

SOME PROPERTIES OF TACHAI-TACHING COOPERATION

By

Roberto M. Bernardo*

It is now more than a decade since the Chinese press and radio have been describing and fanning the nationwide campaign to imitate the Tachai Brigade in agriculture and the Taching Oilfield in industry. A very crucial point in the implementation of the Tachai and Taching work ethic was, however, the Cultural Revolution of 1966-1969. A well-known economist who visited China in 1972, James Tobin, observed that the Cultural Revolution appears "to have given the country not only efficient and dedicated administration but also very high morale and community of purpose. Work and production, more work and production, are the current Maoist keynotes. All the patriotic zeal with which an authoritarian regime can indoctrinate a population is channeled to this end."¹ Tobin's fellow travellers to China, among them Wassily Leontief, John K. Galbraith, and Lloyd Reynolds, have written similar if casual observations.²

*Visiting Professorial Lecturer at the School of Economics, University of the Philippines, first semester of academic year 1974-75, and Lecturer in the Departments of Management and Economics, University of California Extension. The author is thankful for financial support from the Institute of Economic Development and Research of the School of Economics, University of the Philippines for this paper and for a forthcoming monograph from which this is taken. Thanks are also due to Paul Ivory and C. P. Chen of the Berkeley Center for Chinese Studies: they shared some of their vast factual and linguistic knowledge of China with the author together with the U.S.-China Association of San Francisco through whose auspices the author met and talked to nearly five dozen recent visitors to China. This research into the Chinese economy was begun and completed while the author was with the University of California Extension.

¹ James Tobin, "The Economy of China: A Tourists's View," *Challenge*, March-April 1973, p. 22.

² Wassily Leontief, "Socialism in China," *Atlantic*, March 1973; John K. Galbraith, *A China Passage* (Boston, Mass.: Houghton Mifflin Company, 1973). Tobin, Leontief, and Galbraith visited China together for two weeks in September 1972.

Throughout 1974 and early 1975, the Chinese press and radio continued to whip up interest in the organizational, technological, and other economic achievements of Tachai and Taching. Consider, for instance, a monitored broadcast in Mandarin on December 18, 1974 proudly announcing a pledge to imitate Taching by the Kailuan Coal Mine in Hopei province. Consider a Peking radio broadcast on the same date lauding the results of a Kansu provincewide conference on learning from Taching. Many enterprises reportedly formulated plans to emulate Taching and as many as 432 advanced units, collectives and model workers received public honors in the process. In Sian, a Shensi provincial broadcast the day before reported the accomplishments of a symposium on learning from Tachai in the same vein of partisan journalism.³ Not to be surpassed in enthusiasm, *Peking Review* opened the new year 1975 by giving plenty of credit to the emulation of Tachai for "an all-time high" of grain output in 1974 that "topped the more than 250 million tons of 1973." Balancing its economic news by casting an eye on the industrial front, it emphasized equally that "the Taching spirit has not only spurred China's oil industry on but pushed all industry ahead. . . ." The average annual increase of crude oil from Taching's wells since its start in 1960 is allegedly 31 percent.⁴ This feat of Tachai is matched only in the arid northern Shansi. The year 1949 saw a measly grain output per hectare of 630 kilograms per year. But for the past three years, even of bad weather, grain output exceeded 7,500 kilograms a hectare. Tachai's newly appointed female administrator attributed this achievement to the Party's unceasing "work to revolutionize people's thinking."⁵

The Chinese press probably exaggerates these figures. But even a large rate of discount applied to them would leave impressive reminders of success, causing *Newsweek* to take China out of the camp of poor nations blighted by the food shortage.⁶ Other

³From Daily Report: *People's Republic of China*, December 19, 1974, pages K1 and M5, and M2 respectively. This broadcast information service is published by the U.S. Department of Commerce and will henceforth be referred to as DRPRC.

⁴*Peking Review*, January 3, 1975, pp. 8, 9, 16. See also DRPRC, December 30, 1974, page K2.

⁵Kuo Feng-lien, "The Tachai Road," *Peking Review*, October 4 and 11, 1974.

⁶See *Newsweek* (its Special Report on Food), November 11, 1974, p. 88; Feng Nien, "How China Solved Her Food Problem," *China Reconstructs*, January 5, 1975, p. 2.

corroborative data (cf Table 1) sifted by other sources lend additional credence especially to the official qualitative releases, a recent one being the thrilling official announcement to the outside world at the commencement of the current year: "China is self-sufficient in grain."

Table 1

COMPARATIVE GRAIN YIELDS in 1971 IN TONS PER HECTARE

	Rice	Wheat	Maize
People's China			
Tachai, 8.2 tons of combined grains including millet*			
High Stable Yield Regions	4.2	2.9	—
In Other Areas	3.0	1.1	—
Average For Country	3.2	1.5	2.8
Japan	5.2	1.8	—
Taiwan	3.4	2.3	—
India	1.7	1.3	0.9
United States	5.3	2.1	5.5
Indonesia	2.4	—	—
Bangladesh	1.5	—	—

**China Reconstructs*, August 1972, p. 41; other data from Benedict Stavis, *China's Green Revolution* (Ithaca: Cornell University China-Japan Program, 1974), p. 4; *Production Yearbook 1972 and 1971*, FAO.

What is Tachai and Taching cooperation and how might it have contributed to these macroeconomic achievements? These are the main questions I shall discuss in this paper. I should like to add, however, another macroeconomic achievement related to our topic, namely, the elimination of unemployment. "An extremely important principle which Chinese development exemplifies," Mrs. Joan Robinson wrote fairly recently, "is that unemployment is not due to 'over-population' or 'lack of capital,' but to the organization of society."⁷ If it is indeed true that China has eradicated unemployment, then it has marked a momentous event in the history of the world. What is the evidence then for that allegation? Very little, since the Chinese provide us with no hard data and detailed statistics. Their press merely tells us qualitatively that labor shortage in the countryside exists and that one of China's proudest moments was the

⁷Joan Robinson, "Achievements of a Generation," *China Now* (London), October 1974, p. 2.

elimination of unemployment as early as 1958.⁸

At this state of our relative nescience of the Chinese economy we can only put reasonable faith on the judgment of outside students of Chinese reality. Charles Hoffmann accepts the official line on full employment but he dates it from 1971.⁹ That year marked a high point in the rustication of about ten million educated youths and surplus workers, and in the promotion of medium-and small-scale industries in the rural areas. Tobin offers no dates but assures: "There is no unemployment in China. The Chinese proudly make this claim, and I find it easy to credit."¹⁰ A group of five Yale economists headed by Lloyd G. Reynolds sum up their firsthand survey of Chinese agriculture in a way consistent with the full employment thesis: "All in all, we concluded that the claims of full employment in the rural sector were valid. Some of this employment, to be sure, has a low yield per man-hour — for example, creating new land with great effort by carrying baskets of earth from some other area. There is doubtless a tendency to treat the available labor as an overhead cost and to regard *any* addition to output as worthwhile."¹¹ In a way this paper focuses on this last sentence of Reynolds by expanding it analytically in various ways. I shall argue that the conquest of the Everest-like peak of full employment does much to the relative emphasis on collective 'moral' incentives over private material spurs. Yet, insofar as moral incentives are successfully stimulated centrally in the work collective that sooner or later accepts it internally, then that boils down to the treatment of each member as an overhead cost. It follows from this that the aim of the Chinese collective enterprise is the enhancement of its total output curve or the average product of the *entire* working community. But we anticipate the final section of this paper.

The essence of the identical cooperative work ethic of Tachai and Taching is collective moral incentives, and its nationwide implementation does not mean that private material incentives should be banished but that they do not predominate. It means that the motive

⁸ See, e.g., the unsigned "How Did China Wipe Out Unemployment," *China Reconstructs*, March 1974, p. 31.

⁹ Charles Hoffmann, *The Chinese Worker* (Albany: State University of New York Press, 1974), p. 55.

¹⁰ Tobin, *op. cit.*, p. 26.

¹¹ Lloyd G. Reynolds, "China's Economy: A View from the Grass Roots," *Challenge*, March-April 1974, p. 14.

of working more for the community's sake than for oneself, or, which is the same, working more indirectly for oneself by first raising the income of the entire collective, have relative primacy. This relative primacy over private material incentives expresses itself, the Chinese imply, by the abolition of the pre-1967 piecework and related individual bonus payments for various aspects of production and by the use of egalitarian wages incompatible with an inherently unequalitarian labor market. In a country so vast and relatively decentralized, not even its central directors know the real extent and depth of the implementation of the Tachai-Taching work ethic. I can do no better than echo the consensus among visitors to China that it is widespread in some important sense. Tobin's cautious assessment, in his cited article, seems fair: "China really is at the beginning of an experiment to see if nonpecuniary incentives can be substituted for substantial income differences as inducements for high-quality professional, scientific, and administrative performance. Of course, the chances of success are facilitated by the state's control of job allocations . . ." He was, like most of us, very "surprised at how easily and cheerfully they accepted this fact of their lives, and how little value they placed on the freedom of choice they lack. One after another simply said, "I go where the state needs me most."

Emphasizing Collective Spurs by Abolishing Piecework

All wage payment systems are, in a general sense, material incentive plans. But industrial engineers in capitalist countries do not customarily call pay by the hour or day or month a material incentive plan.¹² That term is usually reserved for piecework: the counting of a man's output and paying him more money or less money, depending on his counted output. Time rates of pay, on the other hand, possess a lower material incentive value than piecework because under time rates no direct relation between pieces of output and pay exists. The pay for high productivity workers comes in the form of pay or merit raises or in promotions none of which ensues immediately or is certain. Also, pay raises given for productivity above conventional standards are usually small and they are not proportional to measured differences in productivity between workers. Because of these differences in the two payment systems, industrial engineers in market economies often advocate piecework and other bonus plans finely tuned to variations in productivity. Thus, Franklin Moore writes in his widely used text: "He [consultant

¹² Franklin G. Moore, *Manufacturing Management*, (Fifth ed.; Homewood, Illinois: Richard D. Irwin, Inc., 1969), p. 443.

Phil Carrol] says [piecework] incentive workers turn out two thirds more than hourly paid men. This checks with my own experience years ago as an hourly paid employee, and as a pieceworker, and lastly as a time study engineer. The men I worked with wanted to earn more money, and worked harder to earn more."¹³

The preceding discussion suggests that one indicator of the relative strengthening of collective incentives is the widespread elimination of individually-centered piece and bonus incentives. An important achievement of the Cultural Revolution of 1966-69 was such an abrogation of private monetary incentives that predominated in the pre-1967 economy. Although this statement applies especially to the industrial sector, it applies to agriculture as well. But in a vast country which is necessarily imperfectly planned from the center there is bound to be a segment of undetermined size whose practices deviate from central policy, all or part of the time. Thus the current mini-Cultural Revolution, which began in late 1963 aimed at deepening moral incentives and preventing backsliding, exposed contrary practices. The *Heilungkiang Daily* of March 6, 1974 published a poster from Harbin Railway workers criticizing cash bonuses and leaders who restored them in late 1972. A letter published in the *Anhui Daily* complained similarly that a mining

"... team devised a system of awards according to which a worker would be awarded one yuan for each prop recovered, but would be fined one yuan for each prop lost. In addition, if the entire mining team meets the State target for recovering pit props, each member of the team receives rich awards. When this system was resisted by us and rejected by the Huainan Municipal Party Committee and the Huainan Mining Bureau's Party Committee, some of our leaders, instead of criticizing the resurgence of the revisionist line, still hankered after this system. They argued that although this system looked bad, it was in fact very effective. Were these leaders not trying to say that the workers work simply for money?"¹⁴

It is also worth our time to comment on the prevalent wage system in agriculture after the Cultural Revolution of 1966-69 because confusion among writers characterizes its description. Frederick Teiwes, writing in the prestigious *China Quarterly*, thinks that "piecework [in agriculture] is used where it can be readily

¹³ *Ibid.*, p. 444.

¹⁴ As quoted at length in *China Now*, September 1974, p. 3.

plied." He may have been influenced in this by the group of British engineers who reported: "In the communes, however, there appeared to be a slight deviation from the Marxist-Leninist abhorrence of piecework . . ." ¹⁵ Elsewhere I wrote with some degree of detail on the prevalent job evaluation methods used in Chinese agriculture. ¹⁶ I shall merely summarize its conclusions here. Two varieties of points systems provide the means for figuring out basic, though variable, time rates of pay for each farmer. These two points schemes are similar in intent to several formal varieties of point plans used by many large American corporations for pricing its myriads of satisfactory jobs in terms of their respective basic time rates of pay. The first points method is the informal and participative fixing of points and its flexible application of these points-grades monthly or early or more often on each farmer by mass discussion. Jack Chen, who spent a year with a brigade in 1969-70 describes the other system of fixing work-points to the job, and not to the man: "In these cases each job had its work-point tag fixed by common agreement, and anyone who did that job would get that number of work-points." He adds: "Upper Felicity had tried it once but found that it caused too much discussion and waste of time arguing the merits of a particular job and the way it had been done. Like the system used in Upper Felicity, this system led to average able-bodied commune member earning around ten work-points a day . . ." ¹⁷ The fixing of points on pieces of output, which would have converted the points system into piecework, is not widely used.

Extra Savings by Eliminating Piecework

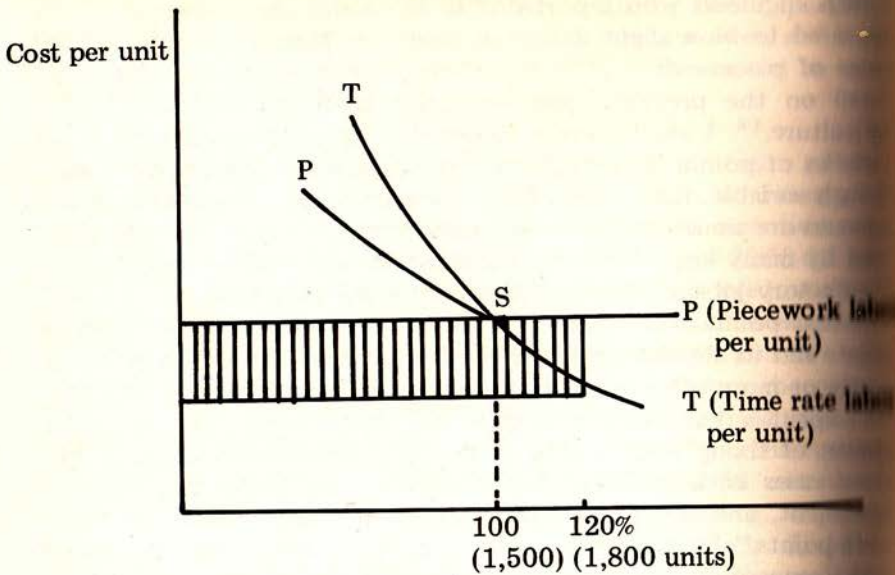
The promotion of the Tachai-Taching work ethic and the consequent widespread elimination of piecework, under possibly unique Chinese historical conditions, generated savings as the following simplified diagram suggests. These savings from lower unit costs and greater capacity utilization is in addition to those that were saved from the dismantling of a cumbersome piecework administration.

¹⁵ See his "Before and After the Cultural Revolution," in said journal, June 1974, p. 338; Hugh Scanlon, *et. al.*, Shop Floor Discussions: British Engineers in China," *China Now*, April-May 1973, p. 3.

¹⁶ Roberto M. Bernardo, "Participative Job and Enterprise Administration in China," from which unpublished monograph this paper is taken.

¹⁷ Jack Chen, *A Year in Upper Felicity* (New York: Macmillan Publishing Co., 1973), p. 163.

Figure I



Production as a percentage of the Standard

Note from the graph that the collective enterprise saved nothing in reduced direct labor cost per unit above the commonly agreed standard number of pieces from the use of piecework payments. Under the pre-1967 piecework system, labor cost per unit remained constant since total labor costs rose proportionately with total outputs. For example, a worker with a basic time rate of pay of 3.00 yuan per day but whose standard output or norm is 15 assembled tables per day is really getting paid 24 yuan-cents for each table. Suppose the enterprise now pays him piece wages and that causes his motivation to rise as shown by his putting out more speed, accuracy and time worked. He might then finish 18 tables a day and thereby earn 4.32 yuan a day (18 times 24). The direct labor cost per unit in the factory remains the same under both payments systems although our harder-working laborer's daily take-home pay under piecework is, of course, larger. The gains to the factory from piecework come from the more intensive employment of capital. Unit operating overhead costs decline as these costs are spread over a larger volume of products, boosting net income disproportionately. Suppose our pieceworker in this example produces below the conventional standard, which experienced time study analysts can set with a surprisingly high degree of agreement. Under piecework, labor cost per unit to factory does not remain symmetrically constant in the

graph because there were reduced daily-wage guarantees made to pieceworkers in the pre-1967 system for performance below the standard.

How is the standard output set for each given job? The state of technology determines the standard number of pieces and, given this, industrial engineers set it so as to allow good, able-bodied workers to exceed it by 15 to 20 percent.¹⁸ The standard is the level of production at which time rate labor cost per unit is equal to the piecework labor cost per unit, as the graph above shows. This level of production is marked at 100 in percentage terms. Since we assume here that 100 workers populate our firm above, 100 percent of standard corresponds to 1500 tables. We therefore assume the universal ground rules whenever diagrams are offered to illustrate essential points that each of the subjects represented are more or less homogeneous units. As technology changes, the curves shift horizontally with 120 percent, say, becoming the new 100 percent standard output.

The two basic methods of paying wages have point S as a common link. Indeed basic time rates of pay are set first in the process of calculating piecerates. And management implicitly expects a level of standard output from its workers on time rates. If basic time rates of pay rise as they did for the lower wage-classifications in 1971-72 at the same expected standard output, the two kinds of labor cost per unit curves both shift upwards directly above point S, maintaining the same relative positions with respect to each other. The important property of the graph above is how the labor cost per unit under time rates of pay declines relative to what it would be under piecework — for production runs above the conventional standard output per worker. Thus, the abolition of piecerates and related individual bonuses during the Cultural Revolution, abstracting from initial installation costs of the new time rates, generated unit labor cost savings approximately represented by the shaded area on the graph. This is contrary to what we would expect under a market socialist or capitalist setting and it requires further explication.

The first assumption of the shaded area of periodic savings is that the level of motivation after the abolition of piecework did not decline. The level of motivation depends upon labor intensity, accuracy, and overtime work. Numerous travellers' reports and

¹⁸“If, for example, time study shows the normal production per hour should be 100 pieces, a typical pieceworker will generally turn out 130 or more and earn a corresponding bonus,” Moore, *op. cit.*, p. 480.

official releases indicate that these components of the workers' motivational level did not decline after the transition to time rates of pay. At Tachai, for instance, its communitarian work ethic reportedly raised the number of days worked by the average worker from 260 days in 1962 to 280 days in 1964. And all the various accounts of Tachai show continuity in that trend. Intensity and accuracy — diligence for short — seems to have been maintained as its director suggests: "Then again in the spring of 1973 a drought of unprecedented severity struck Tachai . . . we let other brigades and teams use the reservoir while we ourselves fetched water from ponds. . . . We had to carry 100 shoulder-poles for every *mu* [.067 hectares] of land, each round trip covering 5 kilometers. . . . That's how we managed to get a bumper autumn harvest in spite of the drought."¹⁹ Similar stories of sustained supplies of diligence and long work-days and long work-years from Taching's workers abound.²⁰ *Newsweek* in its February 1972 special issue on China noted that Chinese farm workers generally put in 10 hours a day. Even the anti-Communist and incisive *China News Analysis*, while emphasizing Chinese resistance to non-monetary incentives, noted that "hundreds and thousands are toiling everywhere on water regulation. . . . These great efforts are undoubtedly achieving much. All this work is being done for little or no remuneration."²¹ A *New York Times* correspondent quotes from his 1971 visit with the chief of production of the Tientsin Machine-Building, which employs some 5,000 workers: "Mr. Liu and his associates insisted that worker enthusiasm was high in the plant, . . . and that workers had voluntarily put in large amounts of overtime without extra pay . . ."²² This type of reports can be multiplied quite easily but it would seem to serve no further purpose.

We must assume it seems, that the level of motivation was at least maintained at the old piecerate level with the switch to time rates of pay. Since this is not normally what we would expect, how was the level of motivation kept from backsliding in the face of the relative weakening of private monetary incentives? The answer at the most

¹⁹ See *People's Daily*, August 6, 1967, p. 5 and *Peking Review*, October 11, 1974, p. 20 respectively.

²⁰ See, for instance, the numerous labor exploits chronicled in *Taching: Red Banner on China's Industrial Front* (Peking: Foreign Languages Press, 1972).

²¹ *China News Analysis* (Hongkong), January 8, 1971, p. 1.

²² Tillman Durdin, "Wage Level Is an Unsettled Problem," in *New York Times Report From Red China* (New York: Avon Books, 1971), p. 185.

general level is by fortifying nonmonetary motivators and satisfiers. Specifically, these were: vigorous group pressure, which played on the worker's need for social acceptance and esteem; the competitive emulation contests culminating periodically in the grant of various public honors in conformity with the various degrees of effort shown by workers; the incessant exhortations to serve the people by the media and the army; the whipping up of patriotism from the sense of national imminent danger from the Soviet Union and less so from the United States; and other nonmonetary means with similar production incentive effects.

One important incentive forged by the Cultural Revolution is the socio-technical redesign and enrichment of the job and workplace itself. The improvement of their nonmonetary characteristics sought to reinforce and ignite dormant psychic incentives. These improvements went beyond, say, the orthodox job enrichment experiments of many large American corporations by including participative and democratic ways of changing the total enterprise environment and culture. The resulting provision of a high-trust atmosphere facilitated the enjoyment of warmer mateyness and enhanced cooperative behavior. Thus, workers could expect with a higher level of certainty that their peers and superordinates would contribute diligence and overtime also if everyone was so enjoined. The promotion of a relatively egalitarian distribution of job satisfactions, power, and respect within the enterprise must also have contributed its bit in compensating for weakened monetary incentives. Space limitations constrain us from discussing these questions in greater detail.^{2 3} In any case, the central focus of this paper is on some of the main effects of the Tachai-Taching work ethic, the essence of which of course is the emphasis on collective nonmonetary incentives over private gain.

Egalitarian Effect on Wages

Much earlier we noted a major effect of the Tachai work ethic in generating savings from lower unit labor costs and from greater use of plant capacity. Here I focus on another important effect of that work ethic, which is its radical levelling of both industrial and agricultural wages. So profound is the levelling, as a matter of fact, that it precluded the use of a live market in the recruitment and deployment of labor. Indeed Chinese ideology criticizes the Soviet Union harshly for its wide use of the labor market where labor is

^{2 3} I deal with this topic in detail in my mentioned monograph.

bought and sold like any other capitalist commodity.²⁴ By thus calling the Soviet Union a capitalist country Chinese policy-makers imply that uninhibited use of labor markets is what defines capitalism and that a country that relies primarily on private material incentives, as the Soviet Union does, must free inherently inegalitarian labor markets. Even the less egalitarian wages of 1966 caused Barry Richman to write from his visit in that year that "occupational-income differentials in China are probably lower than in any other country . . ."²⁵ More recently we have other visitors tell us of a further narrowing in wage differentials. Wassily Leontief wrote, for instance: "The span between the lowest and the highest income in today's China is so narrow, however, that no significant difference between the life-styles . . . arises." James Tobin gives us some numbers which are fairly typical: "In the textile factory the lowest wage was 35 yuan per month; the average was 60; the highest wage for workers was a bit more than 100; engineers and technicians earned 130-140." He notes that "some physicians and surgeons earned 200 yuan and even 300." But "the high wages . . . are obsolete vestiges of the past, maintained for present incumbents out of humanity . . . it was implied that the current generation of physicians, properly inculcated and motivated by Maoist thought, would not expect to advance much beyond 100 yuan."²⁶ In agriculture, where 80% of the population live, wages are even more narrowly spread, since the typical range of points received daily by farmers varies from 7 to 13 and, in addition, from 40 to 60 percent of the wage fund is distributed equally independently of labor input.²⁷ And in regard to the gap between industrial and agricultural incomes, the most accurate rough figure consistent with the various intimate accounts we have of commune life comes from *Time* magazine's well-researched article on China of February 1975: "The average factory worker makes a meager \$28 a month; the average

²⁴ See the unsigned article "Serious Fluidity of Manpower in Soviet Union," *Peking Review*, September 27, 1974.

²⁵ Barry M. Richman, *Industrial Society in Communist China* (New York: Random House, Inc., 1969), p. 240.

²⁶ Leontief, *op. cit.*, p. 75; Tobin, *op. cit.*, p. 29.

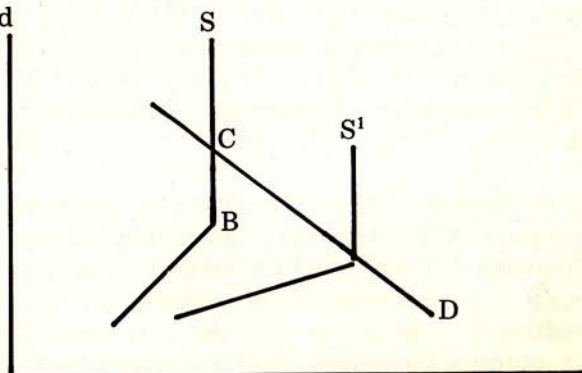
²⁷ According to Jack Chen the actual proportion between these limits depended on the results of discussion and the team's political and social consciousness. Lately the actual proportion seems to have risen nearer to 60% in favor of equal division. See his cited work, pp. 158, 377.

peasant living on a commune about half that.”²⁸ I skip here the lower wages given to apprentices. These are mainly teenagers fresh from junior or senior middle school seeking continuing education and training, not in senior middle school or in the universities, but in the factory. Since the Cultural Revolution, Chinese factories have increasingly become schools and training centers as well. These wages are more in the nature of stipends or allowances.

I should now like to show how the stress on non-monetary incentives released equalizing forces that helped compress wage differentials. The following diagram facilitates explication of the main equalizing forces.

Figure II

Relative Wage
of Skilled Persons
per training period



Relative Supply of Skilled Persons per training period

The height C represents the relative wage of a highly skilled worker under a market setting. Take a look now at the excess of the market wage over the price necessary to induce the last skilled laborer to supply his services. This surplus of the market wage over the marginal supply price is CB. Primary reliance on moral as against material incentives means that this surplus is severely reduced, if not unpaid. The central wage-fixers' tendency to depress wages down to

²⁸ *Time* (China Cover Story), February 3, 1975, p. 22. This ratio between average urban to average rural income seems more consistent with many accounts such as Jack Chen's portrait of commune income and standards of living. Consistency, too, comes from Arthur Galston, *Daily Life in People's China* (New York: Thomas Y. Crowell Co., 1973). See also Tobin, *op. cit.*, p. 27.

B or even below it generates an excess demand for skilled workers at the depressed wage. Quantity, not price, adjusts to this excess demand in due time through the massive commune and factory educational and training programs. Trainees and apprentices are upgraded to the high-skill occupations in team, brigade, and factory. This training and upgrading then enables the production unit to offer skilled personnel lower wages than would be the case if skilled workers had paid for their training. The lower pay for skilled workers is the unit's way of collecting its investment in the workers' education without fear of losing them to higher-paying competitors. Because of limited mobility and low turnover of labor in team and factory, these possess added incentives in providing their workers with general skills as well, and not just those narrow specific skills needed by the enterprise in question. The group loyalty the trainees acquire and the inertia workers accumulate during their time with the enterprise permits further compression of wage differences without causing skill formation to melt away. The process of selection of candidates to the factory's technical colleges and to the universities outside also exerts an equalizing force on wages. These higher-education students are recommended by their work centers both for their talents and their political consciousness. As egalitarian Reds, they are expected to temper their demands for higher pay.

The massive training programs in factory and commune alike epitomized by the national campaign to "train and bring up millions of successors" have raised the relative demand for unskilled laborers. Although this demand for unskilled labor is centrally imposed and subsidized, enterprises have a stake in it too. With future demand for their outputs guaranteed and growing briskly, investment in skill formation will not result in too many skilled technicians. The relative wage of the unskilled thus tends to rise.

All the various forces discussed so far, including activity designed to influence the worker's attitudes toward labor and technical study and innovation, shift and flatten the relative supply curve of labor after the passage of time. Instead of the old S-curve we now have S' at a lower relative wage for skilled laborers. It meets the implicit demand curve, which we have not shifted for simplicity, at a zone where the supply turns up vertically, thus eliminating the payment of large monetary surpluses to both marginally and intra-marginally supplied workers.

The Tachai-like Firm

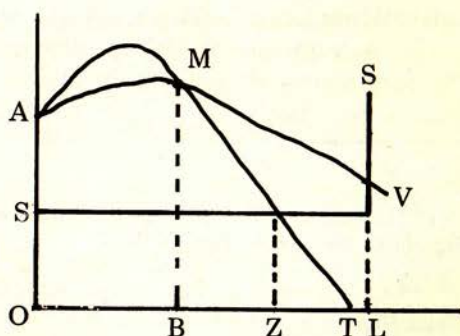
The previous discussion leads finally to a way of characterizing

the major aim of a Tachai-like firm. We suggested earlier that it has an employment demand for unskilled workers to train. By unskilled I mean those whose added contributions to current product are below prevailing total wage rates per worker. Official insistence on an agricultural labor shortage suggests that such a demand exists. Officials do not mean that at prevailing minimum wage rates, there are excess demands for workers. In the Chinese context it most probably means that additional laborers recruited by a team or brigade would have positive additional products that, at the very least, do not fall below zero.

But why would a Tachai-like or Taching-like firm employ workers with such low productivities? The demand to train discussed in the preceding section provides a partial explanation. The national policy of guaranteeing everyone a job coured through the local labor bureau with which the enterprise collective must coordinate its decisions to hire and fire is another reason. Then the Tachai-like firm, publicly esteemed for its production count, may desire production size and thus employ all available labor. Finally, the relative primacy of collective incentives over private material ones means willingness on the firm's part to share income with the available members of the work community. We assume here that this centrally stimulated ethic has been accepted in some significant way by those who direct an undetermined majority of Chinese firms. The upshot of this discussion is that the Chinese firm behaves in such a way as to enhance total production. It treats all available labor as overhead costs. The following graphical model of the Tachai-like firm comes to mind:

Figure III

Average Product (AMV);
 Marginal Product (AMTL);
 Total Wage per worker (OS);
 Supply of workers (SS')
 Demand for Workers to employ (MTL)



Number employed per period

The average products and the added products of labor appear vertically, and are based on a 40-hour week, which we take merely for comparative reasons. We show an increase in the hours worked per week as an upward shift of both productivity curves. The height OS represents the average wage paid by the collective. Note the low added products of the relatively unskilled represented by ZL. Under a free market system these workers are unemployed since the profit-maximizing employment is OZ. Under the Tachai-Taching nonmarket system, the available number of employment maximizes to total output of the entire work force; it is also the level of employment that maximizes the average product of the entire working community. Since total wages per person including collective consumption rises eventually with decisive increases in average productivity, the system is biased not only toward full employment but in efforts to constantly shift the productivity curves up — through technological and managerial innovations.

Finally the tendency to employ all available laborers means, too, that there is a tendency to employ capital fully. This seems obvious, since laborers require plant and equipment to work productively. What is the evidence on time rates of capacity utilization in China? We can do no better than make an educated guess at this based on the disparate scraps of data available. The group of five Yale economists headed by Lloyd Reynolds reported from their visit that "most plants operate two or three shifts, which is sensible in a capital-scarce country."²⁹ Another committee of scholars reported from their visit: "In the Peking factory, for example, 9,000 workers in three shifts work . . ." They add: "At the Shanghai Machine Tool Plant there were three shifts, . . ." And they observe again: ". . . there are canteens at every factory. These stay open twenty-four hours a day so that workers on all three shifts can eat . . ."³⁰ A New York Times correspondent, Seymour Topping, reported similarly from his visit: "Most large factories operate around the clock on three shifts, . . ."³¹ A more recent visitor substantiates this when she writes that "factory plants often are fully utilized, producing on a three-shift, 24 hour a day basis."³² A group of Philippine executives including

²⁹ Reynolds, *op. cit.*, p. 16.

³⁰ Committee of Concerned Asian Scholars, *China: Inside the People's Republic* (New York: Bantam Books, Inc., 1972), pp. 187-88, 190.

³¹ See his "Welfare Plan Assures Minimum Living Standard," in *New York Times Report from Red China*, p. 190.

³² Evelyn Schoenfeld, reporting in *U.S.-China Friendship Newsletter* (San Francisco), January 1974, p. 2.

economists who visited China in 1972 made a similar statement, too, in their report.³³ So did a group of British engineers who wrote on their return from China: "Factories and plants with few exceptions operate on a three-shift system . . ."³⁴ It is easy to multiply these travellers' casual reports on the rather high rate of capacity utilization in contemporary China since many of them eventually yield up such information as when two visitors tell us that a textile mill they visited in Chenchou works three shifts and workers rotate shifts each week.³⁵

Why have I gone on at some length in search of these widely scattered scraps of unweighted data on Chinese plant utilization? An obviously important reason emanates from the need for some *a posteriori* indication of the plausibility of the *a priori* theory of the Chinese firm sketched above. Another comes from a wish to add a property of the participatory economy which Jaroslav Vanek does not mention in his catalogue of its comparative systemic properties. He mentions its incentives to shift up the average productivity curve of labor and the demand for workers to train although not exactly for the same reasons noted here. But he does not mention the participatory economy's effect on shift patterns probably because he does not consider China's economy to fall in that participatory category.³⁶ Finally, I complete this paper's discussion on capacity utilization because it is a focal point of current research in development economics and the Chinese experience seems to suggest that institutions can be devised to influence the interrelated variables of the level of motivation and the levels of employment of labor and capital.

Benjamin Diokno has done some empirical work in the area of capital utilization in capital-short, dollar-constrained, and labor-surplus market economies. He concluded in his research on the Philippine economy: "The existing capital stock of government favored export-oriented firms are being left idle most of the time."

³³ "Report of the Philippine Study Mission to China," (mimeograph, 1973), p. 54.

³⁴ H. Scanlon, *op. cit.*, p. 2.

³⁵ J. Goldwasser and S. Dowty reporting in *Understanding China Newsletter* (Ann Arbor), March-April 1973, p. 4.

³⁶ See his *The Participative Economy* (Ithaca: Cornell University Press, 1971).

Moreover, "empirical evidence shows that most (if not all) capital-poor, labor-surplus less developed countries are faced with excess capacity in their manufacturing sectors. In West Pakistan, G. Winston (1971) showed that the level of industrial capital utilization was about 14 percent. S. Paul (1971) approximated the average capacity utilization in India during the period 1961-1971 at 53 percent. In Colombia, F. Thoumi (1972) found the nonweighted average capacity utilization in the magnitude of 51 percent. In their recent study of South Korean manufacturing sector, Kim and Kwon (1973) showed that the average utilization rate during the period 1968-1970 was in the order of 16 percent."³⁷

The seemingly scientific numerical results above are possibly dubious because they seem incredibly low. But they do show qualitatively a significantly lower level of capacity utilization in the cited market economies than in nonmarket China. This is not supposed to be the case in the purely *a priori* theory we find in many treatises regarding the comparative efficiencies of the two systems.

³⁷ Benjamin Diokno, "Capital Utilization in Government 'Favored' Export-Oriented Firms," *IEDR Discussion Paper No. 74-8*, University of the Philippines School of Economics, July 10, 1974, pp. 6, 1-2.