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Reply to “A Comment on ‘Industry’s Response to Market Liberalization in China: Evidence from Jiangsu Province’”*

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Jiangsu has experienced impressive industrial development since 1949, often achieving higher growth rates than China’s national average. Nonetheless, rates of growth have fluctuated with distinct policy periods. In “Industry’s Response to Market Liberalization in China: Evidence from Jiangsu Province” I analyzed the structure of industrial production and productivity in Jiangsu Province to explore changes in specialization and efficiency. This research covered the years 1952–88 and focused on comparing the period before 1978, when Maoist regional self-reliance was being promoted, with the post-1978 reform when many of the self-reliant policies were reversed.

To analyze Jiangsu’s production structure, I used location quotients for 29 products. The results showed that Jiangsu’s production patterns became less specialized from 1957 to 1978, consistent with self-reliance. In fact, none of the products in the sample showed an increase in specialization during this period. After 1978, however, 14 of the products analyzed moved toward specialization, showing a clear change in the production structure.

To analyze productivity, I applied a simple growth-accounting framework, using estimates of the output elasticities with respect to capital and labor based on Jiangsu data. With these assumptions, productivity declined an average of 2.1% per year from 1953 to 1978, while it increased an average of 4.4% per year from 1978 to 1988. These results did not change substantially with alternative parameter assumptions. Both the specialization and productivity results suggest that reforms had a substantial, positive impact on Jiangsu’s economy.

The comment by MengHao Zhao and Paul M. Sommers addresses the last section of my article, which compared state and collective industrial productivity in the reform period.¹ Series for both gross and net out-

put were used, after adjusting for housing and inflation.² Capital was measured as the net value of fixed capital in each sector, adjusted for inflation. Labor was measured as the total state industrial labor force in the state sector, and employment in urban and rural collectives for the collective sector.³ Since the small number of data points precluded my own estimates of the output elasticities, I used estimates from a previous study that found a capital-output elasticity of .309 for state industry and .722 for collective industry.⁴ While this study used data from across China, these elasticities are plausible for Jiangsu as well. Using these assumptions, I found that productivity in collective industry increased an average of 6.2% per year using the gross output measure compared with 4.1% in state enterprises. Using net output, however, I found that productivity in state industry increased faster than in collective industry: 2.3% in state industry compared with 1.7% in collective industry. Based on these inconclusive results, I suggested "caution in interpreting the fast growth in collective industrial output as evidence that reforms have made China's economy more efficient."⁵

Zhao and Sommers apparently expect industrial productivity to be higher in the collective sector compared with the state sector and so scrutinize why state industry appears to perform better with the net output measure. They employ paired *t*-tests to show that collective output grew significantly faster than state output with both the net and gross output measures. Why, then, does the gross output measure show a different result than the net measure? As they suggest, the results are dependent on which output elasticity is used. They show that if we were to use different assumptions about the elasticities, we would get different results. This, of course, is to be expected.

What matters is how one justifies choosing one set of assumptions over another. Zhao and Sommers suggest using the same weights for both state and collective industry. They first apply a .309 capital-output coefficient to both sectors and then a .722 coefficient to both. Using these assumptions, they are able to conclude that productivity growth has been higher in collective industry, no matter which output measure is used. They base this exercise on the assumption that resources used in the collective sector would otherwise have been used in the state sector. This assumption, however, is highly questionable. Many analysts have written about how collective enterprise development has been largely accomplished through bottom-up initiatives, using household savings and resources of local governments as the main sources of investment.⁶ It is not at all obvious that the same resources could have been mobilized for investment in the state sector. The economy was stagnating before reforms changed the rules that allowed the development of nonstate economic activity.

Using the same capital-output coefficients for both sectors is also questionable. Since collective industry is widely thought to be relatively labor intensive compared with state industry, we would not expect that

capital and labor would affect output in the collective sector the same way as in the state sector. A higher output elasticity with respect to capital means that a 1% increase in capital invested in a collective enterprise will lead to a higher percent increase in output than additional capital invested in a state enterprise. For this reason, it is important to consider the relative weights on labor and capital rather than simply to compare growth rates of outputs to inputs, as Zhao and Sommers prefer.

Finally, let's return to Zhao and Sommers's expectation that growth in productivity has been higher in collective industry than state industry. To the extent that collective enterprises are subject to more market pressures than state enterprises, this expectation is reasonable. But there are a number of characteristics of the environment in which collective enterprises operate that might mitigate the impact of market pressure on productivity. First, intermediate inputs may have increased faster in collective industry compared with state industry.⁷ A recent study by Jefferson, Rawski, and Zheng shows this has been the case in their sample.⁸ Second, there is much evidence of overreported collective output. Jefferson, Rawski, and Zheng have shown that this factor is complicated and could either under- or overestimate total factor productivity.⁹ Third, one of the purposes of collective industry has been to absorb surplus labor from agriculture. By one account, which deals specifically with Jiangsu, there has been a "massive" shift of resources from agriculture to collective industry.¹⁰ Fourth, collective enterprises tend to use low levels of technology, which would not be expected to be as productive as more advanced methods. All of these factors would work against higher productivity in collective enterprises. Finally, at least some state enterprises have become more responsive to market incentives and have adopted more advanced technology from home and abroad.

Ultimately, how much productivity has increased in collective enterprises and how this compares with the state sector is an empirical question—not a foregone conclusion. There is much variation even within ownership categories.¹¹ The answers will depend on the data set in question, including geographic area, time period, measurements used, and methodology. But it will also depend on the assumptions underpinning the methodology. By choosing to weight the growth of labor and capital, my approach incorporates more information about how these inputs affect growth and productivity in the two sectors. We would not expect the impact of additional capital on output to be the same in both sectors. Incorporating this piece of economic information enhances our understanding of the impact of growth in inputs versus productivity on China's development progress.¹²

Notes

* Penelope B. Prime, "Industry's Response to Market Liberalization in China: Evidence from Jiangsu Province," *Economic Development and Cultural Change* 41, no. 1 (October 1992): 27–50. I would like to thank Mary Bumgarner and John Garver for their thoughts regarding this comment.

1. Data on state and collective industry were not available for the pre-reform period.
2. Since both series were available and each has its strengths and problems, both were used. See the data appendix in Prime, for details on the various adjustments made.
3. With collective employment, figures for 3 of the years were not available, so interpolation was used. Rural collectives included town and township enterprises but not village-level enterprises.
4. Gary H. Jefferson, "Potential Sources of Productivity Growth within Chinese Industry," *World Development* 17, no. 1 (1989). Since data collection and reporting have improved in China since this study was done, it now may be possible to do more precise estimates for Jiangsu, including adding more refined input categories.
5. Prime, p. 40.
6. See, e.g., Yuan Peng, "Capital Formation in Rural Enterprises," in *Rural Enterprises in China*, ed. Christopher Findlay, Andrew Watson, and Harry X. Wu (New York: St. Martin's Press, 1994), pp. 93–116.
7. Gary H. Jefferson, Thomas G. Rawski, and Yuxin Zheng, "Growth, Efficiency, and Convergence in China's State and Collective Industry," *Economic Development and Cultural Change* 40 (1992): 239–66.
8. Gary H. Jefferson, Thomas G. Rawski, and Yuxin Zheng, "Chinese Industrial Productivity: Trends, Measurement Issues, and Recent Developments," Working Paper no. 297 (University of Pittsburgh, Department of Economics, Pittsburgh, September 1995), table 5, p. 11.
9. *Ibid.*, pp. 16–21.
10. Samuel P. S. Ho, *Rural China in Transition: Nonagricultural Development in Rural Jiangsu, 1978–1990* (Oxford: Clarendon, 1994), p. 48.
11. Jefferson, Rawski, and Zheng, "Chinese Industrial Productivity," pp. 26, 32.
12. Although not directly relevant to their comment, Zhao and Sommers note that they could not reproduce my elasticity estimates from table A1. My colleagues and I reverified my estimates. It should be noted that while I report the unadjusted capital figures, I always use the revised capital numbers.