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Contesting competitiveness: the case for a democratized workforce

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**CONTESTING COMPETITIVENESS:
THE CASE FOR A DEMOCRATIZED WORKFORCE**

**A thesis submitted to
Regis College
The Honors Program
in partial fulfillment of the requirements
for Graduation with Honors**

by

Kaleb Brooks

May 2012

Table of Contents

Introduction: Leaving Formulism Behind3

Chapter 1: A Model for Firm Performance8

Chapter 2: The Strategic Landscape20

Chapter 3: A Productive Community.....34

Chapter 4: Modeling Cooperative Business Organization65

Works Cited.....84

Introduction: Leaving Formalism Behind

In comparison to the long history of economic theory, the contemporary economic orthodoxy represents a uniquely modernist approach to the discipline. Juxtaposed with the earliest formulations of Adam Smith and David Ricardo, the economic journals of the last sixty years would seem almost ahistorical, as if work did not share the same lineage of thought. Mathematics has always played a central role in economic theorizing, but in the last sixty years, it has taken a new place in the central logic of economics. As the discipline has tended towards increasing scientific rigor, mathematics has slowly supplanted the earlier, more philosophical methodologies common in the field.

This development would not necessarily imply a problem for the field except that, in the process, economic thought eschewed more human-oriented and affective forms of reasoning. Whereas Adam Smith's analysis revolved around a number of concrete, humanized examples, such as his "invisible hand" analysis of bakers or his consideration of labor specialization through the lens of workers in a pin factory, contemporary economic journals tend to consider the human beings involved in economic interactions only indirectly. Marketplaces, firms, and a faceless "consumer" have become the most basic levels of analysis. Mathematics has succeeded in formulizing and standardizing the field by removing this human element.

In the contemporary paradigm, the firm functions a coherent whole, organized by the forces of the market, because labor, management, and capital holders are all seen, from the perspective of mathematical models, as interchangeable, purely rational actors, and while microeconomics has developed a significant literature discussing the behavioral limitations of the rational choice model, this work has yet to trickle up, in any comprehensive way, to the study of growth and competitiveness. As a result of this process of formulization, economic theory, in

the face of one of the most severe recessions in American history, seems incapable of proposing policies which can sustainably restart the engine of growth.

To understand why the economic orthodoxy cannot sufficiently recommend growth oriented strategies, consider the problematic history of the contemporary paradigm. Modern economic models have their roots in the early 1950's. Increases in computing power allowed statistical modeling to supplant abstract theorizing as the fundamental methodology in economic study. In the words of Federal Reserve Bank analyst Renee Haltom, the advent of econometrics allowed economists "the opportunity to develop Keynes's broad ideas into a full-fledged Keynesian toolkit for the economy" (13). Statistical study allowed researchers to specify functional relationships between key variables. For instance, between 1948 and 1959, data on unemployment and inflation appeared to follow an intelligible pattern (Price 14). Economists termed the relationship the "Phillips Curve" and adapted economic theory to match the observed relationship.

Loosening monetary policy, in effect spurring inflation, seemed to reliably cause unemployment to fall, so Fed policymakers used this model to counter cyclical movements in the economy and support growth. A new vision of the economy as stable system was beginning to emerge. Like mechanics tending to an engine, policymakers sought to fine tune the economy for the most efficient outcome. The economic prosperity that followed the Second World War validated these claims, cementing formalistic modeling in the Keynesian paradigm.

The establishment went largely unchallenged until the late 1970's when a series of inexplicable recessions began to throw doubt on the Keynesian consensus. Loose monetary policy had triggered large scale inflation, but unemployment continued to rise. Stagflation was irreconcilable with the Phillips Curve (Courtois 13). Somehow, the behavior of the markets had

suddenly taken on an entirely new pattern. In retrospect, economists attribute this sudden shift to changes in the expectations of economic actors. The Phillips curve relied upon monetary policy to dupe firms into increasing employment. Increasing the money supply would fool managers into believing there was increased demand for their products even when real demand had fallen.

In the words of Fed analyst Renee Courtois:

Such a policy trade off was too simple to be realistic since it would rely on tricking people indefinitely ... Eventually, people would figure out that the boost in demand was only an illusion created by the increased money supply. Workers would be unwilling to work at their old wages since inflation had eroded their purchasing power, and nominal wages would have to rise at a magnitude equal to the increase in inflation. (Courtois 13)

In short, the overuse of a policy solution had fundamentally changed the system upon which Keynesianism was based. The human element forced itself back into the forefront of economic analysis. In treating the economy as if it were a reliable and predictable system, the Keynesian paradigm ignored the simple economic reality that marketplaces and firms are populated by unique and savvy people. The dynamic behavior of markets resisted manipulation as consumers and producers adapted to systemic changes.

Even in the face of this failure, however, the basic methodology of economics remained unchanged. The formalistic process of observation followed by theory remained the primary impetus of economic thought after Keynesianism gave way to the neoclassical paradigm. Increasing processing capacity allowed academic economists to develop more sophisticated models accounting for the reactive behavior of firms and consumers. Attempting to account for the human element mathematically, sectors of the economy were modeled independently and

allowed to react to the behavior of one another. These models, termed dynamic stochastic general equilibrium analysis (DSGE), became standard practice in the period since 1980 (Haltom 15). They do not necessarily represent a cogent theoretical perspective; rather, they are premised on series of accepted methodologies. In Haltom's words: "what models today have in common is not so much any school of thought, but the type of mathematical tools that are in use – so, in a way, mathematics is the new reigning paradigm of economics" (15). As a result, economics has become an increasingly narrow profession. The formalist establishment rewards grants and publications to "careful, well-supported, but necessarily narrow analysis" (Haltom 15), so few main-stream economists engage in archaic broad spectrum theorizing. The resultant economic paradigm represents an interesting paradox. As the language of the field tends towards the more mathematical and abstract, avoiding comprehensive analysis at the level of individual persons, the focus of analysis has tended towards more concrete and narrow considerations.

As such, it is no surprise that the most recent recessions seem to have fallen beyond the analytic purview of the orthodox paradigm. According to Haltom, "economists were so focused on unrealistic, highly mathematical models that they missed the problems developing before their very eyes" (12). The complexities of a housing bubble driven by financial securities bought and sold in a highly specialized derivatives market was beyond the narrow analytical capacity of most formalist models. To add insult to injury, many foreign economies, especially China and Germany, have recovered quickly, while the US economy, unable to add jobs or grow much faster than two percent a year, seems close to reentering recession. As was the case after the 1970's recessions, the human element seems to be rearing its inconvenient head. Amidst the weakness of this recovery, the economic prowess demonstrated by the DSGE models during the "great moderation" of the 1990s and early 2000s seems increasingly illusory. Neither fiscal nor

monetary policy seems to produce the desired effects on growth as the longer run problems of American competitiveness are beginning to make their mark. If economic actors cannot be duped into increasing their demand, how can American businesses generate significant growth? In the face of this question, it is becoming clear that the neo-classical orthodoxy, lacking a theoretical foundation, cannot produce an appropriate response. The focus of economic thought has shifted so fundamentally towards the positive questions of how modern businesses operate that it no longer seems capable of asking the normative, human questions of how they should proceed into the future. In response, a fundamental consideration of the basic sources of wealth and long term growth is needed.

Chapter 1: A Model for Firm Performance

Sadly, considering the past decade of American experience, one should not be surprised by the persistent macroeconomic weakness of this recovery. The 2000's witnessed sluggish growth and two jobless recoveries despite one of the loosest monetary regimes in contemporary history. One need only look to the disturbing results of the last census to understand the gravity of this problem. Compared to its peak in 1999, median household income has fallen by more than 7% (Bernstein 1). In simplistic terms, what little growth the economy produced between the 2001 and 2007 recessions was completely lost upon the majority of Americans. Loose credit inflated aggregate demand sufficiently as to disguise the reality of decreasing competitiveness in American business. As more and more production is located abroad, economic growth, at least for middle America, becomes an increasingly ephemeral concept. It is increasingly clear that the prescriptive economic models used to inform contemporary, American policy (both in boardrooms and Washington) fail to describe the structural components of long run growth. The gravity of the current situation should be seen as an opportunity to revisit economic theory.

In the contemporary economic paradigm, growth tends to be considered from the aggregated perspective of macroeconomic analysis, so the strategic prescriptions laid out in economic theory thus far tend away from comprehensive, individual-level analysis. This perspective is problematic insofar as it restricts the ability of contemporary models to capture the root causes of competitive decline. The problem currently facing many American firms is that the average American worker is not cost-competitive. Although productivity levels are relatively high in the US economy, ranking fourth in GDP production per labor hour behind Luxembourg, Ireland, and Norway, the relatively large costs of production in the US economy, ranging from higher wages to healthcare costs, represent a problem for US based firms facing international

competition (OECD 46). In order to restore long term competitiveness and growth, this trend would need to be reversed, and individual workers would need to become more productive through increasing throughput or creating more valuable, higher quality final products.

Contemporary economic theory constructs a vision of the relevant strategies for attaining these goals from the perspective of the firm; translating these strategies into the human level of analysis identifies the relevant variables for generating a model of competitiveness.

Growth theory is an extension of the production models used to understand the process of value creation. The initial structure of these models, as they have been articulated in the orthodox, post-Keynesian paradigm, is neatly summarized in the Cobb-Douglas production equation. This theory, used widely in macroeconomics, simplifies the economic production of the economy into a consideration of only one aggregated good. This aggregate measure of output is denoted by the variable $Y(t)$, signifying the total production of an economy in a given time period t . Writing in an introduction to a republication of Knut Wicksell's 1898 work *Interest and Prices*, Bertil Ohlin describes the basic assumption that Paul Douglas and Charles Cobb would eventually incorporate into their statistical studies of production: "In general, ... the individual business man will make his calculations for the future, and so fix his demand for labour, raw materials, and credit on the basis of *current* prices" (Ohlin 11). Though initially straightforward, the narrative structure of this claim is highly complex. Assuming a high level of competition, the individual firm can have little effect on the prices of labor, capital, or raw materials. Likewise, it has only negligible impact on the price of output, so the core strategic choices of the firm are limited to identifying the quantity of various inputs to purchase at the given price.

Output, or the value added in the production process, is modeled as a combination of the value of the labor put into a process and the value of capital expended in the use of intermediate goods and services, such as factories, machinery, and raw materials. Mathematically:

$$Y(t) = AK^{\alpha}L^{\beta} \text{ (Jones 68)}$$

Alpha and beta represent the exponential coefficients of each variable. If they sum to one, there is constant returns to scale. Doubling both labor and capital will double output. Accordingly, if they sum to more than one, there is increasing returns to scale. The multiplicative coefficient variable A represents total factor productivity. Intuitively, many things beyond the value of labor and capital expended may affect the value of output. These omitted variables, such as management style or working conditions, are thought to affect the total factor productivity of any given combination of labor and capital rather than fundamentally altering the level of output. As such, they are aggregated into a scaling term, A. Again, the decision to describe productivity indirectly should be traced back to the production narrative expressed in the theory of the Cobb-Douglas model.

Within this narrative, the firm only has two meaningful choices in production: the number of workers to employ and the amount of capital to purchase to meet demand. These decisions can be described in simple rules. Employment input should only be increased up until it matches the marginal production of labor. Likewise, capital should only be purchased up until the rental rate for an additional unit equals the marginal production of that unit. At this point, the cost of producing an additional unit of output equals the demand price, and purchasing more labor or capital would be more expensive than the new revenue from increased production. While this level of simplicity may be admirable, the theory is obviously lacking. Because total factor productivity, A, is expressed as a correction term, it functions more as a coefficient than as

a distinct variable. In explicit terms, A is defined using regressive techniques to improve the fit of the model. Accordingly, while theoreticians may ponder the various conditions that alter A , the model does not itself describe any strategy for increasing production with a given mixture of labor and capital.

Robert Solow was among the first to seize upon this shortcoming to develop a more inclusive model. The Solow model begins with the same assumptions as the Cobb-Douglas model. The entire economy can be represented by one hypothetical firm that employs the entire labor supply and capital stock to produce an aggregated mixture of goods and services, $Y(t)$. Solow's contribution is a description of how a firm might increase its stock of capital, and its productive capacity, in the future. Instead of taking the capital stock as given, he considers the current level as a result of two factors. First, investment can improve the stock of capital. For Solow, this process is represented by the expression:

$$dK/dt = sY(t) \text{ (Solow 66)}$$

In narrative terms, this model explains that the rate of increase in the value of the capital stock is equal to the savings rate times the value of total production, assuming that all savings are invested in physical capital. The previous model did not allow for any savings; capital and labor were paid in full for their value added contribution. In this model, a certain amount of the value of each of their contributions is retained by the firm, and the resulting decrease in consumption is used to invest. On a side note, it is important to mention, at this point, that the Solow model is used to describe a macroeconomy, so there is no concept of borrowing. Realistically, a firm may take advantage of the savings of other firms or individuals to issue bonds or take loans. These alternative strategies of garnering investment are described in the model as additional payments to capital.

Second, the capital stock is thought to depreciate over time at a certain rate. The total life of a machine used in production is limited, so as the machine is used, its value over time depreciates. Thus, a more accurate description of dK/dt may be:

$$K_{t+1} = K_t + sY(t) - dK_t \text{ (Jones 102)}$$

Thereby, the Solow model expands the basic Cobb-Douglas model to two basic expressions describing $Y(t)$ as it changes over time:

$$Y(t+1) = A(K_t + sY(t) - dK_t)^{\alpha} L^{\beta}$$

This model describes a more complex strategic situation for the firm. While d is taken as a given, this model allows the firm to alter the savings rate to change the capital stock in the future. Instead of asking what mixture of labor and capital the firm should choose to meet demand, this model asks the firm to decide how much of its production should be withheld from labor and capital payments to improve productive capacity in the future. Further, the consideration of depreciation means that if the firm does not act proactively in its investment strategy, its productive capacity, and competitiveness, will decrease over time, eating into the capital stock.

Despite this strategic complexity, the production narrative is still lacking. The composition of labor is assumed to be homogenous and the firm has no capability to increase its total factor productivity. On these grounds, Paul Romer complicated the model to consider a more complex treatment of L and A . In his analysis, differences in total factor productivity can be attributed to differences in knowledge. Increases in the stock of knowledge allow the same mixture of labor and capital to be combined into more valuable products. In Romer's words: "The raw materials that we use have not changed, but as a result of trial and error, experimentation, refinement, and scientific investigation, the instructions that we for combing raw materials have become vastly more sophisticated" (Romer 72). To illustrate this point,

consider the case of two bakers. Both may use the exact same amount of time and capital to bake a cake, but assuming both have sufficient skill, the one with the superior recipe will produce a more valuable product. In this sense, then, the value added process cannot be described without a consideration of the knowledge base used in production.

Romer's contribution to the production narrative is not simply noticing that technological change and innovation are contributing factors to economic growth; indeed, Solow included a consideration of knowledge as a public good in his 1956 reconsideration of the growth model (Romer 76). Rather, Romer's analytical contribution is an explicit consideration of the causative relationships driving technological change. In his estimation, private sector innovation is based on firm specific strategic choices. He writes: "technological change arises in large part because of the intentional actions taken by people who respond to market incentives. Thus the model is one of endogenous rather than exogenous technological change. ... Developing new and better instructions is equivalent to incurring a fixed cost" (Romer 72). Similar to the treatment of capital goods in the Solow model, then, the relationship between innovation and firm strategy in the Romer model is predicated on future oriented investment.

To incorporate this conclusion into a growth model, he posits a threefold production function based on four inputs. The original Cobb-Douglas function is complicated to divide total factor productivity into human capital and an index of the level of technology, yielding:

$$Y(t) = F(L,C,H,A) \text{ (Romer 78)}$$

H represents human capital, and A represents the level of technology. The function is broken into three productive "sectors". The first uses human capital, labor, and the existing stock of knowledge to produce new knowledge (Romer 79). Mathematically, this relationship may be modeled as:

$$A_{(t+1)} = A_t + A_t(H^\lambda L_r)$$

L_r represents the labor force devoted to research. Human capital functions as a multiplicative coefficient, scaled by exogenous factors (λ), which determines the rate at which workers are able to utilize existing technological knowledge to produce innovations. Romer describes the second sector in writing: “An intermediate-goods sector uses the designs from the research sector together with forgone output to produce the large number of producer durables that are available for use in final goods production at any time” (Romer 79). At the firm level of analysis, this process is generally exogenous. Intermediate capital goods are rarely produced within the firm; rather they are purchased from without using either savings from previous production or borrowed assets against future production. In narrative terms, this process should be relatively familiar and the model of capital accumulation presented in Solow’s analysis should suffice:

$$K_{t+1} = K_t + sY(t) - dK_t$$

In the event that a firm does produce its own capital goods, that process can be modeled after final goods production. In Romer’s analysis, the final sector, direct production of goods and services, uses “labor, human capital, and the set of producer durables that are available to produce final output” (Romer 79). Translating this narrative into mathematic terms yields:

$$Y(t) = H(L-L_r)^\beta C^\alpha$$

The only substantive difference between this final goods sector and the original Cobb-Douglas is the replacement of total factor productivity with an explicit consideration of human capital.

Again, human capital appears as a multiplicative exponent, suggesting that it functions primarily as a rate of production modifier.

Combining the three sectors into a single, crude production function yields a relatively complete expression of the orthodox understanding of economic growth. One expression of the complete model might be formulated as:

$$Y(t+1) = (K_t + sY(t) - dK_t)^\alpha (A_t + zA_t(L_r))(L - L_r)^\beta$$

For the most part, this model represents a direct translation of the three sectors presented in Romer's analysis. The only major simplification involves the treatment of human capital. First, I conflate physical and human capital as they are presented in Romer's third sector, incorporating the later into the consideration of K . This change is justifiable insofar as human capital behaves similarly to physical capital. Human capital can be measured through years of education or training that are person specific, so increases in the human capital of individual workers within the firm result from intrafirm investments in training and education, similar to the purchase of additional physical capital stock from savings (Romer 79). Further, human capital is subject to depreciation. Economists Rita Almeida and Pedro Carneiro similarly conflate human capital with physical capital in their production function, arguing that:

Average human capital in the firm depreciates for two reasons. On the one hand, skills acquired in the past become less valuable as knowledge become obsolete and workers forget past learning. ... On the other hand, human capital in the firm depreciates because each period new workers enter the firm without training while other workers leave the firm. (Almeida 100)

In the context of an innovation based production model, the first argument is persuasive insofar as the research sector causes human capital to depreciate in the final goods production sector. The second argument introduces a random fluctuation in the stock of human capital. As workers enter and leave the firm, the stock of human capital could either increase or decrease. In terms of

the model, I assume that changes in the innate stock of human capital, the skills, education, and experience a worker possesses upon entering the firm, will be reflected in the wage offer upon hiring, so this random fluctuation can be accounted for in changes in the value of labor (L).

Second, to avoid accounting for the effect of human capital twice, I altered the function of the research sector. Instead of explicitly considering human capital in the rate of innovation, I use a separate parameter to describe the rate (z). While human capital is certainly a component of z , a good deal of the rate cannot be modeled directly. It would be fallacious to assume that two researchers with the same education and experience would be able to solve complex problems at the same rate. Rather, human factors, including epiphany, creativity, ingenuity, and simple luck often have decisive effects on the process of innovation. As such, determining z exogenously as a coefficient rather than as a controlled, measurable endogenous variable seems appropriate.

Given that I have consolidated a complex theoretical discussion into a single equation, the model cannot be solved algebraically. Even with complete information about the capital stock, savings rate, labor composition, and output of a firm, there are at least three coefficients to solve for: z , α , and β . In a formal study, these terms would have to be determined regressively and exogenously to improve the “fit” of the model to statistical observation. Nonetheless, this expression provides useful insight into the strategic choices facing the firm. Even the most complex growth strategies can be expressed in terms of two variables: the investment in capital (including human capital) and the investment in innovation. In terms of the model, the firm has the ability to alter its growth potential by choosing the savings rate (s), and the proportion of the labor force involved in research (L_r). Obviously differences in the utilization of these resources between firms will affect their marginal productivity, represented by z and α , but in terms of the

allocation of resources, the strategic decision calculus of the firm can be represented in the following matrix:

		Increasing Capital Investment	
Increasing Research Investment	Capital Investment at or below depreciation	Capital Investment Exceeds Depreciation	
	Significant Research Investment	Significant Research Investment	
Increasing Research Investment	Capital Investment at or below depreciation	Capital Investment Exceeds Depreciation	
	Minimal Research Investment	Minimal Research Investment	

Treating this matrix as a two variable axis, the first quadrant represents positive growth in both capital stock and knowledge stock. The second quadrant experiences growth in the knowledge stock but zero growth or depreciation of the capital stock. This sort of strategy can be represented by research firms with little interest in final goods production. The third quadrant experiences depreciation of both the knowledge and capital stocks. A firm employing this strategy has little growth potential. Indeed, current production serves to deplete existing stocks. The fourth quadrant represents growing capital stocks and stagnant knowledge stocks. Firms in this field may resemble generic, commoditized goods producers with little emphasis on innovation.

At this point, the raw simplicity at the heart of the orthodox theories of economic growth becomes apparent. The insights associated with investment strategy and resource allocation are nearly axiomatic. While economic theory may provide some more nuanced discussion of the relative performance of each quadrant, as will be discussed in Chapter 2, the basic trends can be gleaned from common sense: firms with greater investment intensity take on more risk but are rewarded with greater growth propensity. I am interested in adding another layer of complexity

to the story. Z and β are not directly related to the resource allocation or investment strategy of the firm; rather, they describe the effectiveness of the firm's strategic choices. These coefficients describe the marginal productivity of labor and the rate of innovation, so the firm has no capability to directly determine them. Likewise, determining the savings rate (s) requires complex negotiations between capital holders, labor, and management, so it is misleading to imagine a unified, coherent actor, the "firm", determining the appropriate rate of investment. Further, considering that the outlays associated with running a research division must be reserved from the production of the final goods sector, a similar argument can easily be made for the investment in research and development, so L_r is also a relatively ambiguous concept. In all of these considerations, the human component of economic growth retains a fundamental role in determining the outcome of any given investment strategy.

To further the economic growth narrative and begin to understand, in a more nuanced fashion, the core economic questions of firm competitiveness and the creation of economic value, the causative relationships beneath these variables need to be considered explicitly. Romer sought to use his discussion of knowledge and innovation to describe why one laborer spending one hour to produce one volume of iron oxide based pigments produces less economic value than the same laborer using the same iron oxide, chemical processes, and time to produce the magnetic material used in cassette tapes (Romer 79), and in the process, he unpacked the notion of total factor productivity. In similar fashion, constructing a coherent narrative describing the function of the unexplained variables (z , s , L_r , and β) may throw light on why the investment strategies of certain firms succeed, while, despite similar financial commitment, those of others fail. This discussion of strategy implementation with regard to the human beings who populate the firm roots the ideal narrative of economic growth securely in reality.

The next chapter seeks to uncover the insights of the current economic models regarding the relative performance of different investment strategies. This discussion will begin to shed light upon the relevant considerations in achieving successful implementation.

Chapter 2: The Strategic Landscape

As the survey of economic growth in the first chapter reveals, the contemporary view of firm strategy can be categorized into two broad categories of investment: innovative and capital. This two variable approach provides an elegantly simple and intuitive model for firm performance in the long run, but in order to understand the more complex strategic landscape facing modern firms at the human level of analysis, the simple narratives in Solow's and Romer's models are largely insufficient. Determining the relative effectiveness of innovation and capital accumulation as well as parsing out the multiple strategic choices within each requires a more complex causal story. To flesh out this narrative, I will supplant abstract theorizing with a consideration of economic history; concentrating on the latter refocuses economic modeling on deductive rather than ideologically inductive reasoning.

Towards this end, consider the case of American industrial development. According to heterodox economist William Lazonick, the successes of American industry in gaining competitive dominance in global export markets in the nineteenth and twentieth centuries can be traced, along with the effects of two world wars in Europe, to the innovative business structures typical of American corporations. These structures allowed American companies to more effectively implement capital investment schemes, and in accordance with Solow's predictions, the observed spread between American and European capital investment reliably predicted the relative competitiveness of American firms.

To substantiate this relationship, consider the structure of British industrial firms in the prewar period. British manufactures, like most in Europe, were dominated by craft control systems. Capitalists were only responsible for the initial capital investments; thereafter, laborers managed the day to day operation of the shop floor. In Lazonick's words: "The progress of the

British Industrial Revolution did not rely to any significant extent on state supported or industry supported education. The reproduction of an abundant and skilled labor force, effected as it was by worker-run, on the job training, required little, if any, expense to either employers or the state” (25). This system of business organization bestowed large competitive advantages to British firms. Investments in human capital were effectively self perpetuating, and the costly onus of management was placed on workers. Capitalists need only invest in the initial startup capital and allow the firm to operate independently. Lazonick continues: “Capitalists’ reliance on skilled labor to organize work and reproduce the labor force had the advantage of low fixed costs not only for the individual firms but for the British economy as a whole” (25). In the production of commoditized goods, this focus on minimizing fixed costs in the short run allowed the British model of proprietary capitalism to become the dominate development pattern in the early industrial revolution.

The significant shortfalls of the model in the longer run only became apparent when foreign producers, especially Americans, began to achieve even lower average fixed costs. The British system proved static because there was little recourse to the perverse incentives of capitalists and labor. Both had direct, short term incentives to maximize the proportion of profits liquidated for consumption. Workers had an incentive to use their control of the shop floor as leverage to increase wages, and capitalists sought to maximize increases in their equity. Neither was sufficiently concerned in reinvestment and long run growth. As such, long run strategy was nearly nonexistent; firms relied upon “markets rather than managers to coordinate industrial activity, and hence more on external than internal economies to cut costs over time” (Lazonick 27). In terms of growth models, this strategic situation resembles the Cobb-Douglas narrative. The firm has little long run capability to alter its growth potential, so it can only minimize its

costs relative to its production by accepting market prices as given and purchasing inputs up to their marginal productivity.

American firms gained a competitive advantage over this model by introducing a long run planning component in their corporate structures. The major innovation in American business was the creation of a management class distinct from proprietary ownership. Lazonick continues: “Using managerial structures to plan and coordinate mechanized production processes and to apply scientific knowledge to industry, US corporations had by the 1920’s generated a Second Industrial Revolution. Propriety capitalism proved inadequate to deal with the technological complexities and the attendant high fixed costs of the new industrial era” (27). The development of managerial structures allowed US corporations to proactively plan for both technological change and the capital intensive production processes of a high tech economy. While elements of both Romer’s and Solow’s models are present in this historic development, Solow’s insight regarding the rate of savings best describes the competitiveness of American corporations. Managerial capitalism succeeded where proprietary capitalism failed because managers could meaningfully exert control over both laborers and capitalists to enforce savings and investment plans. Lazonick writes:

The new owners of these public corporations had neither the incentive nor the ability to assume strategic direction of the companies whose shares they are bought. The market for industrial securities that was essentially created by the merger movement and continued to grow thereafter resulted in the widespread distribution, and hence fragmentation, of shareholding in the dominant corporations. Despite their voting rights, investors in common stock were

powerless to exercise control over the allocation of the surpluses of the corporations that they collectively owned. (Lazonick 30).

This dispersion of power among the capital holders dissipated their power to actuate the short term incentive to increase equity at the cost of capital accumulation. Thereby, managers, whose incentive lies in the long run growth of the firm, could master their corporations surpluses to invest in capital intensive projects. This development allowed the American economy to create new capital at a rate greater than depreciation and, as Solow would predict, to foster meaningful economic growth.

By the same token, our current trade balance and the rapid growth of foreign multinational corporations in Japan, South Korea, China, India, and Europe among others stand testament to the limitations of the American-managerial model and Solow-style growth strategies. The American industrial experience reveals two shortcomings of capital intensive growth strategies. The first was predicted within the structure of the Solow's model. A slightly more complex version of the capital accumulation model presented in the first chapter takes on the form:

$$\Delta r = sF(r,1) - nr \text{ (Solow 69)}$$

In narrative form, the rate of change of the ratio of capital to labor (Δr) is equal to the savings rate (s) times the output per worker ($F(r,1)$) minus the rate of capital depreciation per worker. In terms of the capital-labor ratio, the rate of depreciation is equal to the growth of the workforce times the fraction of current capital stock devoted to each worker (nr). In order to completely capture the depreciation rate in the long run an additional consideration of the capital destroyed in the production process would also have to be included, so nr would likely be replaced by $F(n,r)$. For the sake of simplicity, though, consider Solow's case.

The first limitation of Solow oriented growth becomes evident when one considers the fact that the first term, $sF(r,1)$, faces diminishing returns to capital while the second, nr , grows constantly according to the rate of growth of the labor force (n). This dynamic creates an intersection point between the two curves: $sF(r,1)$ and nr . At this point, the economy cannot grow any further based on capital accumulation. The rate of new capital growth exactly equals the rate of new capital demanded to outfit new workers, so the rate of growth is pinned to the population growth. Therefore, there is no real per capita economic growth. Under this situation, the only way to increase per capita economic growth would be to continually increase the rate of savings, shifting the point of intersection to higher levels of capital.

By this analysis, the current growth problem facing the American economy may be reflective of the steady state conditions in American capital markets. Indeed, the current financial crisis was fueled by a credit bubble in the housing sector paralleled by an unprecedented level of consumer debt. The Solow model would rightly predict that these indications of a low savings rate among domestic consumers would hamper the long run growth potential facing the nation. At the firm level of analysis, this insight also describes the deteriorating competitiveness facing American businesses. Once the steady state has been reached, the ability of managerial structures to create growth through investment strategies is significantly curtailed. Management would need to generate significant new savings to spur further long run growth.

As Lazonick observes, the managerial structure already generates a significantly higher savings rate than would persist under proprietary conditions, so negotiating even higher rates of savings would imply exerting significant pressure on both capitalists and laborers. Ironically, this pressure represents the second major problem facing Solow-oriented growth strategies. In order to glean significantly higher savings rates from labor, through placing downward pressure on the

growth rate of real wages, American managerial structures focused on reducing the bargaining power of labor. Increasing the interchangeability of individual workers through increased division of labor was among the principle strategies in attaining these lower wages. Not surprisingly, these strategies to reduce the bargaining power of labor triggered a reaction among the workforce. Lazonick explains:

With the help of skill-displacing technological innovation and a successful attack on craft unionism in the more capital-intensive industries, management assumed control of the planning and coordination of the shop-floor division of labor. In the process, the work of the operative became not only stripped of skill but also devoid of intrinsic appeal. (Lazonick 34)

Given that work in American industries became increasingly alienating, the American worker's relationship to the firm began to deteriorate; work became a means to purely monetary end. As such, from the perspective of workers, the depression of wages was a significant incursion. In a purely monetary gain framework, the rational response of workers was the reinstatement of unions. But unlike the craft unions of proprietary capitalism, these unions were no longer concerned with human capital accumulation and the maintenance of skills; rather, their sole orientation revolved around wage and benefit growth.

These new combative labor collectives approached their relationship to the firm in a radically different light. Rather than interesting themselves in the long run maintenance of the firm, their sole interest lay in the long run wage growth of their constituents. As such, management's ability to coax productivity increases over any time frame was significantly depressed. In Lazonick's estimation:

Shop-floor experience taught workers that without the support of strong craft unions, greater individual effort could often result in higher manning ratios and reductions in the company's workforce, and that higher wages were often short-lived managerial inducement that only culminated in higher effort norms. To protect their jobs and conserve their energy, therefore, workers would quite rationally, and typically collectively, restrict output even when offered wage incentives. (Lazonick 35)

Ironically, management's attempts to increase firm performance through consolidating power over the shop-floor served to limit its ability to control the production process. Rational labor recognized the strategies employed by management and refused to cooperate. Effectively, this dynamic represents a double-bind for the managerial model. Growth is restricted by the steady state, but any attempt to glean increased savings to foster additional growth will be hampered by the response of labor.

If the case of American industrial development is any indication, long run success of Solow-oriented strategies depend on the relationship between labor and management, especially once the steady state is reached. Additional capital investment schemes will require the cooperation of labor, so the implementation structure plays a pivotal role in determining the marginal productivity of capital. If the cooperation of labor is not assured, reactionary output restrictions may detract from the expected marginal productivity of new assets. Returning to production function outlined in the first chapter, the American experience reveals that the coefficients α and β are causally linked to the relationship tying management to labor.

Before turning to the structure of this causality, consider the relationship between labor and innovative strategy. According to the Romer model, the primary growth alternative to

increasing savings and shifting out the steady state would be redirecting investment from adaptive, existing technologies to research. The creation of new ideas allows production to grow without significant changes to the capital-labor ratio. Recall Romer's example of iron oxide; the same laborers using similar technologies and capital assets can produce radically different amounts of value based on their respective recipes. Further, this growth potential does not face the diminishing returns problem evident in capital-intensive growth. Ideas, unlike capital goods, do not face the restrictions of depreciation or rivalry. Ideas are perfectly reproducible insofar as the use of a recipe by one worker does not restrict the access of any other worker or cause the idea to degrade. As such, the idea creation function, unlike the capital accumulation function, does not face a steady state restriction. Growth according to innovation, at any given investment rate, is unbounded.

Though theoretically unlimited, this growth potential does not come without significant risks to management. Similar to capital accumulation, the goal of innovation is lowering average fixed costs below the rates attained by competitors. The risk emerges in the structure of the investment; unlike capital purchases, the managerial regime cannot attain innovation through fiat. The benefits of a Romer-oriented strategy emerge only once the innovative process is complete. Lazonick explains: "An innovative strategy places the enterprise at a competitive disadvantage, unless it can achieve lower costs per unit of output than its low fixed cost competitors. To do so, the high fixed cost enterprise has to develop and utilize its productive resources in ways that drive down unit cost" (Lazonick, 97). In this analysis, the higher fixed costs facing the innovative firm refer to costs associated with allocating a proportion of the capital stock and labor force to research. These assets are not directly productive within an innovative framework, so the firm faces a higher average unit cost structure than its competitors.

When innovation is attained, the new idea, say a new production process or recipe, can be implemented throughout the firm. The resultant productivity increase on the shop floor allows the fixed costs of research to be distributed among a more valuable group of products, widening the profit margin. Further, once the innovation is secured, non-rivalry dictates that the firm has an incentive to scale up production, increasing the total number of units and accordingly lowering average costs.

From a strategic position, reaping these innovative benefits requires a risk tolerant, highly flexible business organization. In the view of economic historian Ray Marshall, this shift determines the success of firms in the modern marketplace. Before the 1960's, mass production systems, dominated by Solow-oriented strategies, used market power and economies of scale to secure the lowest market prices for inputs, lowering the average cost structure (Marshall 290). In the decades since, this strategy has become increasingly anachronistic, rising personal incomes have reduced the consumer's satisfaction with standardized products and demand for innovative goods has increased. In the modern workplace, higher quality and product differentiation is necessary to attaining significant market penetration. Along these lines Marshall argues:

Flexibility enhances productivity by facilitating the shift of resources from less to more productive outputs and improves quality through the ability to respond quickly to diverse and changing consumer needs. Moreover, flexibility in the use of workers and technology improves productivity by reducing the waste of labor and machine time. (Marshall 291)

This ability to "shift" assets to more valuable outputs determines the firm's ability to quickly retool the shop-floor according to the changing stock of ideas and demands of the consumer

market. This flexibility, as Marshall rightly points out, is contingent upon management's ability to quickly remobilize the workforce.

To maximize the growth potential associated with innovation, therefore, flexibility needs to be evident both within the business organization and within the workforce. Contrary to the pattern evident in capital-intensive strategy, innovative strategy tends to prefer a higher skilled workforce. Workers need to be capable and willing to retrain often to match the shifting production process. The pivotal role of labor shifts the focus away from the effective planning of management to the individual worker. In the analysis of economist Carol Corrado, recent American economic growth would be inexplicable without accounting for the nearly \$3.6 trillion value of the human capital stock within the business sector; current accounting practices do not account for this intangible capital and mask a downward trend in labor's share of income (Corrado 682). This trend reveals the uneasy relationship between the newly skilled workforce and the American managerial system. Investments in this intangible capital represent a relatively large risk for the firm. As in the Lazonick's analysis of American industrial development, increasing the skill density of labor translates into lower workforce liquidity. With every investment in the human capital of laborers, the less replaceable an individual laborer becomes. In turn, this process increases the bargaining power of the workforce. Again, the marginal productivity of labor and capital are pinned to this process. Without a higher skill workforce, the firm will be unable to implement new innovations and marginal productivity will fall below potential. As such, the causal relationship developed between growth and the cooperation of labor in the Solow model is evidenced equally within the Romer model.

Regarding the structure of this relationship, the role of labor in long run considerations begins with financial planning. In both the cases of capital and innovation intensive investment

plans, laborers, among the other stakeholders, need to be convinced to forfeit a significant proportion of their claim on firm revenues. These savings constitute the long run capability of the firm to implement investment schemes. In Lazonick's estimation:

To be innovative in the Third Industrial Revolution requires not only appropriate human resources development and far reaching organizational integration, but also massive financial commitments in the face of returns that are more uncertain than ever. In general, financial commitment means that employees, creditors, or owners who can lay claim to the revenues of the corporation will not enforce those claims in ways that undermine the ability of enterprise to develop and utilize its productive resources. (Lazonick 54)

In this framework, the emphasis is clearly placed on the negotiation process between stakeholders. In referencing the accumulation of human capital, Lazonick argues that innovation requires a skilled labor force, so management cannot force increased savings upon the workers. Likewise, creditors and owners retain some traditional power over management. In order to glean sufficient savings to foster growth, therefore, management must effectively coordinate a deliberative process between stakeholders with disparate short term interests.

Upon further examination, management's goal of maximizing both investment and marginal returns requires a significantly less authoritarian and more invitational relationship with labor. In Marshall's estimation, generating high performance off of long run strategic choices requires "communal and cooperative" learning between management and labor (Marshall 293). In order to convince the workforce to partially forfeit its claim on revenue without eliciting resentful productivity decreases, management needs to clearly communicate the long run common interest in growth while remaining sensitive to the long run interests of labor. This

communal process assures the firm's access to its labor pool during the lean, saving oriented times between innovations or capital infusions. In Lazonick's analysis, the successful implementation of long run growth strategies requires short run "privileged access" to labor assets (Lazonick 83). In short, the long run accumulation of human capital and success of savings regimes requires long run calculation on the part of individual workers. The firm can only succeed insofar as it can avoid intangible capital flight during savings intensive cycles. Lazonick continues: "The company does not own the human beings it employs. Hence, much more than in the case of physical assets the business organization has no assurance that it will be able to utilize the human capabilities that it has developed" (Lazonick 99). If the company can effectively communicate the long run calculation process to its workforce, this lack of ownership would not be a problem, but should the workforce take on a short term consideration, flight would be significant obstacle to growth. Each worker who exits the organization, according to Lazonick, leaves with "the advanced productive capabilities in which the innovative enterprise has of necessity invested" (Lazonick 99). Within the financial planning structure, therefore, the workforce has two methods of recourse to managerial mistreatment. Labor can reduce the growth potential of investment schemes through either exit or combative collective action. In either case, in order to maximize the return on investments, management simply cannot antagonize the labor force.

Similarly, once a new innovation or capital investment is being implemented within the production process, a cooperative relationship between management and labor reinforces marginal productivity gains. Again, the firm needs to foster long run considerations among its stakeholders. Labor, if made to feel insecure in the face of a new, work-saving capital infusion or technology, can significantly sabotage the implementation process. According to labor economist

Adrienne Eaton, the economic insecurity surrounding innovative technologies can significantly dampen worker participation and engagement, encouraging subversive behavior and increasing the propensity to exit (Eaton 195). Resolving this fear amounts to communicating a long run commitment to the labor force. In other words, the long run commitment and sacrifices demanded from labor during the lean times need to be reciprocated during the high profit, post investment cycle. Reciprocity is the basis of a long run relationship between a specialized, high skill workforce and management.

High fixed cost strategies of both the capital and innovation intensive flavors require a shift in the treatment of labor in the long run. Unpacking the assumptions behind contemporary growth models reveals a more complex series of managerial strategies. More specifically, the marginal productivity of investment schemes is determined according to the relationship with labor. The fiat situation implied within the production models of the first chapter, wherein the firm could simply select the correct capital and research investments, does not reflect the complex reality of business organization. Long run financial planning and implementation schemes are constituted by complex negotiations between stakeholders. Ultimately, speaking of the firm as a whole is a misnomer. The firm is constituted by a conglomerate of individuals, and attaining cooperative outcomes within these micro-negotiations relies upon building positive human relationships between co-workers. The unexplained variables in contemporary economic growth theory amount to the human element of firm competitiveness. Fostering healthy, reciprocal, long term relationships within the firm is the most sustainable way to ensure effective strategy implementation. In the next chapter, I will use a number of case studies to sketch out the structure of these negotiations and begin to prescribe managerial practices which tend to

maximize the cooperation with workers (β), marginal return of investments (α), propensity to save (s), and innovative potential (z).

Chapter 3: A Productive Community

At this point, the simplifying assumptions which, for the purposes of growth theorizing, treat the firm as a monolithic entity seem untenable. The complexities of firm performance within any given strategic framework are, to a large extent, determined by the numerous affective relationships between the individuals who populate the firm. In this way, a honest approach to modeling businesses would need to construct a more communal understanding of production. The individuals who make up the management class, labor force, and capital holders each have their individual interests and relationships which play a part in determining the behavior of the whole. Further, the obstacles to long run growth and competitiveness can be represented as collective action problems. Without a trusting and collaborative group environment, every individual has an incentive to engage in short run, cynical exploitation. Workers have an incentive to demand higher wages or threaten lower productivity, managers have no incentive to negotiate with unruly workers and will prefer termination –along with the subsequent loss of human capital– to the slower process of rebuilding positive relationships, and capital holders seek to only increase their equity at the expense of savings. In order to achieve long run growth, these individuals need to recognize a common long run interest in the health of the firm. Increased savings, higher productivity, and greater creativity are the key components of increasing competitiveness, and under a communal framework, each one is properly understood as the product of collaborative and reciprocal relationships within the firm.

To those not versed in economic theory, this conclusion should not be particularly jarring. Instead of treating labor as a homogenous commodity to be increased or decreased according to the demands of production, the communal framework treats each laborer as an individual person with distinct skills and relationships. One would imagine that the difference

between the iron ingots and the workers used to create steel would be obvious, but explicating this difference requires a much more complex model for economic growth. Luckily, the causality between trusting relationships and communal outcomes is well documented in sociology, politics, and, to a certain degree, the economics of human capital, and analysts within these disciplines have constructed a common language to conceptualize these linkages. In their parlance, this discussion of economic growth reveals the importance of social capital accumulation in determining firm performance. The commonalities between social capital theory and the components of competitiveness become clear as John Field provides more concrete definition to the concept. He writes:

By making connections with one another, and keeping them going over time, people are able to work together to achieve things they either could not achieve by themselves, or could only achieve with great difficulty. People connect through a series of networks and they tend to share common values with other members of these networks; to the extent that these networks constitute a resource, they may be seen as forming a kind of capital. (Field 1)

This synergistic concept describes the possibility of collaborative outcomes which surpass the sum of each individual's efforts, and insofar as the firm represents one network of social interaction, it can be said to have a certain stock of social capital. Similar to a capital stock, this supply of social capital contributes to the competitive performance of the firm. Applying this logic to the competitiveness problem, I contend that the disparate outcomes associated with similar investment strategies between firms can be described by varying levels of social capital and collaborative synergy.

To concretize this abstract discussion, consider the case of General Motors. The automaker is an iconic figure of American industrial decline; sliding quality and reliability in its products triggered a fifty year decline in competitiveness and market share. Today it represents about 22% of the US auto market, compared to over 60% in 1960 (Glass 1). Its competitive downfall mirrors its own inability to produce a comparatively high quality car. All of the American car makers face similar problems with quality and reliability. In recent rankings released by *Consumer Reports*, none of the top ten most reliable car producers is American (Glass 1). General Motors represents an incredible test case in the importance of social capital. In 1984, it opened a joint venture plant with Toyota under the name NUMMI and using Toyota's production model, was able to immediately transform the social climate of one of its plants. With a newfound stock of social capital, the plant suddenly became the most productive in GM's network.

Before explicating the role of social capital development in the NUMMI model, one needs to understand the incredibly divisive and combative context of its birth. Before the joint venture began, NUMMI was known as the Fremont Auto Plant. Labor-Management relations in the plant represented the worst possible consequences of low social capital. Even according to the United Auto Workers (UAW) leadership associated with the plant, the workforce system at Fremont was a barrier to competitive success. According to Bruce Lee, former chief of Fremont Union Local 1364:

It was considered the worst workforce in the automobile industry in the United States. And it was a reputation that was well earned. Everything was a fight. They spent more time on grievances and on things like that than they did on producing cars. They had strikes all the time. It was just chaos constantly. (Glass 4)

This sort of disruptive and combative collective action represents the worst possible result of managerial consolidation predicted in Lazonick's analysis of Solow-oriented growth strategies. Low levels of social capital predict feelings of alienation[†] within the workforce. In this case, alienation coupled with a union contract which made it nearly impossible to fire anyone generated a social milieu of irresponsibility and personal validation within the plant. Indeed, according to journalist Jeffrey Liker, "One of the expressions was, you can buy anything you want in the GM plant in Fremont. If you want sex, if you want drugs, if you want alcohol, it's there. During breaks, during lunch time, if you want to gamble illegally-- any illegal activity was available for the asking within that plant" (Glass 3). The importance of social capital is evidenced in the case of NUMMI because the plant succeeded despite employing the same union leadership which spawned the flawed Fremont plant. The first fifty people hired onto the NUMMI plant after Fremont's closure were the most senior members of the old Fremont plant (Glass 5). Without significantly altering either the labor or capital associated with the plant, NUMMI succeeded in dramatically improving productivity. As such, the changes in business organization associated with the Toyota production model isolate the effect of social capital on productivity.

NUMMI was a joint venture between GM and Toyota. GM sought to learn Toyota's production system and its methodologies for producing a profitable small car; Toyota sought to placate the protectionists in the American legislature by opening a US plant but was unfamiliar with the complexities of the American union system (Glass 1). The plant would utilize a GM workforce and capital stock managed according to the Toyota principles. Before opening the

[†] The discussion of alienation presented here is relatively simplistic. Although Lazonick intends to invoke a more complex Marxist concept through his use of the term, for my purposes, a relatively straightforward use of the word suffices. Alienation refers to the feeling of being unattached to the workplace. Rather than being a vocation of sorts, work becomes a mere means to a monetary end.

plant, Toyota began flying the workforce to Toyota City, Japan in groups of thirty to learn the production system firsthand (Glass 6). The experience was transformative. According UAW veteran John Shook:

You had union workers-- grizzled old folks that had worked on the plant floor for 30 years, and they were hugging their Japanese counterparts, just absolutely in tears. ... And it might sound flowery to say 25 years later, but they had had such a powerful emotional experience of learning a new way of working, a way that people could actually work together collaboratively-- as a team. We knew it wasn't going to be easy-- there were a lot of hurdles to overcome-- but there was no question in anyone's mind that this was going to work. (Glass 7)

Shook's retelling reveals the affective transformation that contributed to NUMMI's success. Toyota's "new way of working" represented a new structure for the social network of the plant. The Toyota production model succeeded in transforming combative and destructive relationships into collaborative ones. After just three months, the cars coming off the line were getting near perfect quality ratings. According to Jeffery Liker, "it would probably take 50% more workers under the old system to build the same car at the same rate" (Glass 8). In the case of NUMMI, a simple change in the relationships between coworkers and managers succeeded in dramatically altering the output of the shop floor.

The Toyota system succeeded in generating an environment conducive social capital accumulation at the NUMMI plant in two ways. First, Toyota's system radically redesigned the organization on the shop floor. Frank Langfitt describes the changes:

The key to the Toyota production system was a principle so basic it sounds like an empty management slogan-- teamwork. Back home in Fremont, GM supervisors

ordered around large groups of workers. The Takaoka plant, people were divided into teams of just four or five-- switch jobs every few hours to relieve the monotony. And a team leader would step in to help whenever anything went wrong. (Glass 6)

The Takaoka system represented very simple but profound change. Instead of acting as distant authorities, managers and team leaders were actively involved in the production process, and working in small groups, the men could get to know each other. Their tasks and responsibilities were shared among the group, so accountability for errors belonged equally to managers and workers. As such, instead of blaming one another for problems, the two groups had an incentive to work in solidarity to find solutions. According to Liker, the Americans visiting Takaota "... would usually get behind. And they would struggle, and they would try to catch up, and at some point, somebody would come over and say, do you want me to help? And that was a revelation, because nobody in the GM plant would ever ask to help. They would come yell at you because you got behind" (Glass 6). This experience represented one of the fundamental differences between a Toyota and GM plant. At Fremont, an individual's mistakes were his own, and he would be punished accordingly. Conversely, at Takaoka and NUMMI, when an individual struggled, others would offer help. This sort of kindness and reciprocity formed the foundation for new relationships and social capital.

In social capital theory, the institutional shift associated with the implementation of the teamwork model allowed co-workers to form new "closed relationships" with one another (Coleman 334). Because working in small teams created a sense of group accountability, the Takaoka system built a shared expectation of reciprocity among the workforce. This official obligation simply formalized the social obligations associated with friendship on the shop floor.

When formal, employment based obligations harmonize with those of one's social life, the individual experiences closure. In a more technical sense, Field defines closure as "the existence of mutually reinforcing relations between different actors and institutions" (Field 27). Within a closed system of expectations, mutual reinforcement allows the group to effectively collaborate. The traditional problems associated with free riding dissolve as the entire group becomes uniformly oriented toward similar goals. As a result, according to Liker: "Grievances and absenteeism plummeted, and lots of workers preferred the NUMMI teamwork system to the old combative one at GM. Several told us they enjoyed coming to work for the first time" (Glass 6). Under a closed system, choosing not to come into work not only eschews the formal obligations of employment but also disappoints one's friends in the production team. In Robert Putnam's analysis, once this critical mass of social capital is reached, the group can easily surmount the obstacles to resolving its collective action problems. The type of social pressure that coworkers can exert to lower absenteeism and raise productivity represents social capital's ability to "increase the potential costs to defectors" (Putnam 167). The Takaoka system succeeded in allowing disparate individuals to recognize a shared interest in high quality production, so the propensity to externalize the costs of poor workmanship and selfish behavior over the business dropped.

Second, the Toyota production system succeeded at NUMMI because, once closed relationships solidified, management institutionalized a willingness to defer to the needs of the team. In other words, the new, friendlier relationships between labor and management were buttressed by a series of new procedures based in mutual trust. Perhaps the most iconic of these changes was the installation of "andon chords" alongside the assembly lines. These chords would stop the entire line, so workers could fix any mistakes. Allowing the workers to stop the line at

their own discretion was a new concept for GM veterans. Lee explains his experience at Fremont: “You saw a problem, you stop that line, you were fired.” (Glass 7). GM’s unwillingness to afford the workforce control over the assembly line emerged from management’s fundamental distrust of workers. Liker explains: “Because the theory was, they’ll stop it all the time. They don’t want to work, you know, they want to sit and play cards or whatever. You know, that was a free break for them, if the line stops, so you wouldn’t give them the ability to stop the line” (Glass 7). This sort of fundamental distrust manifested itself in combative relations; workers were well aware of their demonized portrayal and had little incentive to exceed expectations. Because they would be seen as lazy and incompetent regardless of their motives, most workers simply fit the management’s representation. Even if workers wanted to resolve a problem before it compounded further down the line, the lack of trust made them powerless to do so. Conversely, under the Toyota system workers were encouraged to stop the line any time they saw a problem. Langfitt describes the system: “if it was going to work, it would mean a radically different relationship between workers and management. One where the managers trusted the workers to let them pull the andon cord and stop the line. One where the workers trusted their bosses enough to ask for help when there were problems” (Glass 8). This sort of mutual trust formed the foundation for a new relationship between labor and management. Trusting workers to make the right choices and seek help when necessary fundamentally changed the traditional managerial view of workers. It asked management to see workers as savvy and competent people with a shared interest in quality production, and it challenged workers to rise to the occasion. Instead of expecting people to be at their worst, it challenged them to be at their best.

While this difference may sound vapid, the Takaoka system authenticated this new level of trust throughout the plant. The production process affirmed the intelligence and specialized knowledge of workers, empowering them to involve themselves in the engineering process.

Langfitt explains:

Under the Toyota system, when a worker makes a suggestion that saves money, he gets a bonus of a few hundred dollars or so. Everyone's expected to be looking for ways to improve the production process, all the time. This is the Japanese concept of *kaizen*, or continuous improvement. And if you look around a Toyota plant, you can see the result of all those improvements. You see mats for workers to stand on, special cushions they throw into the car frames when they have to kneel inside, hanging shelves that travel along with the car and the worker, carrying parts and bolts they need within easy reach. (Glass 9)

By providing bonuses, the *kaizen* system creates a monetary and social incentive to improve productivity. The formal system of suggestions and bonuses is supported by an informal milieu of trust. Workers are comfortable coming forward with their thoughts because they trust that their ideas will be taken seriously. In the language of social capital, the environment of trust lowers the transaction costs associated with information dissemination (Putnam 135). The unique, contextual knowledge specific to workers on the shop floor can flow naturally into the engineering process. In other words, the accumulation of social capital directly affects both the productivity of labor and the firm's innovative potential.

The NUMMI case reveals the power of social capital to affect two of the unexplained components of economic growth. The productivity of labor (β) is directly improved within the context of high social capital. Workers are encouraged to help one another, reducing the

incidents of manufacturing defects and improving the rate of production. Likewise, the creation of healthy relationships between workers and management reduces the incentive for both to engage in combative or reactionary collective action against the other. The types of disruptive behavior witnessed at the Fremont plant would be untenable in the NUMMI environment.

Unable to actuate their frustrations in other ways, Lee explains, “Fremont workers struck back at their bosses in other ways. They'd intentionally screw up the vehicles. Put coke bottles or loose bolts inside the door panels so they'd rattle and annoy the customer. They'd scratch cars” (Glass 7). Under conditions of higher social capital, workers have positive relationships with their teammates and leaders, so there is little need to turn to passive aggression. Individuals feel empowered to address their grievances directly with one another. In similar fashion, the environment of trust between workers and management allows pertinent information to flow freely within the firm. In effect, then social capital at least partially describes the rate of innovation (z).

The success of NUMMI, however, implies an important series of questions. If social capital accumulation could quickly solve so many of GM's problems, why did GM's market share continue to slide? GM sought to apply its lessons from NUMMI to other plants but quickly learned that social capital does not behave like physical capital; the firm cannot simply decide to buy more of it. Social capital derives from human relationships within a firm, so investment in social capital is not a purely monetary consideration. As such, in order to significantly improve the cooperative capacity of a firm, a significant transformation in its social climate would need to take place. Coleman provides some insight into this problem when he writes:

Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some

aspect of a social structure, and they facilitate certain actions of individuals who are within the structure. (Coleman 302)

Because social capital is contingent upon the variety of human interrelationships, its structure is not discretely definable. It will always be defined by the social structure from which it derives. Further, given that the social structure of a workplace is not necessarily pegged to its organizational characteristics, simply altering the procedures of a plant will not suffice to accumulate social capital. Consider, for instance, GM's experience implementing the lessons of NUMMI in its other plants. Langfitt explains: "The first round of changes put andon cords and Japanese style inventory control into the GM plants. But there was no change in the culture. Workers and managers continued their old antagonistic ways. In some of the factories where they installed the andon cord, workers got yelled at when they pulled it. A few plants even cut the cords down" (Glass 9). The use of andon chords was revolutionary for the workers at NUMMI because it represented a fundamental shift in culture. It represented the new trust between workers and management. Without this change in culture, the change in procedure was meaningless. Further, the change in procedure does not necessitate a change in culture. GM's upper management quickly learned that it was simply incapable of changing the attitude of its middle managers through fiat.

The GM Van Nuys plant, in particular, provides a useful case study in the complexities of social capital accumulation. The plant was among the first to adopt the NUMMI model, but the changes were rejected by the labor force. For example, many in the Van Nuys auto workers' union opposed the team concept as anti-union. According to Van Nuys vehicle inspector Richard Aguilar:

The team concept, it sounds good-- I mean, team player sounds good. But it pits worker against worker, it really does. ... People now snitched on each other. You know, they'd point fingers, oh, he's not doing his job right, you know, or she's not doing the job right. And they would even keep track of the stuff they'd missed. Because that's what the company puts in them, that the only way you can protect your job, you have to keep the team strong, so if there's a weak link, you've got to get rid of that weak link. And I would go tell them, you can't do that. You can't build a case for management against another union member. It made me angry and disappointed that the union had gone so backwards that they forgot what a union meant-- taking care of each other. (Glass 8)

Aguilar expresses a deep sense of union solidarity. In this sense, the term social capital accumulation may be a misnomer. Social capital, as Coleman notes, derives from any social structure in which individuals use social connections to complete their goals. Under this loose definition, a belligerent union system represents one form of social capital. The goals of a Takaoka inspired system would be the transformation of that social capital to attain closure between the goals of workers and the goals of the firm. In Aguilar's experience, the goals of the individual workers and the union obviously diverge from those of management. The teamwork model forces workers to view each other through a lens of team competition rather than union solidarity, so any team oriented change in procedure should be rejected. The only way to change this reaction would be to dramatically alter the social climate of the plant.

At NUMMI, every worker had experienced the closure of Fremont, so a common interest in maintaining competitiveness was among the foremost goals of both labor and management. Langfitt explains: "This was one of the biggest differences between Fremont and Van Nuys. Van

Nuys hadn't been shut down. Turns out, it's a lot easier to get workers to change if they've lost their jobs and then you offer them back. Without that, many union members just saw the Toyota system as a threat” (Glass 7). At Fremont, the plant closure forced both labor and management to recall their long run interest in the health of the firm. This new receptiveness to change allowed the Takaoka system to dramatically reorient the social structure within the plant. Whereas plants like Van Nuys were typified by strong relationships among the unionists and few personal ties to management, the NUMMI plant encouraged integration between team leaders and the rest of the workforce. The Paxton model of social capital describes the shift well. Under this model, social capital is present where both associations and subjective ties between individuals reach a critical mass (Field 75). At Van Nuys, the number of official associations between managers and workers was high, but there were few subjective ties. According to the Paxton model, this structure requires the group to “resort to more costly ways of securing cooperation, such as a legally binding contract” (Field 75). Aguilar’s insistence on the formal systems of negotiation within the union represents these more costly cooperative structures. At NUMMI, the official associations between leaders and workers were buttressed by personal, subjective social ties. Closure between these two types of relationships allowed less costly forms of personal negotiation to supplant costly legal arbitration. The Takaoka system succeeded because, whereas at Fremont, social capital was the exclusive reserve of the union, the new social structure allowed social capital to accumulate between middle management and the workforce.

Thus far, this shift has been portrayed from the perspective of workers, but considering the Van Nuys case again, it becomes clear that the experience was also transformative for the managers. At Van Nuys, management was equally resistant to the NUMMI inspired changes. Langfitt explains:

It wasn't just union members who resisted the Japanese system. Managers didn't like it either. They had their own privileges to protect. Some opposed the idea of stopping the assembly line because their bonuses depended on the number of cars that rolled off that line-- never mind how many defects they had. And under the team concept, executives and workers all share the same cafeteria and parking lot. Managers at NUMMI didn't have a problem with that, but the managers at Van Nuys? They rioted. (Glass 8)

At the level of management, this passage reveals two failures in implementing the Takaoka system. First, the managers at Van Nuys shared a short run interest in maintaining the status quo. The bonus system provided a significant monetary incentive to resist changes. Without the catalyzing experience of a plant closure, the management had little incentive to overcome their inter-temporal biases and consider the longer run. Second, the social structure at Van Nuys retained a strict division between labor and management during the implementation of the new procedures, so managers maintained problematic social relations with their workers. The childish squabbling over the parking lot and cafeteria reveals the depth of animosity between the two groups. In order to achieve the successes of NUMMI, the management at Van Nuys would have to undergo a similar cultural shift.

From both the management and labor perspectives, the success of NUMMI reveals the human element's significant impact on firm performance. The growth models of the first chapter concentrate on the interplay of three inputs, labor, capital, and knowledge, in the production process. In considering the productive disparity between NUMMI and Van Nuys, these models seem to overlook a fourth fundamental asset. The nature of social capital within the firm plays a pivotal role in determining the productivity of the firm's other assets and its long run growth

potential. Further, the NUMMI case exposes a particular form of business organization which both contributes to the accumulation of social capital and takes advantage of it. The firm should foster strong subjective ties between individuals at multiple levels of its organizational hierarchy and utilize these ties through cooperative work procedures based in mutual trust. Finally, the Van Nuys case shows that the cultural shift associated with these positive sorts of relationships is only possible where the individuals at different hierarchical levels within the firm recognize a shared long run interest.

Taking these three components of NUMMI's social capital together, they describe a corporate culture that lends itself to long run growth. In the second chapter, high quality production and innovation based on privileged access to assets during repeated savings and investment cycles were highlighted as the keys to long run competitive success. This discussion of social capital reveals the type of culture which would be conducive to granting the firm privileged access to its workforce while ensuring high quality production, but it does little to describe the actual processes of negotiation between labor, management, and capital holders. High fixed cost strategies rely upon the ability of management to secure mutual sacrifices from both labor and capital holders in order to generate significant savings and prevent both human and financial capital flight. As Lazonick's commentary on Romer's growth model reveals, innovation based strategies are only competitive once marketable innovations are achieved. Prior to this breakthrough, the higher costs associated with a highly trained workforce and large research and development investments place the firm at a competitive disadvantage vis-à-vis its low fixed costs peers. Success, then, is a function of the firm's ability to negotiate loyalty and sacrifice during these cycles of comparative decline. Even in the case of a relatively large firm that is able to generate innovations and move into new markets consistently, a process of

negotiation is needed to maintain the high levels of savings and investment necessary to maintain its position. Social capital describes the difference between corporate cultures which are capable of attaining this sort of privileged access and those which are not, but in order to understand why, a more concrete analysis of the structure of these negotiations is necessary.

Towards this end, consideration of a specific instance where negotiations succeeded is revealing. Consider, for instance, the very public series of negotiations between labor unions and capitalists during the 1991 public accounts crisis on the island of Barbados. The problem facing the country in the early nineties represents a traditional macroeconomic collective action problem that very closely resembles the microeconomic problems of competitiveness. A major downturn in tourism following the 1991 recession reduced the foreign currency entering the country and spurred a foreign exchange crisis (Blumberg 2). Barbados' economy, being a small island nation, relied heavily upon imports. According to economist Peter Blair Henry, at the time of the crisis, Barbados imported goods worth about 68.6% of its annual GDP (Henry 263), and without sufficient stores of foreign dollars, it could not purchase enough imports in international markets to meet domestic demand (Blumberg 2). According to the Governor of the Barbados Central Bank at the time, foreign reserves reached a low point of around \$10 million, so Barbados was essentially forced to seek a foreign currency loan from the IMF (Blumberg 2). As with most IMF operations, this loan came coupled with a series of mandated economic reforms; the IMF sought to force Barbados to reduce the value of its currency, stimulate production, and move away from imports (Henry 265). A less valuable currency makes exports comparatively cheaper for foreign buyers and imports significantly more expensive. Barbadians, weary of losing their purchasing power, refused the loan, and instead, the government initiated its own plan to generate foreign savings. According to Henry, "Instead of devaluing, the government

began a set of negotiations with employers, unions, and workers that culminated with a tripartite protocol on wages and prices in 1993” (Henry 265). This series of negotiations sought to slow the growth of prices and wages in the productive sectors in order to generate sufficient savings to rebuild the country’s foreign reserves. As is the case for a single firm, both parties, employers and workers, would need to lessen their claims on revenues in order to generate sufficient savings to support national competitiveness.

These negotiations were highly successful. Barbados was able to avert the crisis without taking out a loan from the IMF or significantly devaluing its currency. Henry explains the basic tenants of the agreement:

Under the 1993 Wage and Price Protocol, workers and unions assented to a one-time cut in real wages of about 9 percent and agreed to keep their demands for future pay raises in line with increases in productivity. Firms promised to moderate their price increases, the government maintained the parity of the currency, and all parties agreed to the creation of a national productivity board to provide better data on which to base future negotiations. (Henry 265).

All the major parties agreed to take on mutual sacrifices in order to meet their shared goals. For employers, the short term interest in raising prices in order to maximize profits was supplanted with a longer term interest in restoring national competitiveness. Likewise, from the perspective of workers, the short term, immediate interest in securing rising wages was placed aside in order to achieve higher levels of employment and better wages in the longer run. Henry continues: “The fall in real wages helped restore external competitiveness and profitability, thereby achieving the same result as a devaluation but without the risk of triggering an inflationary spiral. The economy recovered quickly. From 1993 to 2000 GDP per capita grew by 2.7 percent per

year” (Henry 266). Through choosing a route of mutual sacrifice, the Barbadians were able to avoid the costly long run impacts of accepting a loan. The IMF loan would have resolved the foreign reserves problem very quickly in the short run, but the process of forced devaluation would likely have triggered a harmful, structural process of inflation. With rising prices, the purchasing power of Barbadians would have deteriorated, and both workers and employers would be comparatively poorer in the long run. This short run solvency problem coupled with a shared long run interest and a series of savings-oriented negotiations make the tripartite protocol a close approximation of the savings and investment cycle in high fixed cost strategies.

Before attempting to glean some insight from the successes of the tripartite protocol, the problems posed by the foreign reserve crisis reveal the unique structure of the collective action problems facing the firm. In the Barbados case, the negotiations took place in a very public series of well documented meetings, so the entire process was significantly more transparent than it would be for any given firm and, as such, reveals the basic structures of the problem very clearly. At its onset, the foreign reserves crisis closely resembled a prisoner’s dilemma game. In political science, this metaphor is a very common model for cooperation, so crafting an analogy with the Barbados case may grant some insight from existing collective action scholarship.

In the prisoner’s dilemma, two individuals are captured by the authorities and interrogated separately. If both confess, then both will be sentenced to jail time. If both stay quiet, both will be released. If one confesses and the other does not, the one who remained quiet will receive a longer jail term, and the confessor will be released. In effect, the metaphor simplifies a collective action problem into two choices for each participant, cooperate with the others or defect. Simplifying the situation further, Robert Axelrod developed the following game matrix (Axelrod 8):

		Column Player (CP)	
		Cooperate	Defect
Row Player (RP)	Cooperate	RP=3, CP=3	RP=0, CP=5
	Defect	RP=5, CP=0	RP=-1, CP=-1

This version of the game uses payouts in lieu of prison terms in order to understand the rational choice problem beneath the dilemma. Here, mutual cooperation nets each player a payoff of 3 while mutual defection nets a mutual punishment of -1. This formulation reveals the fundamental obstacle to cooperation in a prisoner's dilemma. Assuming the odds of the other player cooperating are the same as the odds of defection, the estimated value of cooperation is 1.5, and the estimated value of defection is 2. Under these conditions, it is rational for every player to defect. Axelrod summarizes the dilemma:

It is better to defect if you think the other player will cooperate, and it is better to defect if you think the other player will defect. So no matter what the other player does, it pays for you to defect ... But the same logic holds for the other player too. Therefore, the other player should defect no matter what you are expected to do. So you should both defect. ... Individual rationality leads to a worse outcome for both than is possible. Hence the dilemma. (Axelrod 9)

This rational choice problem mirrors the competitiveness problem. The short run incentive facing any individual in any single game diverges from the longer run interest of the group over multiple games. The only way to attain the mutual interest of the group and the individual over multiple games would be to overcome the rational-choice problem and foster cooperation.

Returning to the Barbados example, the tripartite protocol closely resembles a single iteration of this prisoner's dilemma game. The workers and unions would represent one player while the employer's coalition would represent the other. To begin, consider the labor player. When asked to volunteer lower wages and similar sacrifices in the negotiation process, the national workforce effectively faced the same two contingencies that face the workforce of a single firm. In the words of economists Richard Freeman and James Medoff, the two basic strategies available to any organized workforce are exit and voice (Freeman 7). Exit represents the pure economic response to undesirable conditions. By altering the supply of available labor at a given price or under given conditions, the workforce can force the labor market to react. Where workers have little mobility or there are few competing employers, the workforce exercises its exit option through strikes, work stoppages, and sabotage. Because few Barbadians could have simply left the country in response to the tripartite negotiations, this latter form of exit, a national strike, was their primary exit-recourse. According to journalist Alex Blumberg: "They staged a general strike and held a massive two-day demonstration, the largest in Barbados history. It's estimated that 10% of the island's population took to the streets" (Blumberg 7). This sort of protestation represents the defection choice for the labor player.

Voice, on the other hand, represents the cooperative choice. Freeman defines the voice option: "voice refers to the use of direct communication to bring actual and desired conditions closer together" (Freeman 8). This process is based on compromise between the workforce and the employers, so the equivalence between desired and actual conditions will always be imperfect. As noted in Axelrod's definition of the dilemma, cooperation can never achieve the returns in a single game that exploiting a cooperative opponent will. In the Barbados case, the national workforce eventually chose to exercise its voice in the political bargaining process and

cooperate with the agreement, and the payoffs were lower than continued defection may have produced. The unions eventually acceded to an 8% one-time pay cut (Blumberg 7), but they were able to avoid the even higher punishments associated with mutual defection and national insolvency. Should the nation have become insolvent and forced to accept the IMF assistance, the workforce would have been forced to accept a 10% nominal pay cut along with significant inflation (Blumberg 6).

From the perspective of the employer player, the choices are largely the same. The employer could choose to cooperate with its workforce in a negotiation process to bring its desired outcomes closer to those observed on the shop floor, or it could simply choose to defect and fire any individuals unwilling to work under a given set of conditions. Should this sort of defection effectively threaten an otherwise cooperative workforce, the exploitive employer would be able to retain its human capital and impose low wages, but if the defection is met with exit from by the workforce, the firm is punished with human capital flight. As such, these two players and four strategies, exit and voice for workers and termination and voice for employers, constitute a traditional prisoners dilemma game.

The Barbados agreement succeeded because the negotiation process emphasized two of the traditional solutions to the prisoner's dilemma. In both cases, the role of social capital in competitive success is reemphasized. First, both players tended to conceptualize the negotiations as one game in a long series. Both the workers and employers recognized the consequences of mutual defection. If neither party cooperated, then the state would be unable to generate sufficient savings, and the government would be forced to accept an IMF loan. Leroy Trotman, a Barbadian union leader, explains the long run consequences of these loans:

[The IMF] wanted to double the size of classrooms. They wanted to have people going to a hospital have to pay for services. And our position was that we were going to be under an IMF program for awhile, but we were going to come out from it. And that when we came back out, our people had to be healthy, and they had to be educated, and ready to take on the job of building the country again. (Blumberg 8).

His concern with education and health services reveals a uniquely community oriented perspective in his long run calculations. Trotman recognizes that the wellbeing of his union would be directly contingent upon the wellbeing of the community moving forward. If accepting the IMF's terms represents the punishment for mutual defection, Trotman's comments reveal a striking cognizance that the consequences stretch well beyond the single game scenario. Further, he recognizes that "the job of rebuilding the country again" will fall squarely on the shoulders of the same people who would be negatively affected by the IMF loan. The same people who are party to the current game are the players in an infinite stretch of games moving forward.

In game theory, this series of iterative interactions among a stable group of individuals is one precondition to the successful resolution of a prisoner's dilemma. The incentive to exploit another player falls as the possibility of meeting that player again increases. If a player has been exploited by another in the past, he/she would be less willing to cooperate in the second meeting, so his/her opponent's chances of winning a positive payoff fall. If the relationship becomes dominated by distrust, then the only possible outcomes for the opponent are mutual defection or being exploited. To avoid this outcome in multiple games, the best possible outcome for both players collectively is mutual cooperation. Economist Martin Mayer translates this insight into a firm level of analysis:

Once a manufacturer begins to go under, even his best customers begin refusing payment for merchandise, claiming defects in quality, failure to meet specifications, tardy delivery, or whatever have-you. The great enforcer of morality in commerce is the continuing relationship, the belief that one will have to do business again with this customer, or this supplier, and when a failing company loses this automatic enforcer not even a strong-arm factor is likely to find a substitute. (Mayer 280)

In any single game, a firm can likely receive large rents from exploiting its suppliers or customers, but it risks sullyng the relationship. If the firm wishes to retain a positive relationship with a customer or supplier, it cannot fall to this temptation. Exploitation only becomes a tenable strategy once the relationship has a set end point. In the Barbados case, the relationship between employers and labor had no set end point. Both players, restricted by the borders of their state, would be forced to interact repeatedly in the future, so the incentive to cooperate was significantly higher than it would be for any given single game.

Likewise, cooperation would be significantly more likely within the firm if all players, management, labor, and capital, were well aware that each single negotiation game was but one in a much longer series. In Axelrod's estimation, the basic insight from the prisoner's dilemma is that cooperation is promoted by, "enlarging the shadow of the future. There are two basic ways of doing this: by making the interactions more durable and by making them more frequent" (Axelrod 129). In both cases, the basic solution to the prisoner's dilemma closely resembles the components of social capital utilized on the shop floor of NUMMI. Creating durable and frequent relations between team leaders and the workforce bolstered productivity and creativity while limiting the incentive to withhold or sabotage production. The same two strategies seem to

improve the prospects of successful resolution in longer term negotiations concerning firm strategy. First, durability simply refers to the length of a relationship, so improving the durability of a relationship refers to assuring the other player that any single meeting is not the last. In Barbados, the durability of the relationship was implied by the national negotiation process. The likelihood of any given group of workers or employers simply leaving the country was relatively low. In terms of a workforce, durability refers to continuing employment. The prospect of layoffs in the imminent future would sever the long run relationship between the players, so durability relies upon both players being reasonably sure that the relationship will continue.

Second, frequency refers to the number of interactions within a relationship in any given period of time. At NUMMI, the Takaoka system improved the relationship between leaders and workers by improving the frequency and proximity of their interaction. Leaders were expected to work alongside their team any time there was a problem. In the Barbados case, the frequency of the interaction was improved by decomposing the implementation of tripartite protocol into a series of annual negotiations. According to Blumberg, after the tripartite protocol, “Barbados society seemed permanently altered. These meetings between employers, employees, and government were so effective that they became formalized into what's called the Social Partnership. I was actually in Barbados during one such meeting, the yearly gathering of all three groups, which is called the Week of Excellence” (Blumberg 10). Annualizing the negotiation process explicitly recalls a series of infinite iterations and improves the incentive to cooperate in any given meeting. According to Axelrod: “Decomposing the interaction promotes the stability of cooperation by making the gains from cheating on the current move that much less important relative to the gains from potential mutual cooperation on later moves” (Axelrod 132). Translating this insight to the firm level of analysis, cooperation seems more likely where

strategy, savings, and investment decisions are made in a series of iterated negotiations rather than through monolithic union contract negotiations or management imposition. As evidenced by the success of the tripartite protocol, a process of continual negotiation on a regular schedule would tend to foster a more long run series of calculations by all players and foster healthier relationships among participants.

Returning to the two basic components of Barbados' success, the tripartite negotiations also succeeded because the agreement was premised on reciprocal sacrifices. Both players accepted the lower payoffs associated with mutual cooperation in order to achieve their shared goals. In Blumberg's analysis, the labor unions accepted this sacrifice after it became evident that mutual defection would achieve nothing. Blumberg explains:

In the end, the speeches, the general strike, the 30,000 marchers in the street, could not contradict the basic reality that the country of Barbados would run out of money unless it figured out a way to get its people to spend less ... [Trotman] and the leaders of the other unions knew that fighting on-- more strikes, more demonstrations, which might get out of hand and lead to violence-- all of that could kill an already fragile tourist industry. So they went back to their members, and in meeting hall after meeting hall, all over Barbados, explained to the union rank and file, "We're sorry, but this is the deal." (Blumberg 9)

Blumberg's depiction casts Trotman and the other union leaders in a uniquely pragmatic light. The unions recognized the dire consequences, both in terms of the IMF loan and the fragile tourist industry, of a stubborn adherence to the current wage levels, so they were willing to ask their constituents to stomach a wage cut. Recognizing that fighting tooth and nail would get them nowhere, the unions were willing to unilaterally accept a sacrifice for the greater good. Union

leader Denis De Peiza explains: “We had to choose between the lesser of two evils, either taking a pay cut, or having many Barbadians on the street without a job. To put it in a very simplistic way, all we said, "Save Barbados." Two words, and we had the interest of the country paramount” (Blumberg 9). These sentiments reveal an acute sense of mutual responsibility and collective identity at play in the union’s decision to accept a pay cut. Every individual was willing to accept a small sacrifice in order to prevent the potentially disastrous harms of layoffs befalling the few. The unions were willing to accept a pay cut because individual workers supplanted their cynical, individual calculations with a caring concern for collective wellbeing.

The successes of the tripartite protocol, however, were not premised on this unilateral sacrifice by a single player. Instead of exploiting the cooperative outlook of the labor unions, the employers reciprocated their collective mindset. Blumberg explains: “The self-sacrifice was contagious. If the unions could go against their very reason for existence and lend their grudging support to wage cuts, then the business community could go against the thing it held most dear, profits” (Blumberg 10). The business community, recognizing the workers’ willingness to sacrifice, reciprocated the wage cuts by agreeing to freeze prices. Without a steady increase in prices, the workers would not feel the loss in purchasing power associated with their wage cuts as acutely, but the business community would have to absorb any increases in the price of inputs.

According to Tony Walcott, a Barbadian business leader:

The mercantile community did as was said, "Look, we will accept a lower margin, or a lessening margin, just to be able to hold prices." You kept the retail price fixed at a number. So it eroded your margin a bit. So here you are. The price of oil is going up. So that means that the price of all sorts of other things are going up,

because everything is tied to oil And instead of raising it-- that level-- they just took it. (Blumberg 10)

The business community, adopting a similar communal outlook, was willing to sacrifice its own profits in order to ease the hardships facing the working class. This mutual sacrifice laid the groundwork for a cooperative relationship based on positive and trusting relationships, so instead of resenting the government and employers for wage cuts and retrenchments, the workers recognized that every party was equally contributing to the painful process of rebuilding the foreign reserve. Indeed, when the economic conditions required retrenchments, the workers would not resist; rather, the unions adopted a cooperative framework for negotiation. Blumberg explains:

Remember the world was in recession at this time, so layoffs were already up in Barbados. These wage cuts were going to make that even worse. So the unions and employers came up with an idea to try to reduce the impact of these layoffs, or as they were termed, retrenchments. Again, here's Tony Walcott with the business community: "We started to develop tools like insisting that if there were going to be retrenchments in a household, both bread winners would not be retrenched. At least one had to be retained to ensure that there was money coming in." (Blumberg 11)

The communal mindset that pervaded these sorts of negotiations represented a genuine cultural shift in the Barbadian business community. Instead of thinking about the relative gains and losses of the workforce and the capital holders, businesses operated under new criterion of mutual care. Both were willing to sacrifice in order to assure that individual families would remain solvent. The unit of analysis shifted from the individual to the commonwealth.

In game theory, this sort of cultural shift signifies a collectively stable norm of reciprocity. Axelrod defines the concept: “A strategy is collectively stable if no strategy can invade it” (Axelrod 56). In more common parlance, collective stability occurs when a certain strategy becomes nearly universally accepted and no deviant strategies can out-perform the group. Once mutual cooperation and sacrifice became the norm in the Barbadian business community, for example, selfish, deviant strategies became untenable. Axelrod explains why: “A community using strategies based upon reciprocity can actually police itself. By guaranteeing the punishment of any individual who tries to be less than cooperative, the deviant strategy is made unprofitable. Therefore the deviant will not thrive, and will not provide an attractive model for others to imitate” (Axelrod 138). In the purely rational terms of a prisoner’s dilemma, this self-policing occurs when the deviant strategy is unable to achieve cooperation from its peers in the community. Because the other community members achieve sufficient payoff from their interactions with cooperative peers, they can stomach the mutual punishment of defection with the deviant. In the Barbados case, businesses and workers would agree to neither supply nor purchase from businesses that broke with the spirit of the protocol.

Collective stability succeeds in resolving the prisoners dilemma because it both mounts a significant disincentive to defect and creates a series of cooperative norms within the community. Similar to the effect of closure on the small groups of workers in NUMMI, a collectively stable environment among the aggregated groups of workers, management, and capital holders would tend to support cooperative outcomes. As the Barbados case reveals, this sort of cultural shift is associated both a willingness to negotiate and a willingness to sacrifice for the common good. Without these initial overtures, strategies of reciprocity cannot take hold.

Consider, for example, the similar case of Jamaica, when, in the early 1970's, it experienced a similar foreign reserve crisis. Blumberg continues:

Jamaica in the mid-1970s faced the identical crisis Barbados faced in the '90s, a foreign exchange crisis. ... Jamaica's leader at the time was a bright and charismatic man named Michael Manly, popular with the rich and the working class. But unlike the leaders in Barbados, he didn't bring the country together to share the burden of becoming temporarily poorer. He didn't build trust between workers and business owners. The thing that almost all middle class Jamaicans alive at the time remember-- in 1975, he made a famous speech saying that if Jamaicans didn't like what he was doing, there were five flights a day leaving for Miami. Thousands of middle class Jamaicans took his advice and left. (Blumberg 11)

Without open channels of negotiation, the Jamaican workers lacked a meaningful opportunity to exercise their voice, so in step with Freeman's labor framework, many were forced to adopt the defection strategy of exit. This mass exodus of Jamaica's middle class represents a national manifestation of the human capital flight problem facing a firm. If the firm is unwilling to secure the loyalty of its workers by opening the channels negotiation and sharing the burdens of increased savings, it will be unable to retain its human capital and remain competitive. In the case of Jamaica, losing its skilled, middle class workers significantly altered the nation's growth potential. Blumberg continues:

The exodus of foreign capital and middle class Jamaicans ... crippled the Jamaican economy. It actually shrunk an average of 2% per year for 15 years in the '70s and '80s, a statistic that makes economists gasp. And successive Jamaican

governments faced with the declining tax revenues continued to borrow, so that today, almost 50% of the money the Jamaican government collects goes towards paying interest on debts from the past. (Blumberg 11)

The massive disparity in outcomes facing Barbados and Jamaica after similar macroeconomic crises reveals the gap between the potential opportunities associated with mutual cooperation and the punishment associated with defection. The ethic of reciprocity in Barbadian society allowed the nation privileged access to its human and capital assets during a time of savings and reinvestment. Without a similar ethic, the Jamaican middle class had little reason to sacrifice for the commonwealth.

In considering the role of social capital in business competitiveness, then, two variables seem tantamount to firm success. Cooperative outcomes rely upon relationships within the firm based on both reciprocity and commitment. On the shop floor at NUMMI, reciprocal relationships based on the Takoaka teamwork model created a norm of mutual care and laid the foundation for closed intra-firm social relationships. Pride in the product and a willingness to ask for help improved both the productivity of labor and the quality of production. Similarly, reciprocity between team leaders and workers precipitated a series of new, positive subjective ties in the organizational hierarchy of the plant and generated a new climate of trust which empowered the workers to access their specialized knowledge and creativity to improve the production process and the firm's innovative potential. In comparison to Van Nuys, relationships based on commitment thrived at NUMMI because both management and labor recognized a shared long run interest in the health of the firm. In this way, relationships based on commitment thrive where common long term interests are articulated to every member of the firm. From a more aerial perspective on firm strategy, the Barbados case reveals that reciprocity fosters a

culture of collective stability. With a norm of reciprocity, deviant strategies become unprofitable, and the firm gains privileged access to its human and capital assets even in times of increased savings and comparative decline. These more cooperative outcomes rely upon management's willingness to approach its capital-holders and employees as equal parties to the negotiation process. Likewise, opening these negotiations frequently and regularly communicates a significant, long term commitment to the stakeholders. This sense of commitment allows individual to overcome the dilemma of a single game and prefer cooperation over a long series of iterations. In both cases, high levels of social capital based on reciprocity and commitment constitute a corporate culture capable of overcoming the collective action problems associated with firm competitiveness. The next chapter attempts to sketch the tenants of business organization which allows this form of social capital to accumulate within the firm.

Chapter 4: Modeling Cooperative Business Organization

The Jamaica and Van Nuys cases represent a cautionary tale at the onset of this chapter. Both reveal the problems associated with mandating cooperation from a position of authority. Because Michael Manly's administration provided no procedural redress for middle class Jamaicans seeking to negotiate the terms of his economic plan, his calls for mutual sacrifice fell on deaf ears. Without the necessary structures to seek mutual cooperation, many Jamaicans were compelled to defect, emigrating out of the country. Conversely, at the GM Van Nuys plant, upper management mandated a series of procedural and organizational changes including andon chords and team production systems, but the culture of the plant resisted these changes. Both managers and laborers, suspicious of one another, eschewed the cooperative avenues opened by these structural changes, preferring their old, defective work habits. Both components, it seems, would be necessary to successfully model cooperative business organization. Without the proper procedural and organizational characteristics, the individuals within the firm have little chance to actuate their social capital into competitive returns or to improve their social capital by forging new relationships. Likewise, without genuine positive relationships, these cooperative procedures would remain unused. As such, fostering a cooperative type of social capital premised on reciprocity and commitment represents a complex social task. The sort of successful cultural shift witnessed in NUMMI and Barbados cannot be mandated by existing power structures. The paradigm shift associated with social capital driven firm strategies requires both comprehensive, structural changes to the business' organization and an authentic process of trust building.

From a contemporary economic perspective, the former consideration would seem significantly more familiar. The American literature on unionization dating back to the early

1970's has developed a comprehensive examination of the various components of business organization, industrial relations, and labor practices which contribute to improving competitiveness and productivity. Reading these insights through the lens of social capital, there are three structural preconditions to securing privileged access to the workforce, achieving cooperative outcomes, and successfully implementing high fixed cost strategies.

First, a genuine process of labor-capital negotiation would be impossible without some symmetry of power between the parties. If labor could not realistically threaten collective defection, then the process of negotiation would become a courtesy of the capitalists. The capital holders could simply end negotiations and mandate their will at any point; the process would be a mere token. Economist Ray Marshall explains: "It is very difficult to have effective participatory, cooperative arrangements between parties with greatly unequal power. This is so because the stronger party will be inclined to exert unilateral control, thus destroying cooperation and internal unity and causing the weaker party to seek countervailing power" (Marshall 299). In line with Lazonick's analysis of American industrial development, this passage implies that increasing power asymmetry between management and labor would tend to foster resentment and combativeness among the labor force. In order to prevent this resentment from culminating in wage driven, uncooperative labor movements, Marshall's analysis would seem to recommend seeking cooperation among equal parties in the first place. In order to attain this sort of power parity at the onset of negotiations, labor must have collective bargaining rights.

This line of reasoning yields a paradoxical conclusion; the solution to the competitiveness problems associated with combative labor unions relies upon improving the strength of labor organizations. In this analysis, unions are simply one form of labor organization; they guarantee neither improved nor lowered productivity. Nonetheless, they are indispensable in a high fixed

cost framework. Collective bargaining through a centralized labor organization, such as a union, is the only way that the labor force can meaningfully become a party to the negotiation process.

Adrienne Eaton explains:

Union workers can as a group trade harder and/or more productive work for high wages, or trade increased productivity to prevent reductions in wages when earlier gains are threatened by the forces of competition. Nonunion workers lack the institutions – the collective voice which permits inter-worker discussion and then explicit negotiation with employers – to make these exchanges. More productive work for higher wages is a trade that union workers do not always want to make, But union workers are better off than nonunion workers insofar as the institution of unionism permits them to make, or not make, this exchange. (Eaton 191)

In Eaton's analysis, establishing a union is a necessary precondition to negotiating with a workforce. Unions provide the basic structures antecedent to both cooperative and defective outcomes, so they effectively transform the labor relationship into a prisoner's dilemma. Nonetheless, given that formal labor organization is the only way to secure proper collective bargaining, unions represent the only chance for cooperative outcomes. Without negotiation, laborers will unionize on an ad hoc basis to protest certain conditions, such as slowing real wage growth, but are very unlikely to engage in collective, ad-hoc sacrifices on behalf of the firm. Unlike cooperation, defection is nearly always available to a workforce. In other words, because unions make both cooperation and defection available to a workforce, they are a necessary precondition to high fixed cost strategies.

Besides opening formal negotiation channels between the workforce and the capital holders, the process of unionization is also an important precondition to many of the other

benefits of social capital. In addition to creating a power parity between management and labor in the aggregate, the protections afforded to unionized workers reduces the power asymmetry between individual workers and managers on the shop floor. Deescalating this interpersonal power asymmetry results in a work environment conducive to both transparency and creativity. The automatic, procedural protections afforded a unionized workforce reduce the authority of individual managers to terminate workers based on arbitrary or interpersonal pretexts. While this sort of tenure system may increase the incentives to laziness and misconduct in certain contexts, consider the Fremont auto plant, removing the fear of reprisal is a fundamental first step to coaxing the workforce to engage in more participatory structures. Again, Adrienne Eaton explains the basic logic of this insight:

Protection from arbitrary treatment is widely regarded as one of the most significant benefits unions offer workers ... The importance of such protection for genuine participation should not be underestimated. In the more extensive involvement programs, workers are asked to give their opinions and suggestions about a wide range of issues including potentially their supervisor's role and performance and company policies. ... Workers will be reluctant to participate fully insofar as they have reason to fear retaliation from their superiors. (Eaton 194).

To paraphrase Eaton's argument, exploiting opportunities for improvement requires systems of accountability capable of identifying inefficiencies at all levels of an organization. Insofar as these problems may arise from the misconduct or ineptitude of first line supervisors or other middle managers, acquiring the honest opinion of those on the shop floor requires systematic protection from reprisal. Likewise, because workers can feel comfortable expressing themselves

freely, unionization serves to open the lines of communication necessary to fostering a culture of creativity and innovation.

Taking this argument a step further, union employment contracts and formal grievance procedures create a sense of economic security among the workforce and reduce defensiveness vis-à-vis technological innovation. In a high fixed cost framework, solvency and competitiveness rely upon the firm's ability to recuperate the costs associated with large investments. As such, being the first to adopt new technologies and procedures is a cornerstone of successful strategy. In order to retain human capital during these rapid shifts on the shop floor, unions provide procedural checks against the natural suspiciousness of the workforce. Eaton explains: "Workers' concerns regarding their economic security in the face of an innovation aimed at improving work methods and productivity also can be a barrier to participation. Job loss, reduced amounts of employment, and wage reductions are all feared" (Eaton 196). The employment guarantees and formal downsizing procedures associated with union contracts soothe these fears among a workforce, reducing workers incentives to sabotage or protest technological improvements. Indeed, the mutual commitment implied by a formal employment contract in a unionized context improves the firm's ability to quickly adapt to new technologies and a capricious marketplace. Once workers become accustomed to quickly learning new work procedures and technologies, a special sort of dynamic human capital accumulates within the firm. Instead of becoming cemented in static work habits, union protected workers who stay with a firm through multiple innovation cycles develop specialized skills and thought patterns conducive to frequent retraining and continuing education. Privileged access to this sort of specialized human capital is foundational to innovative business strategy.

The second structural component of successful intra-firm social capital accumulation would be small group collectivization within the larger union context. The success of the Takaoka system in reforming the workers at NUMMI was founded upon a common culture of mutual concern and affability among small groups of workers. The teamwork model is the root of interpersonal social capital accumulation. Axelrod explains:

Hierarchy and organization are especially effective at concentrating the interactions between specific individuals. A bureaucracy is structured so that people specialize, and so that people working in related tasks are grouped together. This organizational practice increases the frequency of interactions, making it easier for workers to develop stable cooperative relationships.

Moreover, when an issue requires coordination between different branches of the organization, the hierarchical structure allows the issue to be referred to be referred to policy makers at higher levels who frequently deal with each other on just such issues. (Axelrod 131).

This passage has a number of important insights. First, the creation of small, collaborative groups oriented around common tasks sufficiently increases the proximity and frequency of their interactions to incent friendly, cooperative relationships. From a social perspective, these close working relationships allow workers to get to know one another and develop amiable group dynamics. From a more rational perspective, increasing the number of iterated games likely to occur in the future lowers the incentive to dissent in the present game. Second, Axelrod's analysis of hierarchy implies that the social capital developed in a small group can spread outward to the organization writ large. In Axelrod's more formal prisoner's dilemma framework, "by binding people together in a long-term, multilevel game, organizations increase the number

and importance of future interactions, and thereby promote the emergence of cooperation among groups too large to interact individually” (Axelrod 131). By drawing clear lines of representation and responsibility between discrete groups, a hierarchical structure explicitly identifies the operational sovereignty of each respective group. In a unionized context, for instance, clearly identifying the union warden in charge of adjudicating disputes within a given group of workers imbues the midlevel negotiations between union officials and managers with a representational legitimacy. Insofar as the process is transparent and union officials are genuinely representative of their constituents, individual workers have reason to accept decisions handed down from higher level negotiations as legitimate and binding. In other words, the cooperative atmosphere generated in the small group setting, when paired with a formal hierarchical structure, such as a collective bargaining scheme, trickles up to produce a cooperative atmosphere throughout the firm.

Following this process of aggregation to the highest level negotiations between labor and management, the final structural precondition of successful intrafirm cooperation is neutral arbitration. Recall that the successful tripartite protocol negotiations in Barbados included three distinct parties. The government moderated the negotiations between the organized labor groups and the employers. Although it represented an antagonist, pro-IMF voice at the onset of the negotiations, by the end, the government constituted itself as a strong, neutral power in the center of the negotiations. This moderating force is a pivotal component of successful bilateral negotiations. Indeed, this concept is the organizing force behind Germany’s successful work council program. The German industrial relations system consists of three distinct parties. Labor is directly represented by unions with legally protected collective bargaining rights. Management

represents the capital interests of a given firm, and a third, legally distinct work council serves as a moderator. Lowell Turner describes the process:

The Works Constitution Act [established in 1952] ensures an integration of sorts into the process of managerial decision making. ... Works councilors are elected by the entire workforce, serving part time in smaller plants, with a mix of both part time and full time councilors in larger plant. They work under a “peace obligation” (Article 74) and a “Trustful Cooperation” clause (Article 2), which together require that they work with management in the interest of smoothly running production of goods or service. The integration into managerial decision making processes and the fact that they are elected by a plant workforce combine to mean that works generally consider closely the interests of the firm and/or the plant holistically. (Turner 223)

Turner’s concentration on the process of integration reveals the novelty of the work council system. Councilors are selected from the workforce and democratically elected but are expected to integrate with management’s interests along with those of the union. Indeed, they are legally required to consider the interests of the firm beyond the exclusive considerations of their constituents. They are expected to be party to both major union decisions and management meetings while serving as the neutral moderator in formal negotiations.

In playing this multifaced role, councilors force both management and labor to constantly consider the interests of the other. As councilors penetrate the otherwise unilateral decision making processes of either group, each is required to consider the longer term interests of the firm. In short, work councils serve to pull both groups towards the middle. Councilors serve as a neutral party with vested interests in both groups, so as their influence within the firm increases,

the cooperative climate between labor and management tends to improve. For instance, shortly after Volkswagen adopted a works council system in its IG Metall plants, plant management adopted a series of new, participatory labor structures, including a series of intensive management training programs concentrating on training managers “to listen to the concerns of workforce representatives and to seek consensus prior to the implementation of policy” (Turner 226). These sorts of institutional shifts signal, from the outside, a more complex series of cultural shifts in the industrial relations climate. Investing significantly in a complete overhaul of the training system for managers represents an overture to labor. Its substance is secondary to its symbolic effect. The content and effectiveness of the classes are largely irrelevant to the message of increased receptiveness implicit to the policy. These subtle shifts in the tonality and undertones of the discourse between labor and management betray a paradigm shift in the culture of the firm. Neutral arbitration allows the initial boundaries between management and labor to dissolve, opening the channels for honestly cooperative negotiations.

These three structural shifts accumulate into a three layered process of negotiation and deliberation within the firm. First, small scale tactical decisions on the shop floor are resolved through interpersonal deliberation between teammates. The teamwork model encourages small groups of workers to determine their own work procedures and divide the labor accordingly. Likewise, should someone fall behind, the team determines who ought to help out. Given formal suggestion systems and innovation incentives, the team also functions as the laboratory for shop floor experimentation. Second, each of these small-scale deliberation processes accumulates into a larger intra-union negotiation. The union elects its own leadership and adopts a cohesive platform for engaging management. Finally, under a process of neutral arbitration, this union platform is filtered through negotiations with management to produce large scale firm strategy.

To ensure that each level of this process produces cooperative rather than defective outcomes, these structural components cannot stand alone. Cooperation requires a genuine cultural shift within the workplace. Collaboration, in other words, is founded upon a milieu of mutual trust. Attaining this trust, in turn, requires an aura of authenticity. The emotional response of the Fremont workers after visiting Takaoka seemed to spring from the authenticity of their experience. The Takaoka model was not a mere management gimmick designed to elicit harder work. It represented a genuine paradigm shift with regards to the auto plant. Generating this sort of feeling of authenticity in each of these three deliberative settings validates the cooperative structures. In other words, this process of trust building is antecedent to actuating these structural shifts into tangible returns to competitiveness.

To concretize this discussion in more formal analysis, the relationship between affective response and collective action has been studied comprehensively in political and communicative applications. Applying the insights of deliberative democracy to the competitiveness problem gives shape to the cultural shift necessary to complete the model. To begin, Darrin Hicks, a communications and rhetoric scholar, provides clear definition to this authenticity problem in writing:

One of the fundamental insights of the research on process quality is that processes have a communicative function. When people are invited to participate in collaborative activity they must make a quick, often intuitive, judgment as to the likelihood that they will be exploited or rejected by others. Although there may be significant advantages of collaboration, a judgment that there is a relatively high likelihood of either exploitation or rejection will lead people to pursue lower risk, lower reward self-oriented goals. (Hicks 457)

Hicks introduces a complex bivariate understanding of deliberative structures. First, the operating procedures and processes within an organization must provide the opportunity for deliberative structures to develop. After this forum is established, a secondary communicative aspect determines the propensity for collaboration. In short, structures are useless unless the social environment surrounding them is intuitively inviting.

Once this second, affective threshold is met, the individual is much more likely to accept the higher risk, higher return, long run calculus associated with cooperation. Hicks continues:

When people perceive that they are being treated fairly – understood in terms of positive attributions of trust, neutrality, and standing – they will, in turn, feel valued, respected, and cared for by the group. The result is that they will come to see their individual identity in terms of their group membership: an identification that, in turn, results in an increased commitment to the groups' projects and goals.

(Hicks 458)

Juxtaposing this passage with a theory of economic competitiveness produces a strange result. Suggesting that workers ought to be personally committed to the goals of the firm seems odd in an economic context. Rational theory limits the calculus of workers to a consideration of the likely benefits and compensation attached to a position weighed against its risks and inherent displeasure. Hicks' insight suggests that workers' relationships with their employers may, under certain conditions, take on a much more complex structure. A culture of mutual care and belonging can develop within a firm. Workers can develop a sort of identification with the needs of the group and a willingness to forgo higher wages or compensation in order to meet its needs. From the outside, this sort of behavior would appear largely irrational. Where this sort of culture develops, the participatory structures afforded by unions become a unique avenue to new sorts of

economic competitiveness. The firm gains privileged access to its workforce because each individual is uniquely oriented towards the same long term goals. This sort of cohesive social group within the firm is the ultimate manifestation of collaborative social capital.

Because this communicative response is largely intuitive, outlining the preconditions to its attainment is a vaguer task than enumerating the structural shifts associated with cooperation. Amy Gutman and Denis Thompson, two political theorists, provide a relatively lucid analysis of the values and structures associated with an inviting deliberative process. In their estimation, there are four necessary components. First, collaborative structures gain an aura of authenticity when the decision making process becomes more accountable and transparent. Towards this end, the primary attribute of deliberative democracy is a procedural shift in governance structures. Gutman and Thompson explain: “Most fundamentally, deliberative democracy affirms the need to justify decisions made by citizens and their representatives. Both are expected to justify the laws they would impose on one another ... Its first and most important characteristic ... is [the] *reason giving* requirement” (Gutman 3). This simple procedural change represents a profound shift in paradigm. Simply mandating a process of justification removes policy considerations from the secretive bargaining table of those in power and places it squarely in the center of public debate. Fiat is replaced with persuasion. This process is humanizing insofar as it affirms the right of each individual participant to receive and vet the logic of a given position. Even in the case of higher level decisions precipitated without the direct involvement of the shop floor, a deliberative framework demands that both managers and involved union leadership (labor’s “representatives”) clearly articulate their reasoning for public consumption. This right to review the arguments surrounding a proposition transforms the role of the worker from that of a passive recipient of policy to an active participant in the process of corporate governance.

From a managerial position, recognizing these rights of the workforce and expending the time and energy to articulate and defend the logic behind a given policy proposal communicates a sort of respect for individual workers. Requiring justification from both parties to a given policy places procedural emphasis on fostering reciprocity. In Gutman and Thompson's words:

The justification for regarding principles as politically provisional rests on the value of reciprocity. From the perspective of reciprocity, persons should be treated not merely as objects of legislation or as passive subjects to be ruled. They should be treated as political agents who take part in governance, directly or through their accountable representatives, by presenting and responding to reasons that would justify the laws under which they must live together. (Gutman 116)

By removing the inherent authority of managerial decisions and the assumed propriety of their policies, the deliberative process of justification recognizes the provisional nature of political logics. In this context, the authoritarian managerial structure must be replaced with a reciprocal one. Through a deliberative process, the people on the shop floor are transformed from the subjects of managerial authority and the pawns of a distant, opaque union negotiation to distinct individuals deserving of a chance to consider and critique the logic of their leaders. Accordingly, reason giving is the first step towards a genuinely democratized workforce.

Along these lines, the second practice of authentic participation dictates that the reasoning within a deliberative body be equally accessible by all parties. Gutman and Thompson explain: "The reasons given in this process should be accessible to all citizens to whom they are addressed. To justify imposing their will on you, your fellow citizens must give reasons that are comprehensible to you. If you seek to impose your will on them, you owe them no less"

(Gutman 4). Their verbiage implies a form of obligation within a deliberative environment. In order to respect the parties whom an actor would impose its will upon, it must justify its actions with logic expressly available to their sensibilities. For example, management could not attempt to justify its actions through appealing to a highly technical or financial understanding of the firm's interests. Rather, it would need to translate its policies into a language accessible to the average worker. Similar to the effect of neutral arbitration upon a negotiation process, this sort of mediation requirement would tend to force management's policy paradigm into longer term considerations where the sensibilities and interests of management, as the representatives of capital interests, and the workforce begin to harmonize.

In Gutman and Thompson's analysis, this trend towards a common language, value set, and expression of goals can only begin once two preconditions are met. First, mutual accessibility can only be established in an environment of genuinely public deliberation. They explain: "The deliberation itself must take place in public, not merely in the privacy of one's mind. In this respect deliberative democracy stands in contrast to Rousseau's conception of democracy, in which individuals reflect on their own on what is right for the society as a whole, and then come to the assembly to vote in accordance with the general will" (Gutman 4). Their critique of Rousseau's vision explicitly rejects the sufficiency of union elections and representation. Once agreements between management and the union are reached, the policy must be returned to the shop floor for consideration. Private deliberation within the union is not sufficient. The union must articulate its reasoning to the workers in order to ensure that its logic meets the standard of mutual accessibility. The process must begin and end with vibrant public deliberation.

Second, the doctrine of mutual accessibility relies on the willingness of deliberative actors to select arguments that minimize potential contention. Gutman and Thompson continue:

In giving reasons for their decisions, citizens and their representatives should try to find justifications that minimize their differences with their opponents.

Deliberative democrats do not expect deliberation to always or even usually yield agreement. ... Practicing the economy of moral disagreement promotes the value of mutual respect (which is at the core of deliberative democracy). By economizing on their disagreements, citizens and their representatives can continue to work together to find common ground, if not on the policies that produced the disagreement, then on related policies about which they stand a greater chance of finding an agreement. (Gutman 7)

Here, Gutman and Thompson explicitly suggest a longer term, multiple game deliberative process. By fostering a communicative paradigm that economizes on points of disagreement and focuses on longer term common interests and opportunities for cooperation, deliberative processes can communicate to all parties a sense of mutual respect and overwhelming commonality that transcends the perils of immediate divisiveness. These sorts of normative shifts in the deliberative process remove the perverse incentives associated with a single negotiation and allow the interests of all parties to tend towards a common ground in the long run. To return to Hicks' language, this sort of mutual accessibility paves the way for individuals to begin to understand their own identity in terms of their membership in the firm.

After accessibility, the third component of successful participation is binding decisions. In order to generate the worker buy-in associated with successful deliberation, the process cannot be merely hypothetical or theoretical. In order to be genuine, the outcomes of deliberative

processes must have visible and practical effects. In Gutman and Thompson's language: "the process aims at producing a decision that is binding for some period of time. In this respect, the deliberative process is not like a talk show or an academic seminar. The participants do not argue for argument's sake; they do not even argue for truth's own sake. They intend their discussion to influence a decision" (Gutman 5). Under this requirement, the deliberative process cannot function as a primarily suggestive or advisory forum. Deliberation cannot properly function as a token of management's good will or as an ancillary appendix to the real negotiations between management and union leadership. These latter forms would detract from the aura of authenticity surrounding a genuinely participatory system. Workers are neither ignorant nor naive; they are savvy people fully capable of sensing processes that are a sham. If a participatory forum is nothing more than a managerial gimmick designed to dupe people into believing that their input is relevant and important, the process is doomed to failure, and workers will resume their short-run, risk-averse, individually focused decision calculus.

In terms of the three structural components described in this model, the binding decision requirement prescribes a highly accountable union system. Individual workers have neither the time nor the technical expertise to engage in the highest level negotiation processes, so the views of the workforce are aggregated through a work council and a formal union. In a binding deliberative process, however, the will of individual workers does not end with the election of union leaders. Gutman and Thompson explain: "citizens rely on their representatives to do their deliberating for them, but representatives are expected not only to deliberate among themselves but also listen to and communicate with their constituents, who in turn should have many opportunities to hold them accountable" (Gutman 30). After a decision between labor representatives and management is reached, the union must return the policy to its constituents,

justifying its propriety. In the spirit of binding deliberations, this process of accountability must also be binding. If the union is unable to persuade its members of an agreement, it must return to management and revisit the policy. The structures and formal procedures provided by a union serve to expedite the process, but ultimately, a decision reached through deliberation itself serves as the binding policy.

In accordance with this spirit of accountability, the final component of successful deliberation is frequent and regular opportunities to revisit decisions. Recall that Axelrod prescribed frequent and regular negotiations in order to emphasize the longer run common interests of two parties and incent cooperation in any single meeting. Gutman and Thompson proceed with similar logic in arguing that successful deliberation must be dynamic over the longer term. They write:

Although deliberation aims at a justifiable decision, it does not presuppose that the decision at hand will in fact be justified, let alone that a justification today will suffice for the indefinite future. It keeps open the possibility of a continuing dialogue, one in which citizens can criticize previous decisions and move ahead on the basis of that criticism. Although a decision must stand for some period of time, it is provisional in the sense that it must be open to challenge at some point in the future. (Gutman 6)

This dynamism prevents the deliberation process from becoming path dependent. Individual precedents can be revisited at any point. This freedom to challenge previously accepted norms reduces the feeling of incredible importance attached to a single negotiation and allows the parties to a deliberation to consider the longer term more readily. For example, a workforce may be anxious to accept a pay cut during a particular economic downturn for fear of setting a

problematic precedent wherein the workers would bear all of the hardships of recessions in the future. Under a process of genuine deliberation, this anxiety should fade because past policies can be revisited at any time to account for the ever changing context. This process of constant re-visitation bolsters the communicative aspect of participation because it improves the authenticity and binding authority of a deliberative body. At no point should a deliberative process become a mere perfunctory procedure because the workforce would never be permanently bound by the decisions of its predecessors or the power structures of the past.

In combining these deliberative and communicative requirements with the structural and procedural shifts advocated by unionization theorists, a coherent model of worker participation begins to emerge. This model prescribes a democratized workforce and tends to place as much emphasis on the cultural and social milieu of a firm as its formal work procedures. In traditional economic study, the empirical analysis of unions and worker participation schemes is largely inconclusive. In the words of economist David Lewin studies of worker participation have yielded the conclusion that, “union worker exercise of voice ... can have a variety of outcome ranging, probabilistically, from highly positive to highly negative” (Lewin 318). Where participation succeeds in buttressing the competitive prospects of a firm, something beyond the tangible and measurable differences in procedure between union and nonunion firms is at play. This model seeks to describe the procedure by which the union can be transformed from a countervailing power structure used to challenge management to a cooperative forum designed to find the common ground between workers and capitalists.

Where this transformation is successful, empirical study has shown that, in certain firms, increasing union voice tends to reduce quits, absenteeism, malingering, and “quiet sabotage” (Bennett 242) while improving the propensity towards workplace innovation and increasing the

liquidity of information (Bennett 221). This form of union voice represents the highest aspirations of Lazonick's elusive privileged access employment relationship. In other words, the democratized workforce model begins to sketch out the components of industrial relations that affect changes upon the unexplained, human variables of economic growth. Stepping back for a moment, the insight of this model is highly intuitive. The workers relationships with their peers and workplace affect their willingness and ability to be productive and, accordingly, the competitive potential of the firm. A social climate predicated on respect will tend to outperform one based in domination. Further, the more that a firm emphasizes a dynamic, investment laden growth strategy, the more it will need to rely upon the positive relationships in its increasingly stressed workforce. At the human level of analysis, social dynamics like reciprocity and commitment ought to take on the same fundamental importance afforded basic economic considerations like the capital to labor ratio. Accordingly, the democratized workforce model is inherently prescriptive. It imagines a new sort of firm, poised to take advantage of the mysterious human elements of economic growth. Humanizing the study of economic growth reduces the certainty and formalist rigor of these prescriptions but firmly plants the consideration of competitiveness in a familiar social context.

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