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Capitalists' Institutional Agenda, Class Conflict Spillover, and the Last Instance

Eric A. Nilsson

ABSTRACT: This paper constructs a model of the "institutional agenda" of capitalists in a closed domestic economy. The link between this agenda (i.e., the set of institutions capitalists desire) and the actual institutions regulating the economy is established. Some characteristics of this model are consistent with the claims of radical institutionalists; however, other characteristics are not. This model also permits, for the first time in a formal model, discussion of the link between the base and the superstructure, of the role of "the last instance" in historical development, and of the claim that there exists a "monopoly capital" stage of capitalism.

A core claim of radical institutionalism is that the individual institutions regulating capital accumulation are interdependent. The concepts of a *social structure of accumulation* and of a *mode of regulation* explicitly embrace the idea of interdependence between institutions, though it is also articulated by others who use more eclectic frameworks of analysis (e.g., Marglin 1990). Many theoretical, historical, and econometric accounts of the construction of these interdependent sets of institutions, their operation, and their breakdown have been provided within this literature (e.g., Gordon, Edwards, and Reich 1982; Bowles, Gordon, and Weisskopf 1983; Lipietz 1987; Boyer and Juillard 1991).

Despite this, many implications of institutional interdependence are as yet unexplored. This paper explores these implications by constructing a formal model of the "institutional agenda" of capitalists within a closed capitalist economy and establishing a link between the set of institutions capitalists desire and the actual institutions within the economy. This model permits me to deduce implications of institutional interdependence that were previously unrecognized or, at the very least, never before explicitly derived. Among other things, I will be able to trace how exploitation strategies at the point of production shape both inter-firm competition and politically determined national macroeconomic policies.

Department of Economics, California State University, San Bernardino, CA 92407.
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This is not the first formal model produced within the radical institutionalist literature. Most recently, Bowles and Boyer (1990) and Marglin and Bhaduri (1990) have reformulated standard aggregate supply-aggregate demand models in a way that directly links macroeconomic behavior with the underlying institutions regulating the economy. However, institutions appear in these models only as the *exogenously* determined foundation of wage-led macroeconomic regimes. The present model takes a more difficult route: it builds from the ground up a model of the *endogenous* determination of the institutions regulating a capitalist economy.

Besides making clear certain implications of institutional interdependence not previously noted, this model also permits me to comment on various debates in the wider radical literature. For instance, although it recognizes the importance of class struggle and historical contingency, this model leads to the conclusion that the base determines the superstructure although only in the last instance. Unlike in the existing literature, this later term — "the last instance" — is given a precise definition. In addition, in *some* situations the claims of the monopoly capital school are confirmed: the appearance of monopoly power directly alters all the institutions in an economy in a predictable way and, so, alters the behavior of this economy.

SOME POINTS OF CLARIFICATION

The intent and methods of this paper are easily misunderstood. First, one might question the need for constructing a formal model of institutions. Real institutions are, after all, constructed out of the messiest sort of class struggle and subject to the vagaries of history. I do not claim that a radical theory of institutions must take the form of a formal model in order for it to advance. I am merely claiming that formal models can help identify interrelationships within and possibilities about the set of institutions regulating a capitalist economy that have escaped notice in other forms of inquiry.

Second, many readers may question particular assumptions or simplifications of the model. Because no precedent for a formal model of institutions exists, I was not able to make a few changes in an existing, well-accepted model to accomplish my purpose. Instead, I was forced to build this model *de novo* and thus be quite selective about what aspects of reality entered the model.

Third, although this model includes actors who maximize objective functions, it is not a neoclassical model. The institutions that arise to regulate the hypothetical economy discussed below are not the products of atomized decision-making and voluntary exchange. They are the

products of class struggle between capitalists and workers. Maximization appears when capitalists determine the set of institutions they desire to construct in the economy. Capitalists have goals, and they act in ways consistent with these goals.

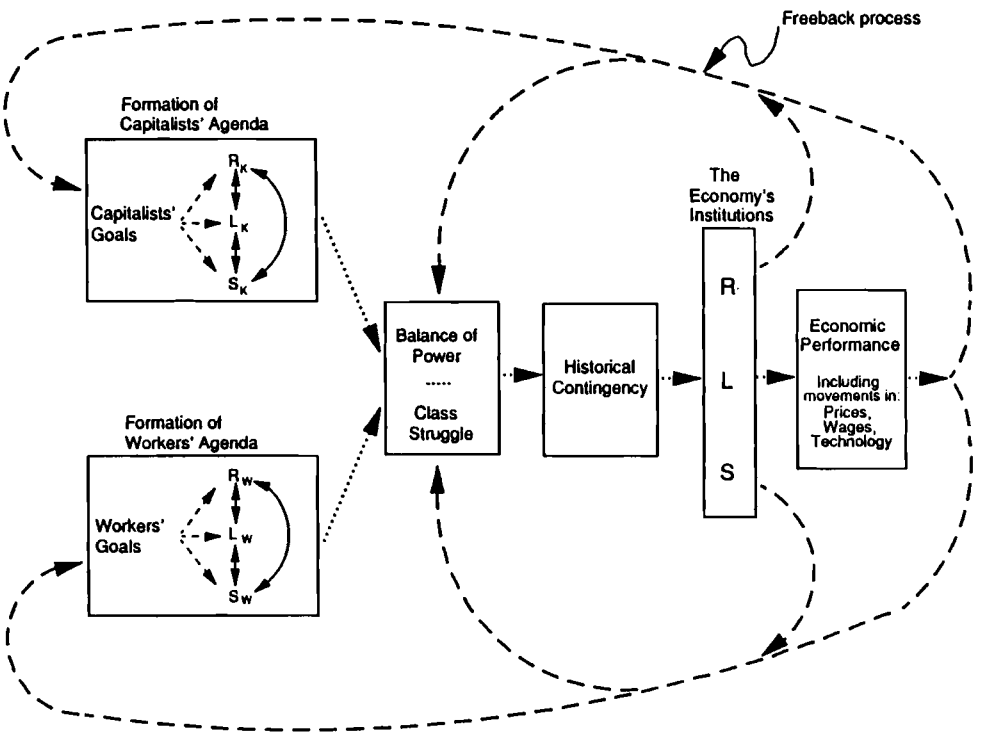
OVERVIEW OF THE MODEL

The conception of the economy developed below is most closely aligned with the social structure of accumulation literature although it also parallels aspects of the Regulation School's concept of a mode of regulation. The economy is portrayed as a set of three relationships, each of which is regulated by an institution specifying the rules of the game of that relationship. These relationships are an intra-class relationship (competition between capitalists in output markets), an inter-class relationship (the capital-labor relationship within the firm), and a third-party, political relationship (State intervention into the economy). Three institutions arise endogenously to regulate these relationships: the degree of inter-capitalist rivalry, the type of employment contract offered workers, and the macroeconomic stabilization and taxation policies pursued by the State.

These three relationships and their associated institutions are connected through many mechanisms. I isolate for consideration their link with the level of instability in the economy: some of these institutions play a part in determining the level of instability in the economy while other institutions are shaped by this endogenously created instability. Writings within the radical institutionist literature frequently link institutions with social and economic stability (e.g., Gordon, Edwards, and Reich 1982: 23).

Figure 1 gives a stylized overview of the determination of the institutions regulating a capitalist economy. This figure permits me to identify one aspect of this model deserving special emphasis. In this figure, R, L, and S represent the degree of rivalry, the labor institution, and the form of the State regulating the economy. This set of institutions is the product of many factors: the institutional agenda of capitalists (R_k, L_k, S_k), the institutional agenda of workers (R_w, L_w, S_w), the balance of economic and political power between capitalists and workers, and a heavy dose of historical contingency. The evolution of institutions is made more complex by path dependence: not only are the current institutions within an economy the result of unpredictable and contingent forces, various feedback processes (the dashes in Figure 1) make the future development of institutions dependent on these current contingent institutions.

Figure 1



I develop a model of the formation of the institutional agenda of capitalists — the triplet (R_k, L_k, S_k) in the upper left-hand box of Figure 1. I develop a model of the institutions capitalists desire — rather than of the actual institutions regulating the economy — because it permits me to keep the model as simple as possible. The actual institutions regulating the economy will be a blend of those desired by capitalists and those desired by workers. How capitalists' institutional agenda shapes the actual set of institutions regulating the economy will be more fully discussed below.

THE INDIVIDUAL INSTITUTIONS OF THE MODEL

I now consider the three institutions included in this model of capitalists' institutional agenda: the degree of inter-capitalist rivalry, the type of employment contract offered workers, and the macroeconomic stabilization and taxation policies pursued by the State. After these institutions are considered in isolation, the following sections consider

their simultaneous determination, the characteristics of the set of institutions desired by capitalists, and the comparative statics of the model.

Inter-Capitalist Competition

In both the Marxian and neoclassical literatures, structural factors (e.g., the number of firms and barriers to entry) determine the level of competition within an industry. In contrast to this, I want to emphasize how institutional factors shape the extent of capitalist competition.

Competition between firms is a double-edged sword for the participants. Increased competitive aggressiveness gives a single competitor the potential for increased sales at the expense of rivals. But as each competitor fights more aggressively for a larger slice of the pie, the distribution of this pie becomes more anarchical and uncertain. I formalize this double-edged nature of competition below.

Assume a nation has a single industry that produces a differentiated product. This industry contains two identical firms ($i=1,2$), each managed by a risk-neutral capitalist having no time preference. These firms have a two-period life span. Firms compete by introducing product innovations and by altering the institutional environment in which they operate. To give exclusive attention to such Schumpeterian competition, I assume that price and the expected level of sales for the industry are exogenously fixed at P and Q in each of the two periods. What is at stake in competition in this model is the distribution of industry sales, Q, between the two firms.

At the beginning of the first period, each firm introduces product innovations that potentially differentiate their good from that sold by their competitor. These innovations are chosen from an exogenously determined set, can be introduced without cost, and will alter the quality of the good sold over the two-period life of the firm. The proportion of available innovations introduced by firm i is given by r_i, $0 \leq r_i \leq 1$. Lesser innovations are introduced before more major innovations and a larger r_i gives the firm a "better" product in the minds of customers. Call the pair (r_1,r_2) the *competitive environment* of the industry and R $(= r_1 + r_2)$ the *degree of inter-capitalist rivalry* in the industry. The latter can take values from 0 to a maximum of 2.

To simplify, I assume that, at the beginning of the first period, firms share equally industry sales, Q. The competitive environment causes firm sales to vary from this baseline of ½Q. In period 1, sales for firms 1 and 2 are,

$$Q_1^1 = [1 + v(r_1,r_2) + k^1 + m^1]\ ½Q, \tag{1}$$

and

$$Q_2^1 = [1 - v(r_1,r_2) - k^1 + m^1]\ ½Q, \tag{2}$$

where $v(r_1, r_2)$ indicates the success of firm 1 in competitive environment (r_1,r_2), k^1 is a random component associated with competition, and m^1 is a macroeconomic shock (distributed according to $N(0,\sigma_m)$) assumed, for now, to be exogenous. That each of v and k^1 takes opposite signs in equations (1) and (2) indicates that competition is a zero-sum activity: the gain to one firm is a loss to the other. Here, as elsewhere, the time period appears as a superscript. A higher number of product innovations introduced by firm i leads to a higher expected proportion of industry sales made by firm i, but at a diminishing rate: $(\partial v/\partial r_1 > 0,\ \partial v/\partial r_2 < 0,\ \partial^2 v/\partial r_1^2 < 0,$ and $\partial^2 v/\partial r_2^2 > 0)$. When firms introduce the same number of product innovations they expect to split evenly industry sales (i.e., $r_1 = r_2$ implies $v=0$).

Competition is a potentially chaotic process. The outcome of competition depends on many factors that competitors cannot know ahead of time. Let k^1, the random component associated with competition in period 1, be distributed according to $N(0,\sigma_k(r_1,r_2))$, where $\sigma_k \geq 0$, and $\partial\sigma_k/\partial r_1 = \partial\sigma_k/\partial r_2 = \Omega > 0$. That is, the apportionment of industry sales between competing firms when minor product improvements are introduced (i.e., r_1 and r_2 are small) is more predictable than when more extensive product improvements are introduced. The sales predictions for, say, individual firms within the automobile industry when these firms all change slightly the exterior color of their cars would be more accurate than when these firms also add air bags and computerized road map systems.

Firms innovate only during the first period. The improved product the firm sells in the first period continues to be sold unchanged during period 2. Let sales for firms 1 and 2 in period 2 be,

$$Q_1^2 = Q_1^1 + (k^2 + m^2)\ \tfrac{1}{2}Q, \tag{3}$$

and

$$Q_2^2 = Q_2^1 + (-k^2 + m^2)\ \tfrac{1}{2}Q. \tag{4}$$

That is, after the expected share of industry sales for each firm is determined by the relative number of product innovations the firm introduces, actual sales then follow an unpredictable path. This path is determined by the combined effect of the two types of random components in the model, that associated with competition and that associated with macroeconomic behavior. The random component associated with competition in period 2, k^2, is distributed (as was k^1) according to $N(0,\sigma_k(r_1,r_2))$. The shock associated with macroeconomic instability in period 2, m^2, is distributed (as was m^1) according to $N(0,\sigma_m)$. All random components in equations (1) - (4) are assumed to be independent.

These sales functions embody the double-edged nature of competition. Increases in competitive aggression (the number of product innovations introduced) leads both to a higher expected proportion of industry sales for a firm (via $v(r_1,r_2)$) and to a higher level of instability in the apportionment of industry sales between the firms (via $\sigma_k(r_1,r_2)$).

The degree of inter-capitalist rivalry, R, within this industry is determined as follows. The sales made by the firms are the outcome of a two-person non-cooperative game in which each firm uses the number of product innovations as its instrument. Assume that firms move simultaneously and that they know the payoff functions. Since the expected value of each random shock (m^1, m^2, k^1, and k^2) is zero, the expected payoff (profit) functions for the risk-neutral firms over their two period lives are,

$$E(\pi_1) = P\,[(1 + v)Q] - C_1 - T_1, \tag{5}$$

and

$$E(\pi_2) = P\,[(1 - v)Q] - C_2 - T_2, \tag{6}$$

where the terms within brackets are the expected value of sales for each firm over the two periods (e.g., for firm 1 the summation of the expected values of equations (1) and (3)), and C_1, C_2, T_1 and T_2 are the production costs and taxes paid by the firms. Each of these latter four variables is (temporarily) assumed to be constant.

Since v is increasing in r_1 and decreasing in r_2, both firm 1 and firm 2 introduce all known product innovations, $r_1 = r_2 = 1$. Here, the degree of inter-capitalist rivalry will be at its maximum, $R = 2$. In this equilibrium the identical firms will expect to share equally industry sales because $v(1,1) = 0$. Because of the unpredictable and chaotic nature of output markets (i.e., the presence of m^1, m^2, k^1, and k^2), the actual level of firm sales will vary from the expected levels, but our risk-neutral capitalists will not be concerned with this fact.

Above, the degree of inter-capitalist rivalry desired by capitalists is shaped by only the competitive relationship between firms. This will no longer be true once other factors — in particular, the conflict between capital and labor — are introduced into the model.

The Capital-Labor Relationship

The full complexity of the capital-labor relationship cannot be translated into any mathematical model. I isolate for analysis one aspect of this relationship — the extraction of labor from labor power — and highlight how this extraction process shapes the employment contract offered

workers. To do so, I assume that work effort (labor) is the only input into production:

$$y = oe, \tag{7}$$

where y is the level of output per worker per period, e is the level of work effort per worker per period, and o is output per unit work effort which is assumed to be exogenously fixed by technology.

Each institution that potentially structures the capital-labor relationship — internal labor markets, profit-sharing, wage profiles rising with seniority, and so on — serves several possible functions simultaneously. But one function that many of these institutions clearly serve is to extract work effort from employees. One central mechanism through which these institutions extract work effort is by rewarding *present* good behavior (observed high work effort) with *future* rewards (say, promotions or wage increases coming from seniority). Without an explicit or implicit long-term employment relationship, the promise of future rewards would not induce greater current work effort. Further, by promising continued employment (contingent on satisfactory performance), a long-term employment relationship increases the value of the job to the worker by eliminating the costs associated with spells of unemployment and job search, and by promoting the acquisition of firm-specific skills.

As a consequence of the importance of long-term employment relationships, I model a firm's choice of whether to offer to workers a *long-term employment relationship* (LTER) or a labor contract based on a *casual employment relationship* (CER) in which no long-term employment is guaranteed. (In a quite imprecise way, an LTER is a one-dimensional proxy for selected components of "bureaucratic control" while a CER is a one-dimensional proxy for selected components of "simple control" (e.g., Gordon, Edwards, and Reich 1982).

Let an LTER take the form of a labor contract with a two-period duration. This type of contract specifies that the firm will pay a worker a set wage, 2W, at the end of the two-period contract. A CER, on the other hand, takes the form of a labor contract with a one-period duration. This second type of contract specifies that the firm will pay a worker a set wage, W, at the end of the single-period contract. W in both cases is exogenously determined by the level of the reserve army of the unemployed, and there are as many workers as firms need available at this wage rate. Under either type of contract, workers caught "shirking" (working at a level of work effort below that deemed proper by capitalists) during the period of the contract are fired at the end of the contract. Fired workers receive no compensation from the firm.

What is relevant to capitalists' agenda is how they think workers will respond to the labor contract capitalists offer. Assume that capitalists believe that work effort is an increasing function of the cost of job loss, z,

$$e = e(z), \tag{8}$$

where $de/dz > 0$ and $d^2e/dz^2 < 0$. The cost of job loss, in turn, is an increasing function of the real wage, w (= W/P). To simplify, assume that the cost of job loss equals the wage income lost by being fired (cp. Bowles 1985).

The level of work effort provided by workers will differ under the two labor institutions. Under CERs, workers identified as shirkers lose a single period's pay so $e^{CER} = e(w)$. Under LTERs, shirkers lose two periods' pay so $e^{LTER} = e(2w)$. As e is an increasing function of the cost of job loss, LTERs extract more work effort per period than do CERs. The particulars of these two different types of labor contracts differ from that of real world labor contracts. However, LTERs in this model embody what is arguably the essence of many work effort-extracting institutions: increasing the cost to workers of not working as hard as capitalists deem proper through the use of an institution predicated on a long-term employment relationship.

Firms using CERs hire workers twice over the life of the firm: at the beginning of period 1 and at the beginning of period 2. After the end of period 1, all workers are dismissed and the exact number of workers needed by the firm in period 2 are hired. However, firms using LTERs hire workers at the beginning of period 1 and guarantee these workers employment over the full two periods of the model. In particular, firms using LTERs during period 1 must continue to employ all these workers during period 2 even if it turns out that not all these workers are needed in the second period. This would be the case if the actual level of sales for the firm during period 2 is less than that of period 1 (e.g., for firm 1, $k^2+m^2 < 0$). However, if sales in period 2 exceed those of period 1 (e.g., for firm 1, $k^2+m^2 > 0$), firms that offered workers LTER contracts in period 1 hire extra workers at the beginning of period 2. They offer these extra workers a CER contract for the one period left in the life of the firm. The hiring and dismissal process involves no cost to either firms or workers.

At the beginning of period 1, firms know with certainty the sales during period 1 (Q_1^1 and Q_2^1) and know with certainty the expected values of sales in period 2 ($E(Q_1^2)$ and $E(Q_2^2)$). They do not know the actual values of the Q_i^2's until the beginning of period 2. Firms will offer their

workers the type of contract (CER or LTER) giving the lowest expected production cost for the two-period life of the firm.

The cost of production for firm i over its two-period life is equal to the level of employment in each period times the nominal wage rate: $N_i^1 W + N_i^2 W$. Under CERs the level of employment in each period will be exactly that needed to produce the actual sales in the two periods. The expected cost for firm 1 if it uses CERs over the two periods is,

$$C_1^{CER} = \frac{(1+v)\ ½Q}{e(w)o}\ W + \frac{(1=v)\ ½Q}{e(w)o}\ W = \frac{(1+v)\ Q}{e(w)o}\ W, \qquad (9)$$

where e(w)o is the output per worker and $(1+v)½Q$ is the expected level of output in each of the two periods. The cost for firm 2, C_2^{CER}, would be the same, except a -v would appear in place of v.

The expected cost for a firm using LTERs is more complicated. With a probability of 0.5, the summation of the random output market components (k^2 and m^2) in period 2 will be negative. However, firms using LTERs must still employ in this period all workers hired during period 1. With a probability of 0.5, the summation of k^2 and m^2 in period 2 will be positive, and the firm will hire additional workers and will offer these workers CER contracts. If the summation of these two random components happens to be positive, its expected value will depend on σ_m and σ_k. Denote the expected value of this positive shock by $s(\sigma_m,\sigma_k)$. In this case, the expected cost over the two-period life of firm 1 is

$$C_1^{LTER} = [\frac{(1+v)\ ½Q}{e(2w)o}]\ w + [0.5\ \frac{(1+v)\ ½Q}{e(2w)o}$$

$$+ 0.5\ (\frac{(1+v)\ ½Q}{e(2w)o} + \frac{s(\sigma_m,\ \sigma_k)\ ½Q}{e(w)o})]W, \qquad (10)$$

$$= (\frac{(1+v)\ Q}{e(2w)o} + 0.5\ \frac{s(\sigma_m,\ \sigma_k)\ ½Q}{e(w)o}.$$

The first term in brackets is the expected employment in period 1 while the second term in brackets is the expected employment in period 2. The positive shock, s, is equal to the expected value of the positive values of a random variable distributed according to $N(0,\sigma_m+\sigma_k)$. It can be shown that $s = (2/\pi)^{½}(\sigma_m+\sigma_k)$. The expected cost for firm 2 if it uses LTERs, C_2^{LTER}, would be the same except a -v would appear in place of v.

A comparison of equations 9 and 10 reveals the advantages of the two different labor institutions. Because a firm using CERs employs only the

exact number of workers needed in each period, the firm's cost does not depend on the level of output market instability ($\sigma_m + \sigma_k$). However, CER contracts extract less work effort per period then do LTER contracts (e(w) versus e(2w)). Firms using LTERs extract more work effort than those using CER contracts, but they must employ in period 2 all workers employed in period 1 even if these workers are not needed. Consequently, when a firm uses LTERs, its expected cost increases with the level of output market instability.

Figure 2 illustrates the cost for firms as output market instability increases under the two different labor institutions. Denote the total level of instability in output markets by σ, where $\sigma = \sigma_k + \sigma_m$. If $\sigma = 0$, LTERs are the lower cost labor institution as they extract more work effort than do CERs while at the same time firms need not fear having to pay workers who are not needed (that is, in equation 10 $s(0,0) = 0$). As σ increases, LTERs become more costly as firms using LTERs are potentially stuck with paying for an increasingly large number of unneeded workers during period 2. However, as σ increases the expected cost of CER contracts remains constant. Below some critical level of instability, σ°, the expected cost of LTERs is lower than that of CERs while above σ° CERs are cheaper. If output market instability, σ, is exogenously determined, then firms would simply identify and then use the lower cost labor institution.

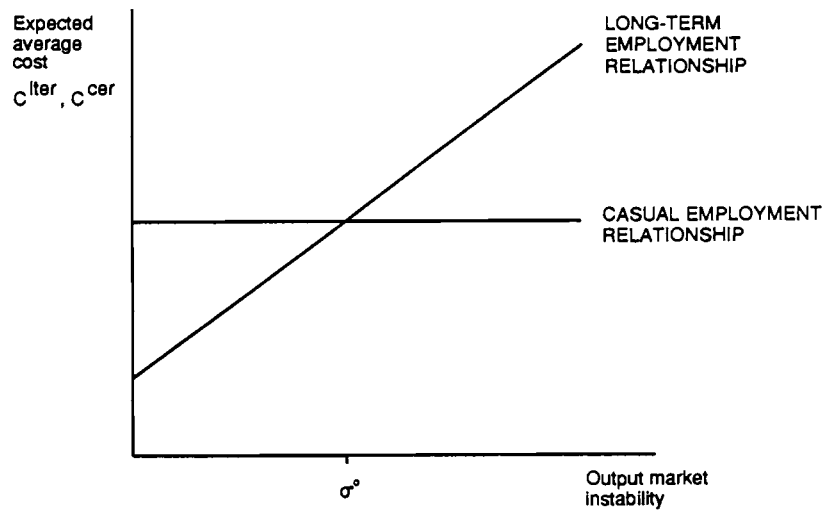
State Intervention into the Economy

One of the most important sources of instability in a capitalist economy is the business cycle. Such macroeconomic instability has already appeared in the sales functions of firms as m^1 and m^2, each distributed according to $N(0,\sigma_m)$.

Macroeconomic stabilization smooths the business cycle by reducing macroeconomic instability, σ_m. Let ℓ represent the level of macroeconomic instability under a policy of laissez-faire (no macroeconomic stabilization) and g represent the level of macroeconomic stabilization provided by the State. That is, $\sigma_m = \ell - g$.

The level of macroeconomic stabilization the State can provide is limited by its tax revenue. Assume that the level of macroeconomic stabilization is equal to g(T), where T is the tax revenue collected by the State to fund macroeconomic stabilization. Let this macroeconomic stabilization function have the following properties: $g(0) = 0$, $dg/dT \geq 0$, $d^2g/dT^2 \leq 0$. For the sake of plausibility, g is restricted to $0 \leq g \leq \ell$. Further, infinite spending on macroeconomic stabilization might fail to eliminate all macroeconomic instability. That is, it might be that $g(\infty) < \ell$. Simplifying greatly, I assume that all tax revenue for

Figure 2



macroeconomic stabilization comes from a lump sum corporate tax and that the two firms pay the same amount of tax: $T_1 = T_2 = \frac{1}{2}T$.

I am concerned in this model not with what the State actually does, but with what capitalists desire the State to do. Assume that capitalists desire that the State provide that level of taxation and macroeconomic stabilization that maximizes profits for them. In this case, capitalists would like the State to increase taxes up to the point that marginal benefit (reduced costs for the firms) of macroeconomic stabilization equals marginal cost (increased tax payments by firms).

The State can take one of two different forms in this model. A *Laissez-Faire State* collects zero taxes and provides no macroeconomic stabilization ($T = 0$, $\sigma_m = \ell$) while a *Keynesian State* collects some positive level of taxes and so provides some macroeconomic stabilization ($T > 0$, $\sigma_m < \ell$).

CAPITALISTS' INSTITUTIONAL AGENDA

I now consider capitalists' institutional agenda: the set of three institutions capitalists desire to construct in the hypothetical economy described above. The following set of equations summarizes the factors shaping capitalists' institutionalist agenda. The expected payoff functions for firms 1 and 2 in their competitive struggle over their two-period lives are

$$E(\pi_1) = P\,[(1 + v(r_1,r_2))\,Q] - C_1 - T_1, \tag{11}$$

and

$$E(\pi_2) = P\,[(1 - v(r_1,r_2))\,Q] - C_2 - T_2. \tag{12}$$

These two equations are the same as (5) and (6). The level of output market instability caused by competition between firms is

$$\sigma_k = \sigma_k(r_1,r_2). \tag{13}$$

The expected cost of extracting labor from labor power for firms 1 and 2 are

$$C_1 + \min\left[\left(\frac{(1+v)\,Q}{e(2w)o} + 0.5\,\frac{s(\sigma_m,\,\sigma_k)\,\frac{1}{2}Q}{e(w)o}\right)W,\ \frac{(1+v)\,Q}{e(w)o}\,W\right], \tag{14}$$

and

$$C_2 = \min\left[\left(\frac{(1-v)\,Q}{e(2w)o} + 0.5\,\frac{s(\sigma_m,\,\sigma_k)\,\frac{1}{2}Q}{e(w)o}\right)W,\ \frac{(1-v)\,Q}{e(w)o}\,W\right], \tag{15}$$

where the first term in the bracket is the cost of LTERs (see equation 10) and the second term is the cost of CERs (see equation 9). A firm will, of course, select the labor institution that minimizes costs. Finally, the impact of State macroeconomic and taxation policies is described by

$$\sigma_m = \ell - g(T_1+T_2) = \ell - g(T), \tag{16}$$

where g(T) is the level of macroeconomic stabilization provided by the State. All variables and functions are as previously defined.

The capitalists seek the profit-maximizing *set* of institutions. They can act as individuals (i.e., non-cooperatively) or cooperatively. One possible set of institutions is a maximum level of inter-capitalist rivalry (R=2), casual employment relationships, and a Laissez-Faire State. Represent this set by [2, CER, LF]. An alternative set is moderate inter-capitalist rivalry (e.g., R=1), long-term employment relationships, and a Keynesian State: [1,LTER,K].

CHARACTERISTICS OF CAPITALISTS' NON-COOPERATIVE INSTITUTIONAL AGENDA

Capitalists might be unwilling or unable to act collectively. The sequence of decisions made in this model in such a non-cooperative setting is as

follows. Before the start of period 1, capitalists derive the work effort functions of workers laboring within the two different types of contracts, e^{LTER} and e^{CER}. With that information in hand, and with knowledge of the production function and their respective sales functions, the two capitalists simultaneously: 1) play a Cournot-type game with the number of product innovations as their instrument, 2) determine the labor institution each will use to extract work effort from their employees, and 3) determine the level of macroeconomic stabilization they will each independently demand from the State.

In this non-cooperative setting, two different sets of first order conditions need to be considered: that when the desired set of institutions includes LTERs and that when it includes CERs. I also need to consider the conditions determining whether LTERs or CERs is the desired labor institution for capitalists.

Capitalist Agendas with Long-Term Employment Relationships

The first order conditions for an interior solution involving LTERs can be found simply. First, substitute the cost of LTERs (the first term in parentheses in equations 14 and 15) for C_1 and C_2 in equations 11 and 12. For firm 1 this gives the expected profit equation

$$E(\pi_1) = P\,(1 + v(r_1, r_2))\,Q - \left[\frac{(1+v)Q}{e(2w)o} + 0.5\,\frac{s(\sigma_m, \sigma_k)\,\tfrac{1}{2}Q}{e(w)o}\right] W - T_1. \tag{17}$$

Then, create a system of three equations by setting $\partial E(\pi_1)/\partial r_1 = 0$, $\partial E(\pi_2)/\partial r_2 = 0$, and $\partial E(\pi_1)/\partial T_1 = 0$. (Because firms 1 and 2 are identical, I do not need to explicitly consider $\partial E(\pi_2)/\partial T_2$.) After simplifying and making use of the fact that $s(\sigma_m+\sigma_k) = (2/\pi)^{1/2}(\sigma_m+\sigma_k)$, the first order conditions become

$$\left[P - \frac{W}{e(2w)o}\right]\frac{\partial v}{\partial r_1} = \left[\tfrac{1}{4}\,(2/\pi)^{1/2}\,\frac{W}{e(w)o}\right]\frac{\partial \sigma_k}{\partial r_1}, \tag{18}$$

$$-\left[P - \frac{W}{e(2w)o}\right]\frac{\partial v}{\partial r_2} = \left[\tfrac{1}{4}\,(2/\pi)^{1/2}\,\frac{W}{e(w)o}\right]\frac{\partial \sigma_k}{\partial r_2}, \tag{19}$$

and

$$\left[(\tfrac{1}{8})\,(2\pi)^{-1/2}\,\frac{QW}{e(w)o}\right]\frac{\partial g}{\partial T_1} = 1. \tag{20}$$

Equations 18 and 19 indicate that for each firm the level of competitive aggression, r_i, would equate the marginal increase in profit from increased competitive rivalry between capitalists (left of the equals sign) to the marginal increase in the cost extracting labor from labor power (right of the equals sign). Equation 20 shows that the level of tax collected from each identical firm would equate the marginal increase in tax/macroeconomic stabilization (right of the equals sign) to the marginal decrease in the cost of extracting labor from labor power (left of the equals sign) for that firm.

Three implications can be drawn from this set of first-order conditions. Each follows because class conflict between capital and labor spills over from its immediate environment (the firm and the labor contract) to shape both inter-capitalist competition and State macroeconomic/taxation policies. I call this phenomena "class conflict spillover."

First, output market competition between firms is intimately linked with exploitation strategies within the firm. The degree of inter-capitalist rivalry ($R = r_1 + r_2$) is shaped both by capitalists' goal of taking sales away from their fellow capitalists and by capitalists' goal of extracting low-cost work effort from their workers. In particular, capitalists' goal of extracting low-cost work effort from their workers suppresses competition between firms in output markets (when LTERs are used by firms).

Second, exploitation strategies within the firm are intimately linked to politically determined macroeconomic policies at the level of the nation. While the proximate goal of macroeconomic stabilization is to reduce output market instability, the ultimate goal for capitalists in this hypothetical economy is to extract low-cost work effort from workers. If capitalists have their way, the State acts as a collective capitalist. This is implied by equation (20).

Third, first-order conditions 18 and 19 imply that inter-capitalist competition and capital-labor conflict have *equal* casual priority in shaping the degree of inter-capitalist rivalry as both sides of the equations have equal mathematical weight. Capital-labor conflict is as important in determining how capitalists compete as is inter-capitalist rivalry itself.

I hesitate to draw a general conclusion from this third implication of the first-order conditions. More likely, a class relationship "close to" a particular institution will have a larger impact in the form taken by that institution than other relationships "far from" the institution in question. But, still, a variety of relationships (some that appear quite distant to the institution in question) might have a non-trivial impact on any given institution under analysis. Class conflict spillover is a potentially important phenomena.

Capitalist Agendas Involving Casual Employment Relationships
The first-order conditions for solutions involving CERs are found by substituting the cost of CERs (the second term in parentheses in equations 14 and 15) for C_1 and C_2 in equations 11 and 12. For firm 1 this gives the expected profit equation

$$E(\pi_1) = P\,(1 + v(r_1, r_2))\,Q - [\,\frac{(1+v)Q}{e(w)o}\,]W - T_1. \qquad (21)$$

Then, create a system of three equations by setting $\partial E(\pi_1)/\partial r_1 = 0$, $\partial E(\pi_2)/\partial r_2 = 0$, and $\partial E(\pi_1)/\partial T_1 = 0$.

These first order conditions are,

$$[\,P - \frac{W}{e(w)o}\,]\,\frac{\partial v}{\partial r_1} = 0, \qquad (22)$$

$$-\,[\,P - \frac{W}{e(w)o}\,]\,\frac{\partial v}{\partial r_2} = 0, \qquad (23)$$

and

$$\frac{\partial C_1}{\partial \sigma_m}\,\frac{\partial \sigma_m}{\partial T_1} = 1. \qquad (24)$$

In equation 22 the term in brackets is the profit per unit. If it is positive, firm 1 maximizes profit by attempting to increase r_1 until $\partial v/\partial r_1 = 0$. As the maximum value of r_1 is 1, the border solution of $r_1 = 1$ gives the maximum profit for the firm. The same will be true for firm 2. Because labor costs do not increase as output market instability increases ($\partial C_1/\partial \sigma_K = 0$), both firms will simply select the highest level of r possible to increase their expected sales of industry output. If firms use CERs, the level of output market rivalry will be at its maximum (R=2).

If CERs are used by the firm, $\partial C_1/\partial \sigma_m = 0$ and equation 24 indicates that no positive level of macroeconomic stabilization will satisfy the first-order condition. This is because, again, when CERs are used labor costs are not affected by the level of output market instability. Since macroeconomic stabilization is costly but provides no benefit to firms, capitalists will desire to pay zero tax and to receive no macroeconomic stabilization; casual employment relationships will be associated with a Laissez-Faire State in capitalists' institutional agenda.

Therefore, the above first-order conditions imply that restrained output market competition ($R < 2$) or a Keynesian State ($g > 0$) will exist *only* in combination with LTERs. Only if firms use LTERs does it make sense for them to reduce output market instability by restraining competition or by paying for macroeconomic stabilization. LTERs are a necessary precondition for these two other institutions.

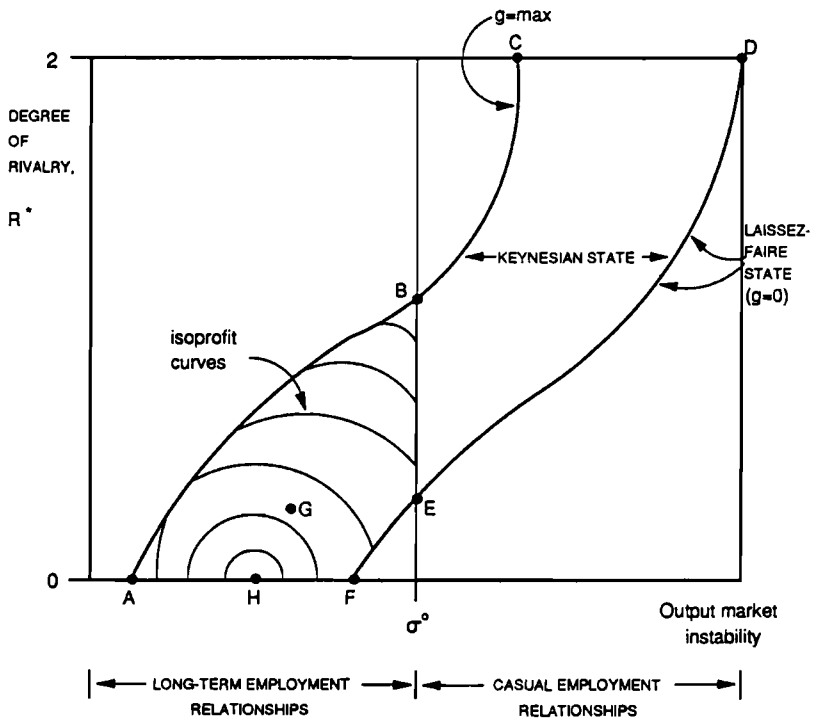
However, the converse is not true. With some sets of parameters, LTERs might always be lower cost than CERs. It might be that, as output market instability increases to its maximum level (when output market rivalry is at a maximum and the State provides no macroeconomic stabilization), the work-effort eliciting impact of LTERs always more than counteracts the increased cost of having to pay laid-off workers their wages. In terms of Figure 2, this case would be represented by the maximum level of output market instability possible in the economy always being less than σ°. The use of LTERs does not imply that firms will necessarily desire to restrain competition or to create a Keynesian State.

The Set of possible Equilibrium Capitalist Agendas

Figure 3 visually depicts the set of all possible equilibrium solutions for some group of parameters. The vertical axis measures the degree of inter-capitalist rivalry within the market, R^*, which is one of the three institutions regulating the economy. As the two firms are identical, they will introduce the same number of innovations in equilibrium, r^*. In this case, $R^* = 2r^*$.

The horizontal axis indicates the level of output market instability in the economy, $\sigma = \sigma_k + \sigma_m$. If a Laissez-Faire State exists, the level of output market instability in the market associated with any given R^* will be equal to $\sigma_k(\frac{1}{2}R^*, \frac{1}{2}R^*) + \ell$. Curve FED (labeled "g=0") indicates the level of output market instability for a given R^* if a Laissez-Faire State exists. A Laissez-Faire State would be represented by a point somewhere on this curve. Macroeconomic stabilization provided by a Keynesian State reduces the level of output market instability below that existing with a policy of laissez-faire. If a Keynesian State provides the maximum level of stabilization it can (by collecting, improbably, infinite taxes) then output market instability associated with each R^* would be $\sigma_k(\frac{1}{2}R^*, \frac{1}{2}R^*) + (\ell - g(\infty))$. Curve ABC (labeled "g=max") indicates the level of output market instability associated with a given R^* if the government provides this maximum level of macroeconomic stabilization. A Keynesian State will provide a level of macroeconomic stabilization between 0 and the maximum level. Therefore, the level of output market instability (for a given R^*) when a Keynesian State exists

Figure 3



will be indicated by a point between the two curves g=0 and g=max. A Keynesian State, then, would be represented by such a point.

The institution regulating capital-labor conflict can also be introduced to this diagram. The level of endogenously created instability — the combined product of output market competition and macroeconomic stabilization — is measured along the horizontal axis. As before, let σ° represent the level of output market instability at which LTERs become lower cost than CERs. At values of σ less than σ°, profit-maximizing capitalists would desire to use LTERs; at values of σ greater than σ°, capitalists would desire to use CERs. Points in the diagram to the left of σ° represent LTERs while points to the right represent CERs.

The set of possible equilibrium sets of institutions desired by capitalists is a discontinuous set. In Figure 3, the points within region ABCDEF represent all possible combinations of the degree of inter-capitalist rivalry, macroeconomic stabilization, and level of macroeconomic stabilization. However, only points within the sub-region ABEF or point D represent *stable* equilibrium sets of institutions. Within region BCDE

(excluding the line segment BE) CERs are lower cost than LTERs, and so CERs will be used by firms. But, as discussed above, if CERs are used by firms, then a Laissez-Faire State and the maximum degree of inter-capitalist rivalry will also be used. Therefore, the only possible equilibrium point within region BCDE will be point D, an institutional set represented by [2,CER,LF]. Because of the interdependencies between institutions, the characteristic of a single institution — the discontinuous labor institution that takes on only one of two forms — becomes a characteristic of the set of equilibrium combinations of institutions.

Figure 3 also includes an iso-profit mapping for some set of parameters. These iso-profit contours indicate profits associated with LTERs. When LTERs are used, profit reaches a maximum at point H. However, non-cooperative capitalists will be unlikely to achieve maximum profits. Indicate the non-cooperative equilibrium solution involving LTERs by point G. If point G gives greater profit than that associated with CER-based institutions (point D), firms will desire to establish the set of institutions represented by point G. If point G gives lower profit than that associated with point D, then firms will desire to establish CER-based institutions.

Long-Term Employment Relations or Casual Employment Relations?

Whether a firm desires to establish an institutional set including LTERs (interior solution G in Figure 3) or an institutional set including CERs (border solution D) depends on which set gives the greatest profit. That is, it depends on the sign of

$$\pi' = \pi_L - \pi_C$$

$$= \frac{QW}{o}\left[\frac{1}{e(w)} - \frac{1}{e(2w)} - \frac{\frac{1}{4}\, s(\ell - g(T^*),\ \sigma_k(r_1^*, r_2^*))}{e(w)}\right] - T^*, \quad (25)$$

where π_L is the profit under LTERs and π_C is the profit under CERs, and the stars denote the non-cooperative equilibrium values associated with LTERs. When this expression is positive, a solution involving LTERs is optimal for firms. When this expression is negative, the border solution involving CERs is optimal. (Derivation of this expression starts with equation 11 and is based on the recognition that, with identical firms, in equilibrium $r_1 = r_2$ and so $v = 0$.)

Equation 25 suggests that capital-labor conflict, capitalist competition, and State macroeconomic policies are all (equal) partners in determining whether capitalists desire to offer LTERs or CERs to their workers.

According to this equation, the choice between labor contracts is shaped by the capital-labor relationship (via the effect of w and e). It is also shaped by inter-capitalist competition (via $\sigma_k(r_1^*, r_2^*)$) and by State macroeconomic and taxation policies (via $g(T^*)$ and T^*). As capital-labor conflict spill over to shape the regulation of competition and the form taken by the State, inter-capitalist rivalry and State macroeconomic policies spill over from their immediate environment to co-determine which labor contract is optimal for firms. Through this additional mechanism, exploitation strategies within the firm are once again intimately linked with intra-class competition between capitalists and politically determined macroeconomic stabilization policies.

A final characteristic of the non-cooperative equilibria should be noted. Some have claimed that a successful set of institutions provides social and economic stability (e.g., Gordon, Edwards, and Reich 1982: 23; Kotz 1987: 21 and 23). But in this model the profit-maximizing r_i's and T_i's will *not* minimize economic instability (measured by $\sigma = \sigma_k + \sigma_m$). As seen in Figure 3, minimum attainable instability is associated with point A. However, profit-maximizing capitalists would prefer to be at point G or, even, at point D. While it might be that a particular set of institutions happened to be associated with the striving for low levels of instability (i.e., the "golden age of capitalism" (cf. Marglin 1990)), capitalists do not always desire to achieve stability over other considerations.

MONOPOLY CAPITALISM?

Proponents of the monopoly capital school do not claim that monopoly power is the only important force in advanced capitalist economies. However, they believe that the impact of monopoly power is pervasive enough that the current era deserves the label "monopoly capitalism" (e.g., Baron and Sweezy 1966; Sherman 1983). Monopoly power is seen to promote widespread changes in the economy through its effect on the profit rate of the monopoly sector (i.e., large oligopolistic firms). The market power of these firms permits them to raise prices above competitive levels. The subsequent high profits create a tendency toward an increasing surplus and an associated problem of under-consumption, a tendency toward increased instability in the economy, and a rise of government intervention to deal with this under-consumption and instability.

Monopoly power can be introduced into the above model by permitting collusion between firms. Colluding firms could simultaneously reduce the level of competitive aggression they use against one another to zero ($r_1 = r_2 = 0$). Of course, such collusion would occur only if it gave firms greater profits then they had before.

Consider the most interesting case involving collusion. Suppose the non-cooperative solution happens to be the border solution of a maximum degree of inter-capitalist rivalry in output markets, CERs within firms, and a Laissez-Faire State: [2, CER, LF]. Now suppose that firms are able to collude. As firms reduce the degree of rivalry to its minimum, they would desire to shift to LTERs because such contracts will now be lower cost than CERs. And, once LTERs are used by firms, a potential benefit exists from macroeconomic stabilization that did not exist in the non-cooperative solution. Collusion promotes the introduction of long-term employment relationships and the establishment of a Keynesian State.

This case can be illustrated by referring to Figure 3. The non-cooperative solution is represented by point D (as this set of institutions is assumed to give greater profit than that given by the non-cooperative interior solution of G). Sets of institutions associated with collusion in output markets lie along line segment AHF. Of these collusive sets of institutions, that giving the highest profit is that represented by point H. Collusion involves a shift of capitalists' agenda from point D to point H.

We can apply the label "monopoly capitalism" to this set of institution, [0, LTER, K] since the appearance of monopoly power provoked their appearance. Such an economy would likely behave in ways quite different from the economy existing in the initial non-cooperative equilibrium.

However, the mechanisms behind the appearance of this monopoly capitalism is different from that offered by the monopoly capital school. In this model, monopoly power *reduces* (not increases) the level of instability in the economy. This reduction in instability promotes the appearance of LTERs which, in turn, promotes the appearance of the Keynesian State. That is, the Keynesian State appears because of *decreased* (not increased) instability. The appearance of LTERs and a Keynesian State together permit production costs to fall below their previous level. This reduction in *costs* (not an increase in prices) leads to higher profits. Here, new institutions permit increased profits; in the literature of the monopoly capital school, increased profits provoke the appearance of new institutions.

A second case needs to be considered. It is possible that the non-cooperative (pre-collusive) solution involves a Keynesian State and LTERs. This would be the case if point G in Figure 3, rather than point D, was the pre-collusive equilibrium set of institutions. The appearance of collusion (and the move from point G to point H) will not promote the establishment of a Keynesian State or of long-term employment relationships. These two institutions already existed without collusion. Monopoly power is a possible — but not a necessary — cause of the

establishment of a Keynesian State and long-term employment relationships. In this second case, it would be inappropriate to label the "set of institutions [0, LTER, K] as 'monopoly capitalism."

COMPARATIVE STATICS

The comparative statics of this model indicate changes in capitalists' institutional agenda. These comparative statics will, therefore, indicate the location and extent of class conflict over which institutions will regulate the economy. If capitalists are partially successful in pursuing their institutional agenda, the comparative statics also indicate the direction of tendential change of the institutions regulating the economy.

Consideration here of the impact of exogenous changes in prices, wages, and technology on institutions should not be taken to deny that institutional change is largely the result of changes endogenous to the economic system (e.g., Gordon, Edward, and Reich 1982: 27-28; Boyer 1990: 48-50; Marglin 1990: 34). While changes in P, W, and o are exogenous to this model, they are endogenous to the institution-embedded economic system. As shown in Figure 1, these "exogenous" variables are directly shaped by the institutions regulating the economy. Further, as also seen in Figure 1, institutional change can occur not only from changes in the institutions desired by capitalists, it can come from changes in the institutions desired by workers or changes in the balance of economic and political power in the economy.

Incremental Change in Capitalists' Institutional Agenda

First, consider the impact of an exogenous increase in the output price for a firm that uses LTERs (see Appendix). An increase in P increases revenue per unit sold, but also increases the level of employment needed to produce a unit of output because the fall in real wage ($w = W/P$) reduces work effort. This has an ambiguous effect on profit earned per unit sold (which is what a firm gains when it sells an additional unit at the expense of its competitors) and so has an ambiguous effect on the incentive for firms to introduce additional product innovations. An exogenous increase in P, therefore, might increase or decrease the degree of inter-capitalist rivalry desired by capitalists.

An increase in P can also promote a change in the macroeconomic policies desired by capitalists. As noted above, an increase in P increases the number of workers needed to produce each unit of output. For firms using LTERs any given drop in sales (say, one coming from an exogenous macroeconomic shock) becomes more costly for firms because more workers are now kept on the payroll although they are unneeded. Therefore, the return to macroeconomic stabilization increases for such

firms and, *ceteris paribus*, they can be expected to demand a greater level of macroeconomic stabilization from the State. (Note that the usual casual relationship is reversed. Typically, increased macroeconomic stabilization is seen to promote inflation; here, inflation promotes increased macroeconomic stabilization.)

Second, consider the impact of an exogenous increase in the nominal wage rate. An increase in W (holding P constant) increases both the cost per worker and work effort provided by workers. This has, of course, an ambiguous effect on cost per unit produced. Profit per unit might rise or fall and, so, the degree of inter-capitalist rivalry desired by capitalists might increase or decrease. By having an ambiguous effect on cost per unit, this exogenous increase in W has an ambiguous effect on the marginal return to macroeconomic stabilization. The equilibrium level of macroeconomic stabilization might, therefore, also increase or decrease. When firms use LTERs, a change in the level of the reserve army (the proximate regulator of wages) will produce minor changes in the institutions capitalists desire, but the direction of these changes will be unpredictable.

Third, consider an exogenous improvement in technology. An increase in output per unit work effort, o, reduces the cost per unit. This increase has two effects: 1) it increases profit per unit and so rewards the introduction of product innovations more than previously and 2) it reduces the cost associated with product innovation-induced instability as fewer workers are required to produce a unit of output. Through both these channels, technical advance increases r_1 and r_2 and, so, increases the degree of inter-capitalist rivalry. Further, by lowering the cost per unit, technical advance reduces the marginal return to macroeconomic stability and, so, provokes a cut in the level of macroeconomic stabilization desired by capitalists. At some sufficiently high level of technological capability, capitalists might fight to have their Keynesian State replaced by a Laissez-Faire State. However, such a change would occur gradually as the level of macroeconomic stabilization provided by the State slowly falls toward zero: the State withers away.

Each of the above cases assumes firms desire to use LTER in order to extract work effort from workers. In each case, a small change in a parameter leads to an incremental shift in the set of institutions capitalists desire. Sometimes, incremental changes in the institutions capitalists desire would be quickly reflected in the actual institutions regulating the economy. For instance, capitalists can unilaterally change the level of competitive aggression they use against one another. An incremental increase in the amount of competitive aggression desired by capitalists would likely be quickly reflected in the extent of rivalry in the industry.

However, incremental changes in capitalists' institutional agenda might not be reflected quickly in the actual institutions regulating the economy. For instance, workers might fight capitalists' initiatives to change the macroeconomic stabilization policies of the State. Incremental changes in capitalists' demands might have to build up for awhile before capitalists are willing or able to marshal sufficient political force to achieve a desired institutional change. Consequently, continual incremental changes in capitalists' desires could lead to infrequent large changes in institutions.

If firms desire to use CERs, small changes in exogenous parameters have a quite different impact. If firms use CERs, they necessarily use the maximum level of competitive aggression toward each other and desire a Laissez-Faire State. Changes in any of the exogenous parameters will cause no change in the institutions capitalists desire (unless they desire to switch to LTERs, a situation we discuss below). In this case, capitalists will tend to have a classically conservative political agenda. They will not be the source of initiatives to change institutions and government policies, but will react to demands for institutional change by others by fighting these demands in favor of the status quo.

Discontinuous Change in Capitalists' Institutional Agenda

A small change in a single exogenous parameter could also provoke capitalist demands for major *discontinuous* innovation in *all* institutions. A small change in a parameter can cause such demands by leading capitalists to desire that the institutions regulating the economy shift from an interior solution involving LTERs, some moderation of inter-capitalist rivalry, and a Keynesian State (e.g., [1,LTER,K]), to a border solution involving CERs, maximum degree of inter-capitalist rivalry, and a Laissez-Faire State ([0,CER,LF]). Alternatively, the demand for discontinuous change could be in the opposite direction.

A small exogenous change in P, W, or o can create the conditions for widespread discontinuous institutional change if, referring again to equation 25, 1) π' is near 0 and 2) $\partial\pi'/\partial P$, $\partial\pi'/\partial W$, or $\partial\pi'/\partial o$ are greater than zero if $\pi' < 0$ or less than zero if $\pi' > 0$ in the neighborhood of $\pi' = 0$. Each of these partial differentials is generally non-zero so a single small exogenous change in any of P, W, or o has the potential to cause discontinuous change in all institutions desired by capitalists.

This discontinuous change in capitalists' agenda might set off a high level of class conflict as capitalists seek widespread institutional change that workers resist. This increase in class conflict can be expected to be sudden and to involve simultaneously many different institutions. This

would be different from the impact of the accumulation of unfulfilled demands for incremental change discussed previously. Such demands for incremental change can be expected to build gradually, and to flare up into isolated battles over relatively small changes in individual institutions.

Widespread discontinuous change might be characterized as a shift between two different social structures of accumulation or modes of regulation. Such a change in institutions will be relatively infrequent as it will happen only when π' is near zero. Incremental changes in institutions will be experienced more frequently.

In both this model and the radical institutionalist literature, widespread discontinuous institutional change leads to increased profits and, so, to an increased pace of accumulation. Radical institutionalists assume, however, that profits are low or falling before widespread discontinuous institutional change. This crisis stimulates the search for new institutional arrangements. In this model, though, profits might actually be high and increasing before such a change, and the new institutions simply give still higher profits.

But even in this model we might expect that widespread discontinuous change in the institutions regulating the economy is most frequently associated with bad economic times, when profits are low. During good economic times (when the reserve army effect is weak), workers likely have sufficient bargaining power to fight off capitalist demands for change in the institutions regulating the economy. Conversely, during bad economic times (when the reserve army effect is strong), workers likely will be unable to fight off capitalist initiatives for institutional change. If this is true, discontinuous change in the institutions regulating the economy will only happen during bad economic times although capitalists might also desire it at other times (cp. Gordon, Edwards, and Reich 1982: 35).

Another possibility cannot be easily dismissed. During good economic times, capitalists might bribe workers (perhaps through paying higher wages or providing better working conditions) to accept the institutional changes that capitalists desire. But during bad economic times (when profits are low), capitalists perhaps can only resort to overt class struggle to gain their desired institutions. Discontinuous institutional change might occur both in good and in bad times, but only during bad times is this change accompanied by overt class struggle and economic crisis.

The radical institutionalist literature, though, assumes that widespread institutional change is necessarily proceeded by a lengthy period of economic crisis and overt class struggle. Accepting this assumption uncritically might lead researchers to overlook major institutional

changes that occur in good economic times. An important corollary is that such researchers might find themselves falsely concluding that the possibility for widespread institutional reconstruction can come "only once a generation" (Gordon, Edwards, and Reich 1982: 243) during a long-wave crisis. Further study of the assumed necessary link between economic crisis and widespread institutional change is clearly warranted.

TENDENTIAL DEVELOPMENT OF INSTITUTIONS AND THE LAST INSTANCE

Radical institutionalists reject the notion that national economies and their institutions follow predictable and inevitable paths of development. According to Kotz (1987: 24), "the construction of a new SSA ... emerges from a complex economic, political, and ideological process that has no inevitability about it." Boyer (1990: 57) claims that "there is no historical law that enables us to foresee what the components of the eventual new regime of accumulation in gestation will be, once we have renounced the concept of determination, in the last instance, of social relations by the productive forces."

The model presented above was developed to deduce implications of the claim that institutions are interrelated. It was not developed to speak to the complex issue of the long-run development of society. However, this model permits a more nuanced interpretation of the link between predictability, inevitability, and the last instance to be articulated than has been found in the radical institutionalist literature.

Tendencies in Capitalists' Institutional Agenda

To discover the tendential path of development of capitalists' institutional agenda, I need to consider the direction taken by this agenda at one critical point: when the economy stands at the watershed between the two qualitatively different sets of institutions of this model. When $\pi' = 0$ the economy is standing at this watershed (see equation 25). If π' decreases at this point, capitalists desire to move toward a set of institutions involving CERs, unrestrained competitive rivalry, and a Laissez-Faire State (i.e., [2,CER,LF]). If π' increases at this point, capitalists desire to move toward sets of institutions involving LTERs, and, most likely, restrained output market competition and a Keynesian State (e.g., [0.7,LTER,K]).

The direction of movement of capitalists' institutional agenda at this watershed is given by the total derivative

$$d\pi'^{t_0} = \frac{\partial \pi'}{\partial P} dP^{t_0} + \frac{\partial \pi'}{\partial W} dW^{t_0} + \frac{\partial \pi'}{\partial o} do^{t_0}, \qquad (26)$$

where dP^{t_o}, dW^{t_o}, *and* do^{t_o} are changes in the exogenous parameters when the economy stands at this point (reached at time t_o), and $\partial\pi'/\partial P$, $\partial\pi'/\partial W$, and $\partial\pi'/\partial o$ are each evaluated at $\pi'=0$. At this particular historical moment, t_o, the exogenous parameters — dP^{t_o}, dW^{t_o}, *and* do^{t_o} take on particular values. For instance, dP^{t_o} could be large or small, or positive or negative.

I am concerned not with this one particular historical moment, but with tendential change. That is, I am concerned with the *expected value* of $d\pi'$, which is determined by the *expected values* of dP, dW, and do:

$$E(d\pi') = \frac{\partial\pi'}{\partial P} E(dP) + \frac{\partial\pi'}{\partial W} E(dW) + \frac{\partial\pi'}{\partial o} E(do). \qquad (27)$$

$E(d\pi')$ indicates the direction of change of capitalists' institutional agenda when we abstract from particular historical situations. The three terms to the right of the equals sign indicate the tendential movement imparted to capitalists' institutional agenda by trend changes in prices, in wages, and in technology. These trend changes emanate from the "base" of society.

Trend movements in prices and wages impart a tendential movement to capitalists' institutional agenda. However, the direction of such movement is unknown. Even if we assume that the exogenous parameters P and W display some trend movement over time (say, a trend upward: $E(dP), E(dW) > 0$), the partial derivatives $\partial\pi'/\partial P$ and $\partial\pi'/\partial W$ have indeterminant signs in the neighborhood of $\pi'=0$ (see Appendix). We cannot tell the direction of tendential change in capitalists' desired institutions imparted by the first two terms of equation 27.

Technological change, however, will have a predictable effect on capitalists' institutional agenda. The forces of production will generally advance under capitalism: $E(do) > 0$. Further, the partial derivative $\partial\pi'/\partial o < 0$ at all levels of o (see Appendix). Therefore, the third term of equation 27 will be unambiguously negative. This contributes a tendential movement toward CER-based institutions. We have in this model, then, a weak form of technological determinism: technological advance is not the only force shaping the tendential movement of institutions (dP and dW have an impact also), but it is the only force that has a *predictable* impact on institutions.

A strong form of technological determinism could potentially exist in the model. *A priori* we cannot reject the claim that P and W (unlike o) display no necessary trend in capitalism. Therefore, it might seem

reasonable to assume that in the very long run E(P) = E(W) = 0. With this assumption, the first two terms to the right of the equal sign in equation 27 disappear, and technological advance alone determines the tendential development of institutions. In this case, $E(d\pi') < 0$, and the tendential movement of capitalists' desired institutions is toward CERs, maximum level of competitive rivalry, and a Laissez-Faire State.

Such technological determinism is rejected by this model. Over time, the balance of power between capital and labor is unlikely to change in predictable ways. This suggests that, while the wage share of output varies in the short run as the balance of power shifts year to year, it should remain relatively constant over time. The expected value of the wage share of output, $\lambda = E(W/(W + Poe))$, should be a constant and $\partial\lambda/\partial t = 0$. It can be shown that this latter partial derivative implies

$$\left(\frac{Poe}{W^2} - \frac{Po}{W}\frac{de}{dw}\frac{1}{P}\right) E(dw) = \left(\frac{oe}{W} - \frac{Po}{W}\frac{de}{dw}\frac{W}{P^2}\right) E(dP) + \left(\frac{Pe}{W}\right) E(do). \tag{28}$$

Because (Pe/W)E(do) > 0, if E(dP) = 0 then $E(dW) \neq 0$. E(dW) and E(dP) cannot both be zero at the same time and, so, the first two terms in equation 27 do not zero out. Technological determinism is, therefore, rejected.

Still, the base imparts a tendential development to the superstructure (institutions). It is unlikely that the summation of the first two terms of equation 27 exactly cancels out the third. Therefore, in general $E(d\pi') \neq 0$. When the economy reaches a watershed between the two different sets of institutions, it will tend to move toward one particular set.

The base imparts an inevitable tendential movement to the superstructure (i.e., $E(d\pi') \neq 0$), but we cannot *a priori* predict the direction of this movement. While (Pe/W)E(do) > 0, the summation of the first two terms will be indeterminant. The complete expression in equation 27 is, therefore, indeterminant. The collective impact on institutions of trend changes in prices, wages, and technology is unpredictable.

Potential Counter-Tendencies

Whatever the tendency emanating from capitalists' institutional agenda, the institutional agenda of workers' potentially opposes it (see Figure 1). Workers' agenda would neutralize any tendencies in capitalists' agenda if: 1) the tendential movement of workers' agenda is in the opposite

direction of that of capitalists and 2) workers' and capitalists' institutional agendas have equal weight in class struggle. The former possibility cannot be dismissed, although it does seem a bit *ad hoc* to assume that it is true. The later possibility is less likely: many reasons exist for believing that capitalists have a greater ability to achieve their agendas then do workers. Therefore, while workers' agenda and class struggle add *unpredictability* to institutional development, they are unlikely to provide any systematic *counter-tendency* to the tendency existing within capitalists' institutional agenda.

Tendencies in the development of capitalists' institutional agenda are, therefore, tendencies in the development of the actual institutions regulating the economy. For instance, if LTERs are initially profit maximizing for firms and if $E(d\pi') < 0$, increases in o will eventually provoke a discontinuous change in the institutions capitalists desire to the border solution involving CERs, the maximum degree of inter-capitalist rivalry, and a Laissez-Faire State. In this case, capitalists will come to believe that the old institutions fetter accumulation, and a period of class conflict may ensue. As it is reasonable to assume that capitalists will achieve some success in achieving their goals, institutions will tend to develop toward maximum rivalry in output markets, casual employment relationships, and a Laissez-Faire State.

The Last Instance

A qualification is required. It is not being argued that class struggle and progressive political initiatives are unimportant. It is merely being argued that it is not *sufficient* to invoke the mechanisms of class struggle and historical contingency to construct a theory of history that purges all vestiges of economistic versions of historical materialism. Even in the presence of class struggle and historical contingency, the economic base can impart clear tendencies to the economy's institutions.

At the same time, any tendency in capitalists' institutional agenda (and so in the economy) exists only as an *expected* value. At any particular time, the actual direction of institutional change might be different from this tendency. Workers' agenda, class struggle, and historical contingency might have a dominant effect on institutional change in particular conjunctures. Of course, this is a commonplace observation.

But we can go beyond this observation. A stochastic process with an expected value of, say, zero need never even reach this expected value if shocks are positively correlated. In this case, initial movements away from the expected value promote a greater likelihood of later movements in the same direction. Alternatively, if a historically contingent increase in, say, the political power of workers promotes the likelihood of

continued greater political power afterwards, the tendency in the development of institutions imparted by capitalists' institutional agenda might be dominated by historical contingency and class struggle if path dependency (the feedback process in Figure 1) is strong. This could be true even in the long run. This suggests, surprisingly, that economism (or even technological determinism) does not necessarily have to be purged to have a theory that stresses the dominant role in the long run of class struggle and historical contingency.

In this model, then, the base determines the superstructure, but only in the last instance. The last instance, however, appears only as an expected value and is perhaps not observable in any particular time or even any particular economy. The last instance might be observed, at best, only when observations of institutional change are averaged over very many countries ($N \to \infty$) and over very long time periods ($t \to \infty$) when the effects of class struggle and historical contingency might be expected to cancel out.

CONCLUSION

Kotz (1987) and Jessop (1990) are correct to call for additional case studies of particular historical conjunctures in order to further develop radical institutionalism. However, I have shown that mathematical modeling can serve as a helpful adjunct to this still-developing theoretical approach by identifying connections, interrelationships, and possibilities that have not been articulated in more informal, expository forms of analysis or in case studies of particular historical conjunctures. I also seek to draw attention to the possibility of a more rigorous theory than currently exists in the radical institutionalist literature and to provide an initial starting point (or, perhaps, foil) from which such a theory might develop.

REFERENCES

Baron, P. and P. Sweezy. 1966. *Monopoly Capital.* New York: Monthly Review Press.

Boyer, R. 1990. *The Regulation School: A Critical Introduction.* New York: Columbia University Press.

Boyer, R. and M. Juillard. 1991. The New Endogenous Growth Theory Versus a Productivity Regime Approach: One Century of American Economic History Revisited. Mimeo.

Bowles, S., 1985. The Production Process in a Competitive Economy: Walrasian, Neo-Hobbesian, and Marxian Models. *American Economic Review* 75(1).

Bowles, S. and R. Boyer. 1990. A Wage-led Employment Regime: Income Distribution, Labour Discipline, and Aggregate Demand in Welfare Capitalism. In, S. Marglin and J. Schor (eds.). 1990.

Bowles, S., D. Gordon and T. Weisskopf. 1983. *Beyond the Wasteland*. New York: Basic Books.

Gordon, D., R. Edwards and M. Reich. 1982. *Segmented Work, Divided Workers: The Historical Transformation of Labor in the United States*. New York: Cambridge University Press.

Jessop, B. 1990. Regulation Theories in Retrospect and Prospect. *Economy and Society* 19(2), May.

Kotz, D. 1987. Long Waves and Social Structures of Accumulation: a Critique and Reinterpretation. *Review of Radical Political Economics* 19(4).

Lipietz, A. 1987. *Mirages and Miracles*, London: Verso.

Marglin, S. 1990. Lessons of the Golden Age: an Overview. In, S. Marglin and J. Schor (eds.). 1990.

Marglin S. and Bhaduri. 1990. Profit Squeeze and Keynesian Theory. In, S. Marglin and J. Schor (eds.). 1990.

Marglin, S. and J. Schor. (eds.) 1990. *The Golden Age of Capitalism: Reinterpreting the Postwar Experience*. Oxford: Claredon Press.

Sherman, H. 1983. Monopoly Power and Profit Rates. *Review of Radical Political Economics* 15(2).

APPENDIX

The direction of discontinuous change between an interior solution and a border solution due to a change in an exogenous parameter depends on the sign of the partial derivatives of π'. The partial derivative of π' with respect to o is (see equation 25):

$$\frac{\partial \pi'}{\partial o} = -\left[\frac{QW}{o}\left(\frac{1}{e(w)} - \frac{1}{e(2w)} - \frac{\frac{1}{4}\, s(\sigma_m, \sigma_k)}{e(w)}\right)\right]\frac{1}{o} -$$

$$\left[\frac{QW}{4e(w)o}\,\frac{\partial s}{\partial \sigma_k}\,\frac{\partial \sigma_k}{\partial r}\,\frac{\partial r^*}{\partial o}\right] \qquad \text{(A1)}$$

$$-\left[\frac{QW}{4e(w)o}\,\frac{\partial s}{\partial \sigma_m}\,\frac{\partial \sigma_m}{\partial g}\,\frac{\partial g}{\partial T} + 1\right]\frac{\partial T^*}{\partial o}.$$

As seen in equation 25, if $\pi' = 0$, then the first term in brackets is T. The second term in brackets is positive as each of the individual terms within this bracket is positive. And, recognizing that $\partial s/\partial \sigma_m = (2/\pi)^{1/2}$, $\partial \sigma_m/\partial g = -1$, and (from equation 20)

$$\partial g/\partial T = 1/[(1/3)(2\pi)^{-1/2}QW/e(w)o],$$

it can be seen that the third term in brackets is negative. Therefore, since $1/o > 0$ and $\partial T^*/\partial o < 0$, the complete expression is negative as π' falls toward and then equals 0. If o increases, π' will eventually become negative, and firms will switch from the interior solution (LTER) to the border solution (CER).

The partial derivative of π' with respect to W is

$$\frac{\partial \pi'}{\partial W} = \left[\frac{Q}{o}\left(\frac{1}{e(w)} - \frac{1}{e(2w)} - \frac{¼\ s}{e(w)}\right)\right] +$$

$$\left[\frac{QW}{o}\left(-\frac{1 - ¼\ s}{e(w)^2}\frac{\partial e(w)}{\partial W} + \frac{1}{e(2w)^2}\frac{\partial e(2w)}{\partial W}\right)\right] - \qquad \text{(A2)}$$

$$\left[\frac{QW}{o}\left(\frac{\partial s}{\partial \sigma_k}\frac{\partial \sigma_k}{\partial r}\frac{\partial r^*}{\partial W} + \frac{\partial s}{\partial \sigma_m}\frac{\partial \sigma_m}{\partial g}\frac{\partial g}{\partial T}\frac{\partial T^*}{\partial W}\right)\right].$$

This whole expression is of unknown size and sign as π' falls toward and then equals 0. This can be seen merely by noting that $\partial r^*/\partial W$ and $\partial T^*/\partial W$ are of unknown size and sign. The derivative of π' with respect to P likewise has an unknown sign for similar reasons.