solidarity. Class Bases of the European Welfare State 1875-1975*, Cambridge University Press, Cambridge.
- Banerjee, A.V. and Newman, A.F., 1991, Risk-Bearing and the Theory of Income Distribution, *Review of Economic Studies* 58, 211-235.
- Benabou, R., 1993, Working of a City: Location, Education and Production, *Quarterly Journal of Economics* 108, 619-652.
- Benabou, R., 1996, Unequal Societies, CEPR Discussion Paper No. 1419.
- Benhabib, J. and Rustichini, A., 1996, Social Conflict, Growth and Income Distribution, *Journal of Economic Growth* 1, 125-142.
- Bertocchi, G. and Spagat, M., 1997a, Structural Uncertainty and Subsidy Removal in Economies in Transition, *European Economic Review* 41, 1709-1733.
- Bertocchi, G. and Spagat, M., 1997b, The Evolution of Modern Educational Systems. Technical vs. General Education, Distributional Conflict, and Growth, mimeo.
- Durlauf, S., 1996, A Theory of Persistent Income Inequality, *Journal of Economic Growth* 1, 75-94.
- Flora, P., 1981, Solution or Source of Crises? The Welfare State in Historical Perspective, in Mommsen, W.J. (ed.), *The Emergence of the Welfare State in Britain and Germany 1850-1950*, Croom Helm, London.

- Flora, P. and Alber, J., 1981, Modernization, Democratization, and the Development of Welfare States in Western Europe, in Flora, P. and Heidenheimer, A.J. (eds.), *The Development of Welfare States in Europe and America*, Transaction Books, New Brunswick.
- Flora P. and Heidenheimer, A.J., 1981, The Historical Core and the Changing Boundaries of the Welfare State, in Flora, P. and Heidenheimer, A.J. (eds.), *The Development of Welfare States in Europe and America*, Transaction Books, New Brunswick.
- Galor, O. and Tsiddon, D., 1997, Technological Progress, Mobility, and Economic Growth, *American Economic Review* 87, 363-382.
- Galor, O. and Zeira, J., 1993, Income Distribution and Macroeconomics, *Review of Economic Studies* 60, 35-52.
- Goldin, C., 1994, How America Graduated from High School: 1910-1960, NBER Working Paper No. 4762.
- Grossman, H.I., 1991, A General Equilibrium Model of Insurrections, *American Economic Review* 81, 921-921.
- Grossman, H.I., 1994, Production, Appropriation, and Land Reform, *American Economic Review* 84, 705-712.
- Grossman, H.I. and Noh, S.J., 1994, Proprietary Public Finance and Economic Welfare, *Journal of Public Economics* 53, 187-204.
- Heidenheimer, A.J., 1981, Education and Social Security Entitlements in Europe and America, in Flora, P. and Heidenheimer, A.J. (eds.), *The Development of Welfare States in Europe and America*, Transaction Books, New Brunswick.
- Kudrie, R.T. and Marmor, T.R., 1981, The Development of Welfare States in North America, in Flora, P. and Heidenheimer, A.J. (eds.), *The Development of Welfare States in Europe and America*, Transaction Books, New Brunswick.
- Lambertini, L. and Azariadis, C., 1996, The Fiscal Politics of Big Governments, mimeo.
- Lindert, P.H., 1994, The Rise of Social Spending, 1880-1930, *Explorations in Economic History* 31, 1-36.
- Meltzer, A.H. and Richard, S.F., 1981, A Rational Theory of the Size of Government, *Journal of Political Economy* 89, 914-927.
- Muller, D.K, Ringer, F. and Simon, B., 1977, *The Rise of the Modern Educational System: Structural Change and Social Reproduction 1870-1920*, Cambridge University Press, Cambridge.
- North, D.C., 1981, *Structure and Change in Economic History*. Norton, New York.
- Olson, M.Jr., 1965, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, Cambridge.
- Overland, J. and Spagat, M., 1997, Political Instability, Foreign Investment and Growth in Proprietary Economies, mimeo.
- Perotti, R., 1993, Political Equilibrium, Income Distribution, and Growth. *Review of Economic Studies* 60, 755-776.
- Persson, T. and Tabellini, G., 1994, Is Inequality Harmful for Growth?. *American Economic Review* 84, 600-621.
- Roemer, J.E., 1985, Rationalizing Revolutionary Ideology: A Tale of Lenin and the Tsar, *Econometrica* 53, 85-108.
- Saint-Paul, 1995, The Dynamics of Exclusion and Fiscal Conservatism. CEPR Discussion Paper No. 998.
- Shavit, Y. and Blossfeld, H. (eds.), 1993, *Persistent Inequality. Changing Educational Attainment in Thirteen Countries*, Westview Press, Boulder.
- Tampke, J., 1981, Bismarck's Social Legislation: A Genuine Breakthrough?. in Mommsen, W.J. (ed.), *The Emergence of the Welfare State in Britain and Germany 1850-1950*, Croom Helm, London.
- Trow, M., 1967, The Second Transformation of American Secondary Education, in Bendix, R. and Lipset, S.M. (eds.), *Class, Status, and Power*, Routledge & Kegan Paul, London.
- Verdier, T. and Ades, A., 1996, The Rise and Fall of Elites: Economic Development and Social Polarization in Rent-Seeking Societies, CEPR Discussion Paper No. 1495.