ISSN 1753-5816

School of Oriental and African Studies University of London

DEPARTMENT OF ECONOMICS
Working Papers

No.150

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STRUCTURAL CHANGE AND INSTITUTIONAL ATTRIBUTES

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November 2006

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Paper first presented at the Second Annual Conference of the *International Forum on the Comparative Political Economy of Globalization*, 1-3 September 2006, Renmin University of China, Beijing, China. The completion of this paper received financial supports from the 9-8-5 Research Funding Programs of the Renmin University of China (project entitled "Technological Innovation and China's Economic Growth"), which is gratefully acknowledged.

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ABSTRACT

China's sustained rapid economic growth over the era of its systemic reform is of general importance for late development under globalization. This paper seeks to construct an explanation of the experience, which centers around the notion of an evolving "regime of accumulation", or development path, that emboddies an uneasy mix of the attributes of allocative and productive efficiency. In this light, the analytical findings of the paper give rise to two main propositions. First, in contrast to the general direction of market reform in the institutional dimension, China's actual path of industrialization and economic growth has rather tended to contradict the principle of comparative advantage – it has been in the direction of capital deepening, especially since the early 1990s. Second, China's reformed economic institutions have encompassed both market-conforming and market-supplanting elements, represented by non-state-owned enterprises and state-owned enterprises, respectively, with the former accounting for the improvement in allocative efficiency while the latter accounting for the improvement in productive efficiency. The paper concludes with a discussion on the social implications of the findings and propositions.

1. Introduction

China's sustained rapid economic growth since the late 1970s is of general importance for world-wide late development under globalization. It is well-known that the era of globalization is also the "lost decades of development" for most parts of the developing world. As can be seen from the figures in Table 1, throughout the 1980s and 1990s, the average annual growth rate of per capita income for all low- and middle-income economies combined is both of disappointingly low magnitude and substantially lower than that of high-income economies. It should be further noted that, over this same period, there is a trend of growing disparity in growth performance across the developing world – with China, the broader East Asian region, and, to a lesser extent, India, growing much faster than the rest. For most parts of the developing world, the term "lost decades of development" is indeed no exaggeration.

[Table 1]

In the face of the picture of late development depicted above, there are two important analytical issues that have been raised in the relevant scholarly literature. First, it is noted that the slowdown in economic growth in most parts of the developing world has been associated with a process of de-industrialization, or at least industrial stagnation. This is in sharp contrast to the phenomenal progress in industrialization in China and, by extension, in the broader East Asian region. An analytical question naturally arises as to what is the relationship between industrialization and economic growth, or, more generally, what is the required structural conditions for late development under globalization (Lo 2006; Weeks 2001). Second, it is noted that the stagnation in late development has occurred "despite policy reforms", that is, despite the general process of market-oriented institutional reforms across the developing world (Easterly 2001). This gives rise to the question as to what is the required institutional conditions for late development under globalization. The surge of the so-called "new comparative economics" in recent years in the development policy-making institutions, as well as in the mainstream economic literature, represents attempts – particular but influential – to answer this question (Djankov *et al.* 2003).

The objective of this paper is precisely to attempt an analysis of the structural and institutional conditions underpinning China's sustained rapid economic growth. The analysis

centers around the notion of an evolving "regime of accumulation", or development path, that embodies an uneasy mix of the attributes of allocative and productive efficiency. As will be seen, the analytical findings give rise to two main propositions. First, in contrast to the general direction of market reform in the institutional dimension, China's actual path of industrialization and economic growth has rather tended to contradict the principle of comparative advantage – it has been in the direction of capital deepening, especially since the early 1990s. Second, China's reformed economic institutions have encompassed both market-supplanting and market-conforming elements, represented by state-owned enterprises and non-state-owned enterprises, respectively, with the former accounting for the improvement in productive efficiency while the latter accounting for the improvement in allocative efficiency. The two propositions are interrelated, because, of China's various ownership sectors, state-owned enterprises owing to their institutional attributes have fitted especially well into the capital-deepening development path. The structural and institutional characteristics of the Chinese economy are thus mutually reinforcing in the generation of the sustained rapid economic growth.

This paper is organized in five sections, of which the present introductory section is the first. The second section seeks to clarify the immediate dynamics of China's economic growth, with a focus on the role of the progress in industrialization. Section three then moves on to analyze the more fundamental causes of China's growth performance, that is, the structural and institutional characteristics of the Chinese economy which have constituted and sustained a high-performing development path. Section four provides a discussion on the social and environmental limitations to the development path, and derives a range of policy implications regarding the future prospects for China's overall economic transformation. Section five gives some conclusions both for China and for late development in general.

2. Industrialization: The Immediate Dynamics of Economic Growth

Prima facie, there should be no mistake that the immediate dynamics behind China's sustained rapid economic growth over the past quarter-century is a process of very rapid industrialization. Further to the international comparison of economic growth, presented in

Table 1, it is noted that China's progress in industrialization has far outstripped the rest of the developing world. Its real growth rate of industrial value-added reached 11.1% per annum in the 1980s, and increased further to the rate of 13.7% per annum in the 1990s. These rates are much higher than the average of all low-income economies (including China) meanwhile, 5.5% and 2.7%, respectively for the two periods, as well as that of all middle-income economies, 3.6% and 3.9%, respectively. They are also substantially higher than the average of the East Asian high-growing economies (including China), the star performers of the developing world, where the average annual growth rates during these two periods are both 9.3% (data from the World Bank, *World Development Indicators*, various issues).

Figure 1 charts out the levels of relative labour productivity of industry vis-à-vis the rest of the Chinese economy. It can be seen that the curve representing relative labour productivity calculated at constant prices has persistently and substantially exceeded that representing relative labour productivity calculated at current prices. This implies a transfer of the gains in productivity improvement, via the effect of changing relative prices, from the industrial sector to the rest of the economy. And the progressively widening gap between the two curves further implies that, over time, the indicated productivity transfer has tended to accerelate along with the progress in industrialization. The contribution of industrialization to China's overall economic growth is thus not simply a reflection of the fact that industry is part of the economy. It rather reflects a dynamic process where industry serves as an engine of growth of the non-industrial sector.

[Figure 1]

The judgement from the descriptive analyses above does not necessarily receive clear supports from standard growth accounting analysis, however. To analyze the characteristics of China's economic growth, and the role of industrialization thereof, the following two equations can be applied:

$$ln(Y/L) = lnA + gt + b_K ln(K/L) + (b_K + b_L - 1)lnL \quad (1)$$

and

$$ln(Y/L) = lnA + gt + b_K ln(K/L) + b_M ln(M/Y) \quad (2)$$

where Y, L and K are GDP, total labour employment and a measure of total capital input, respectively, M is industrial value-added, and t is a time trend. The two equations are derived

from standard neoclassical economics, in the sense that L and K are treated as independent determinants of Y, and that productivity growth, g, is assumed to be exogenously determined. The design of equation (1) is meant to detect the existence or otherwise of increasing returns, reflected in the coefficient of lnL, in China's economic growth process. And the design of equation (2) is meant to verify the impact of industrialization, in the form of the changes of the share of industrial value-added in GDP, on China's overall economic growth.

The upper part of Table 2 gives the the results of the regression analysis of applying the above two equations to Chinese data of the period 1978-2005 (the stationarity properties of these time series are analyzed in Appendix 1, where the relevant cointegration tests are also performed). It can be seen from the results that, within the neoclassical framework of analysis, the main factors behind China's eocnomic growth have been investment (b_K) and "total factor productivity growth" (g). In the mean time, the impact of industrialization on economic growth, b_M, is, surprisingly, found to be significantly negative. And it is also found that there have been strong decreasing returns in the growth process, reflected in the significantly negative value of the coefficient ($b_K + b_L - 1$). These results are consistent with the findings of a range of influential studies by prominent Chinese economists (see, e.g., Wu [2006] and Zhang [2005]).

[Table 2]

Yet, the results seem problematic. Given that the trend of China's industrial growth has been in tandem with that of overall economic growth, and that this stands in sharp contrast to most parts of the developing world, it is hard to believe that the impact of industrialization on China's economic growth has been negative. And recall the discussion on the implications of Figure 1, where it is posited that there has been transfer of productivity improvement from industry to the rest of the Chinese economy. Or is it rather the applicability of the analytics of neoclassical growth accounting exercises that is in question? Conceptually, the treatment of L and K as independent determinants of Y hinges on the assumption that the economy faces no problem of demand deficiency in the process of growth. In the event where there is rather a two-way relationship of cumulative causation between the the two inputs and the output, the application of equation (1) to empirical analysis would then tend to underestimate the returns to scale of the economy. Meanwhile, in both equations (1) and (2), productivity growth is

treated as purely exogenously determined. The application of the two equations to empirical analysis could therefore underestimate the contribution of other variables to productivity growth, including that of the progress in industrialization.

In the relevant literature, there exist a range of alternative approaches to the analysis of economic growth. The Post-Keynesian approach, in particular, is characteristic of attempting to overcome the two shortcomings of the neoclassical framework indicated above. And this has been summarized by the so-called "Kaldor-Verdoorn Laws", which take the following forms

$$G_N = a + b_N G_M \quad (3)$$

$$(G_M - G_{L'}) = a + b_M G_M \quad (4)$$

$$(G_N - G_{L''}) = a + b_N G_M \quad (5)$$

Here, G denotes real growth rates, M and N denote the industrial (or manufacturing) sector and the non-industrial (or non-manufacturing) sector of the economy, respectively, and L' and L'' are total employment of the industrial (or manufacturing) sector and the non- industrial (or non-manufacturing) sector of the economy, respectively. Equation (3) implies that industrial growth contributes to the growth of the non-industrial sector by means of expanding the latter's scale of demand and therefore scale of output. Equation (5), meanwhile, implies that industrial growth contributes to the growth of the non-industrial sector by means of pushing up the latter's productivity level. Finally, equation (4) states that there exists a positive and significant correlation between the output and productivity of the industrial sector. This correlation, according to Kaldorian theory, is underpinned by dynamic increasing returns – that is, the effect of demand and hence output expansion, in the form of learning by doing, induced investment in technological upgrading, and the increase in specialized division of labour in the economy. It can be seen that the formulation of equation (3) through (5) is not restricted by the two crucial assumptions of the neoclassical framework.

Applying equations (3)-(5) to the analysis of Chinese data of the period 1978-2005 yields the results given in the lower part of Table 2. It can be seen that, concerning the correlation between industrial growth and the growth of the non-industrial sector, the results of the analyses of equations (3) and (5) and both statistically significant. It can thus be inferred that industrial growth appears to contribute to the growth of the non-industrial sector through both the channells of expanding the demand for the latter sector as well as raising its productivity.

This inference is consistent with the observation from Figure 1. Meanwhile, the analysis of equation (4) also finds a statistically significant correlation between the output growth and productivity growth of the industrial sector. Thus, if the Kaldorian theory of industrialization and economic growth is correct, the finding implies that there does exist strong dynamic increasing returns in China's economic growth process during this period.

It is apparent that, comparing the results in the upper and lower parts of Table 2, there are both agreements and disagreements between the analysis within the neoclassical framework and that within the Post-Keynesian framework. The main point of agreement is that productivity growth, however defined and measured, has been a main immediate driving force behind the growth process. The main point of disagreement, meanwhile, concerns the sources of productivity growth. Are dynamic increasing returns, and structural changes associated with the progress in industrialization, the sources of productivity growth?

Given the afore-indicated conceptual problems with the neoclassical analytics, and the alternative evidence found from the analysis within the Post-Keynesian framework, it seems fair to say that an answer of "yes" to the question is more likely than that of "no". This is consistent to, and reinforced by, the almost consensus view in the growth and development literature that the Kaldor-Verdoorn Laws as stylized facts are generally found to be evident in late development across the world (Syrquin 1994). A fundamental shortcoming with the Post-Keynesian framework, though, is that the three "laws" are in reduced-form formulation and thus cannot really form an explanation of economic growth – the analytics concerns merely the immediate dynamics, rather than the causes, of economic growth. As an attempt for improvement, the next section seeks to modify the formulation with a view of analyzing the structural and institutional characteristics of China' growth process.

3. Structural and Institutional Characteristics in China's Economic Growth Process

Post-Keynesian economics tends to consider industry or the manufacturing sector as the area where dynamic increasing returns are particularly strong. This, while having important commonalities with the Marxian notion of the "productive labour", ultimately restricts itself to explaining productivity growth as purely technically determined. The Kaldor-Verdoorn

Laws do take into account of demand factors. Yet, the associated reduced-form formulation posts difficulty for clarifying the precise mechanism through which technical factors and demand factors interact to generate productivity growth.

In the relevant literature, the Neo-Schumpeterian theory of innovation does attempt to clarify the interaction between technical factors and economic factors in the generation of productivity growth. By economic factors they refer to the conditions of macroeconomic demand and the properties of the economic institutions in question (see Lo and Smyth [2004] for a review and synthesis of the literature). Demand-pulled productivity growth typically take the forms of learning-by-doing, induced investment in technological renovation and upgrading, and an increase in the economy-wide specialized division of labour, all under the rubrics "collective learning effects". And the properties of the economic institutions in question refer to their capability of utilizing the favourable demand conditions for generating collective learning. There also exists a proposition in the relevant literature which states that collective learning requires rigid institutions, that is, long-term-oriented relationships between major stakeholders of the business system. In other words, there is a necessary trade-off between productive efficiency of this kind and allocative efficiency – the latter, according to neoclassical economics, hinges on the existence of flexible, market-determined institutions (Amsden 1989; Aoki 1990; Best 1990; Lazonick 1991).

These theoretcial propositions, with their emphasis on the structural and institutional characteristics of an economy in the growth process, offer good insights for the analysis of the Chinese experience. Reconsider Figure 1. It is of note that the two curves representing the relative productivity of industry vis-à-vis non-industry, measured at current and constant prices, respectively, both tended to move downwards in the 1980s but then moved upwards in the 1990s. The downward movement of the curves in the first half of the reform era seems anomalous, because, according to Kaldorian theory, industry is typically characterized by faster productivity growth than non-industry. The likely explanation of the anomaly is that Chinese economic growth during this period was propelled by labour transfer of massive scales from agriculture to industry. This movement, while being in line with China's relative scarcity, did have negative impact on the relative labour productivity of industry – as the new entrants into the industrial workforce were mainly unskilled and the rapid expansion of the

workforce exerted downward pressure on the capital-labour ratio of industry. Conversely, the upward movement of the curves since the early 1990s indicates the resurgence of a capital-deepening path of industrialization and economic growth.

The inference above is confimed by what is clearly observable from Figure 2. It can be seen that the incremental capital-output ratio of the Chinese economy as a whole decreased steadily from 2.02 in 1982 to a low level of 1.51 in 1993, but then turned to move upwards to reach the high level of 3.55 in 2003. It might well be argued that the downward movement of the ratio in the first half of the reform era was largely due to improvements in Chinese economic institutions in the utilization of capital inputs. Yet, it is equally plausible that the movement reflects a tendency of substituting labour for capital, which is a salient feature specific to reforming or "transitional" economies. Charactersitic of the development starategy of Soviet-type eocnomies are their emphasis on heavy industrialization, and the associated capital accumulation makes it feasible for pursuing a new strategy of substituting labour for capital in the first stage of the reform era. Conversely, upon the exhaustion of the opportunities provided by the pre-reform capital accumulation, resuming a capital-deepening path of industrialization and economic growth might well be reasonable in terms of feasibility. In terms of efficiency attributes, such a development path most likely contradicts the relative scarcity, and hence comparative advantage, of the Chinese economy. But, theoretically, it could be with fast technological progress and strong increasing returns. Whether or not the sacrifice of allocative efficiency has been more than compensated by the improvement in productive efficiency, therefore, is of crucial importance for assessing the overall efficiency and hence sustainability of China's economic growth.

[Figure 2]

Back to the Kaldor-Verdoorn Laws, it is postulated that, if dynamic increasing returns are present, there exists a positive correlation between the productivity growth and output growth of the manufacturing sector, that is,

$$\dot{\hat{x}}_t = \alpha + \beta \dot{Q}_t \qquad (6)$$

Applying equation (6) to the analysis of data of Chinese industry and non-industry, and state-owned industrial enterprises (SOEs) and non-state-owned industrial enterprises

(non-SOEs), of the period 1978-2005, the results are given in Table 3. It can be seen that, considering the value of β , the value for industry is less than that for non-industry, while the value for SOEs exceeds that for non-SOEs. Yet, for all these four "sectors", the value of β is significantly positive, implying that there are dynamic increasing returns at the secotral level.

[Table 3]

As will be seen in Appendix 1, unit-root tests of the output growth and productivity growth series indicate that they are both integrated of order zero, or I(0), for non-industry and non-SOEs. They are both I(1) for industry. And, for SOEs, the productivity growth series is I(1) while the output growth series is I(0). Cointegration tests, though, indicate that for both industry and SOEs, there does exist a long-term relationship between the two time series. The following error-correction model is used to test the long-term relationship between the two series, as well as the short- term adjustment, for all the four "sectors":

$$\Delta \dot{x}_t = a - b(\dot{x}_{t-1} - \dot{\hat{x}}_{t-1}) + c\Delta \dot{Q}_t \qquad (7)$$

where the coefficient *b* is to indicate the short-term adjustment while the coefficient *c* is to indicate the long-term relationship.

The results are also given in Table 3. First, compare industry and non-industry. It is noted that the value of *c* for industry is more or less the same as non-industry. This result, somewhat surprisingly, does not support the proposition that industry is characterized by stronger dynamic increasing returns than non-industry. This is likely due to the China-specific development that, in the first half of the reform era, industrialization mainly took the form of widening rather than deepening – industrial growth and overall economic growth were in a large measured propelled by the massive transfer of unskilled labour from agriculture to industry. Regarding the estimates of *b*, the value for industry is less than that for non-industry (indeed, it is statistically insignificant for industry). The results imply that industry are less capable of adjusting to cope with short-term fluctuations, i.e., with less allocative efficiency, possibly due to heavier fixed/sunk investment. Second, compare SOEs and non-SOEs. It is noted that the value of *c* for SOEs exceeds that for non-SOEs. The opposite is true concerning the estimates of *b*, where the value for SOEs is less than that for non-SOEs. The results imply that SOEs, owing to their more rigid, long-term-oriented (or less flexible) institutions, are

more capable of generating productive efficiency, but are less capable of adjusting to cope with short-term fluctuations.

On the whole, the findings from the analysis of this section can be summarized as the following. First, it is found that there are long-term, dynamic increasing returns at the sectoral level within industry, non-industry, SOEs and non-SOEs. Second, there is evidence of SOEs being more capable of generating dynamic increasing returns, but being less capable of adapting to short-term fluctuations, compared with non-SOEs. Third, industry is also found to be less capable of adapting to short-term fluctuations than non-industry, but the two sectors are of similar performance with respect to generating dynamic increasings. This last finding explains the accerelation of industrialization, and the improvement in economic performance, of industrial enterprises under the capital-deepening development path of the 1990s. It is also consistent with the improvement in economic performance of SOEs, which, owing to their more rigid, less market-oriented institutions (compared with non-SOEs), fits particularly well into the capital-deepening development path in recent years.

4. Discussion: Endogenous and Exogenous Constraints on China's Economic Growth

The exposition above has focused on the structural and institutional features of China's evolving growth path, with a view of clarifying their efficiency attributes and therefore the sustainability of the growth process. Efficiency attributes can be considered as endogenous constraints on the growth process. In growth-theoretical terms, the improvement in allocative efficiency in the first half of the reform era and the existence of increasing returns in the second half have been the main driving forces behind the productivity and output growth. In particular, since the early 1990s, the efficiency attributes of the capital-deepening growth path have served to offset the setting in of diminishing marginal productivity of capital that could have arisen due to the violation of the principle of relative scarcity. The continuous existence, or otherwise, of increasing returns is thus key to the sustainability of Chinese economic growth in the foreseeable future.

Efficiency attributes aside, in the relevant literature of China studies, there exist a range of further points of criticism that could be posted on China's capital-deepening growth path.

First, such a growth path is typically associated with a process of heavy industrialization. And this process, with its high intensities of raw materials and energy consumption, is bound to be unsustainable over the long term. Second, a capital-deepening, investment-led growth path contradicts the requirements of job creation and equitable income distribution and thus is antithetical to the overarching state objective of "constructing a harmonious society". Third, in the context of a capital-scarce economy like China, a growth path of this kind can arise only on the condition that the financial sector behaves in a non-market-oriented way. The continuous prevalence of the growth path is thus detrimental to the market reform of China's financial institutions. It also tends to strengthen the position of large-scale, state-owned enterprises in the economy, thus further contradicting the direction of market reform in the economic system as a whole. The success, or otherwise, of resolving these problems can be considered as exogenous constraints on the growth process. We address these points of criticism below.

Consider the endogenous constraint. As indicated previously, the efficiency of the capital-deepening growth path is determined by the match between the long-term-oriented institutions and the environment of expanding demand – which combine to generate dynamic increasing returns. But is the demand expansion iteself sustainable? Conceptually, that depends partly on the character of the growth path itself and partly on exogenous factors particularly the patterns of income distribution and consumption. The central character of the growth path is that it is based on a process of "producing investment goods for producing investment goods" (or, for short, "producing machines for producing machines"). According to Marxist theory of expanded reproduction, the sustainability of such a growth process on the demand side is ultimately determined by whether the speed of product innovation is sufficiently fast to match the saturation of the existing mix of products (Meng 2001). In this regard, there is certain degree of optimism. As a matter of fact, the applied research and development capability of the Chinese economy is concentrated in the sector of large-scale, state-owned enterprises. And this sector benefits especially strongly from capital-deepening growth, which implies that the growth path does have the potential for product innovation. Moreover, it is discernible that, ever since the early years of the reform era, a major source of product innovation has been the import of foreign technology (Lo 2004). This is an advantage

that a late-developing country can have, especially for China which has been a major exporter and foreign direct investment receipient on the world scale. This reinforces the potential of generating the necessary product innovation.

Now, turn to the exogenous constraints. Consider, first, that arises from high materials and energy consumption. Since the turn of the century, China's absorption of materials and energy has repeatedly hit the headlines of news media worldwide. Its shares of total world consumption of key materials and energy have been rising fast. In particular, it has become the second largest petroleum consumer after the United States of America, with a high and rising degree of import dependence. In 2005, China consumed 325 million tons of crude oil. The volume of net imports in the same year was 143 million tons, putting the ratio of import dependence at 44%, which contrasts with the ratio of 34% in 2000, 8% in 1995 and -21% (i.e., net exporting) in 1990. From a domestic perspective, it is of note that the energy conumption elasticity of China's economic growth – that is, the ratio of energy consumption growth rate to GDP growth rate – increased from 0.48 in 1990, 0.63 in 1995 and 0.42 in 2000 to 0.97 in 2005. The same trend of fast rising consumption elasticity of economic growth is basically true for most key raw materials.

There exists an influential view in the circles of Chinese economists, which states that high intensities of materials and energy consumption are an intrinsic characteristic of the so-called "extensive pattern of economic growth". Put another way, it is asserted that the high intensities are a logical outcome, and unavoidable cost, of heavy industrialization, and hence of a capital-deepening growth path (Wu 2006). Yet, the logic is not necessary valid. A capital-deepening growth path does not necssitate a high materials-consuming product mix; it can also be consistent with a deep-processing product mix. Moreover, conceptually, a product mix is mainly the outcome of the prevailing pattern of consumption, rather than of the growth path. In the context of China, the high intensities of materials and energy consumption are with both reasonable and unreasonable elements. The Chinese economy and society are now in a stage of accelerating urbanization. This inevitably entails high intensities of materials and energy consumption, although it is true enough that whereever possible the intensities should be reduced to their technically feasible minimum. If China does not produce the relevant products domestically, it has to rely on imports. Thus, for the world as a whole, there will be

no reduction in materials and energy consumption even if China changes its output mix and growth path. And the cost of imports might well exceed that of domestic production. Ultimately, it is the unreasonable elements of the consumption pattern that have to be addressed. The fervour for (and reliance on) the American-type "private cars plus highways" pattern of transportation, and the expansion of megacities, are cases in point. To addess these problems requires a fundamental change of the conumption pattern, and, beneath it, the political and cultural atmosphere of the society. In this regard, the process of industrialization, through its contribution to the productivity growth of the economy as a whole, could be of significant help. It could provide the material base for restructuring the consumption pattern, in the direction of reducing the consumption of materials and energy.

Second, consider the exogenous, social constraint concerning labour absorption. It is observable that, compared with the situation in the first half of the reform era, China's recent capital-deepening path of economic growth has indeed been associated with a slower rate of the outflow of surplus labour from the agricultural sector. Between 1985 and 1995, the agricultural share of total employment decreased by 10 percentage points. It decreased further between 1995 and 2005, but by a smaller magnitude of seven percentage points. And the absolute number of agricultural workers has remained stable at a high level; it actually increased slightly throughout most of the reform era, from a number of 311 million in 1985 to 340 million in 2005. In this connection, labour employment in the secondary sector, whilst increasing from 104 million in 1985 to 181 million in 2005, entails an increase of merely three percentage points in the total. And two of this three percentage points occurred in the first ten years of 1985-1995. Industry, the engine of productivity and output growth, was clearly incapable of absorbing the enormous surplus labour from the agricultural sector. It was the tertiary sector which has been almost entirely responsible for absorbing the surplus labour. Its share of total employment increased from 17% in 1985 to 25% in 1995, and further to 31% in 2005. To overcome the constraint imposed by the requirement of job creation, it thus requires the service sector to be able to continue, indeed to accelerate, its absorption of surplus labour in agriculture. Insofar as the capital-deepening growth path could help in this regard, it could only be mainly in the indirect form of the trasfer of industry's fast growing productivity gains to the services sector.

The same seems to apply to the other exogenous, social constraint concerning income distribution. Just like the case of job creation, the constraint is exogenous in the sense that there are factors other than the nature of the economic growth path that are mainly responsible for giving rise to, or overcoming, the constraint. In China, growing disparities in income distribution – mainly in the forms of inter-regional, inter-sectoral, and urban-rural divides – have been caused by a multiple of factors, which can be ascribbed either to the existing power structure of the society or the market reform. Insomuch as the process of capital-deepening growth has worsened the situation, it is arguably of minor significance. It mainly takes the form of privileging the managerial layer (and the associated blocs of political and business elite) of the large-scale, mainly state-owned and somehow monopolistic enterprises, at the expense of the rest of the society. This situation resembles what is known as 'monopoly capitalism', or 'Fordism', in the literature on the political economy of twentieth-century capitalism. But, in China, this has occurred in the context of a socialism-inspired polity and society. It seems reasonable to judge that the responsibility for remedying this shortcoming should first of all rest on the political: that the prvileged managerial elite could be brought under social monitoring and control, and that the government could implement targeted redistributive policies. In this regard, the implication of capital-deepening growth for income distribution entails a trade-off. Whilst contributing to social disparities in its direct impact, the growth path with its fast productivity growth could be of help for the redistributive government policies.

On the whole, given the fundamental importance which the Chinese state leadership, and the society as a whole, attach to the objective of "constructing a harmonious society", the considerations of job creation and income distribution are surely hard constriants on the process of economic growth. Our discussion above suggests that the capital-deepening growth path, though not being a main cause, does logically lead to worsening the situation. But this need not lead to the conclusion that the growth path should therefore be fundamentally reoriented. What the discussion implies is rather that there could be a trade-off between the positive and negative impacts of the growth path. If it generates fast enough productivity growth, and if the benefits of the growth could be used for implementing remedies, the sustainability of the capital-deepening growth path is not necessarily less solid than a purely

market-oriented one. Such a judgement, then, gives rise to a further, fundamentally important question: should market-oriented reform be the paramount objective, and undeviatable future direction, for the Chinese society? Recall that in the beginning of this section it is mentioned that one major point of criticism of capital-deepening growth is that it violates, and enhances the violation of, the principles of the market. Nevertheless, if market-oriented reform is not the end in itself, but rather the means for serving the objective of "constructing a harmonious society", the growth path could not be dismissed on this ground.

5. Conclusions

In the existing scholarly literature, explanations of China's sustained rapid economic growth over the reform era typically follow the standard neoclasical, production-function approach to growth-accounting analysis. This approach has the property of treating productivity growth as exogenously determined, and of ignoring the importance of the demand conditions in the determination of productivity growth. Insofar as they do attempt to analyze the structural and institutional attributes of the growth process, they tend to stick to neoclassical economics by focusing on allocative efficiency as the principal or even sole criterion of assessment. Hence the typical conclusion that the realization of the principle of the market is the driving force behind China's economic growth – despite the wide-spread existence of market-supplanting elements in China's economic institutions and its growth process.

This paper seeks to approach the subject matter from a broader, more open theoretical perspective. The starting point is the view that productivity growth could be underpinned by productive as well as allocative efficiency, and, *a priori*, there is no reason to determine what kind of efficiency must be more important. Yet, broadening the analytical framework implies needing to take into consideration a broader set of factors that might be of importance in the growth process; and the focus of the paper is on the interaction between technical factors and economic factors in the determination of productivity growth. The analysis of China's economic growth in this paper thus centers around the notion of an evolving development path, or "regime of accumulation", which embodies the indicated interaction along with the changing properties of both the technical and economic factors.

The analytical findings of the paper can be summarized as: first, there are long-term, dynamic increasing returns at the sectoral level in China's economic growth process; second, structurally, industry has been less capable than non-industry of generating allocative efficiency, but their capabilities of generating productive efficiency are rather close; and, third, institutionally, SOEs have been more capable of generating productive efficiency, but being less capable of generating allocative efficiency, compared with non-SOEs. These findings imply that the efficiency attributes of the market-conforming and market-supplanting elements in the Chinese economy must be conjunctural rather than deterministic – the relative efficiency of the elements depends on the appropriate match or otherwise with the overall development path. The finding that the capital-deepening development path, which has become predominant since the early 1990s, has exhibited strong dynamic increasing returns further implies China's economic growth could be sustainable in the foreseeable future and that the associated market-supplanting elements of the economy should be considered as somethng positive, rather than being easily dismissed.

Finally, the paper also provides a discussion on the environmental and social constraints on China's process of economic growth. The central proposition is that the prevailing growth path should not be held responsible for the observed problems in the environmental and social dimensions. In particular, regarding the capital-deepening growth path, insofar as it does have produced unfavourable effects in the environmental and social dimensions this should be seen as a trade-off with its off-setting, favourable effects through its fast productivity growth. There is thus no logical conclusion that, in relation to the environmental and social constraints, the growth path must be less sustainable that the market-oriented alternative. Indeed, given China's outstanding growth performance in the world scene, it is highly questionable that a strictly market-oriented growth path could have achieved a better outcome.

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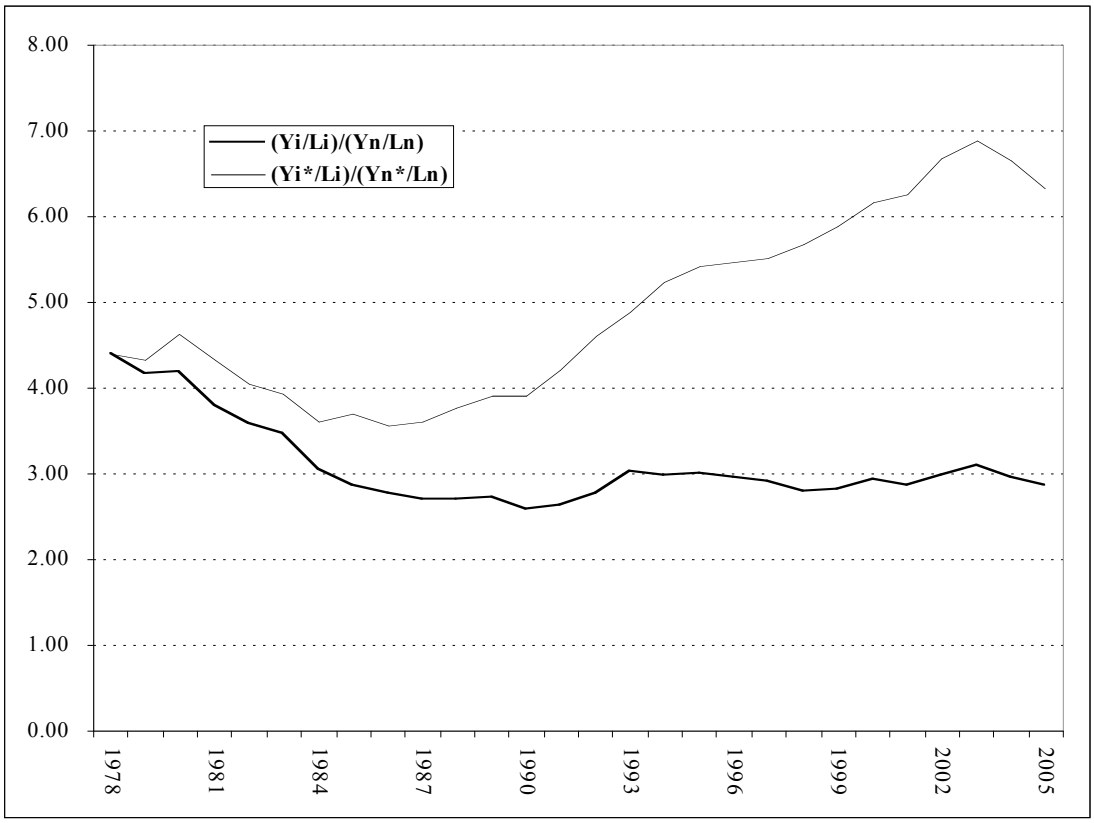
Table 1. China's Economic Growth in International Comparison, 1960-2004

	1960-70	1970-80	1980-90	1990-2000	2000-2004
China	2.9	3.7	8.8	9.3	8.0
India	1.1	2.3	3.6	4.2	4.7
South Korea	6.0	8.4	7.7	4.7	4.0
Brazil	2.6	6.5	0.7	1.3	1.0
USSR/Russia	4.0	4.7	1.3	-4.7	6.5
Low-income economies (excluding. China and India)	2.0	1.8	2.2	1.2	3.7
Middle-income economies	3.5	2.1	1.2	2.2	3.5
Low- and middle-income economies			1.3	1.8	3.3
East Asia and Pacific			5.9	5.7	6.6
Europe and Central Asia			1.2	-1.7	5.0
Latin America and Caribbean			-0.3	1.7	0.3
Middle East and North Africa			-1.1	0.7	2.1
South Asia			3.4	3.7	4.2
Sub-Saharan Africa			-1.3	-0.1	1.6
High-income economies			2.7	2.2	1.4

Sources: World Bank, *World Development Report* and *World Development Indicators*, various years.

Note: Figures are average annual real growth rate of per capita GDP (%).

Figure 1. Relative Labour Productivity of Industry, 1978-2005



Sources: China State Statistical Bureau, *China Statistical Yearbook*, various issues.

Notes: Y = GDP and its components at current prices, with *denoting data at 1978 constant prices. L = total labour employment. The subscripts i and n denotes the secondary sector (i.e., industry plus construction) and the rest of the Chinese economy, respectively.

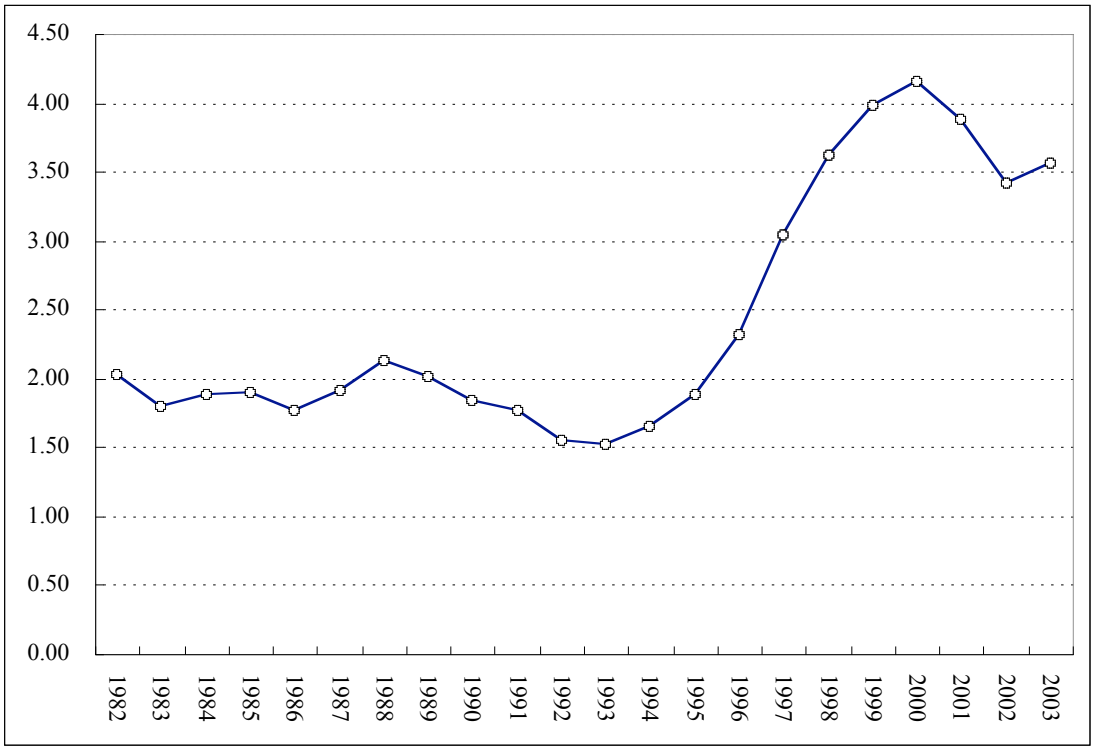
Table 2. The Immediate Dynamics of China's Economic Growth, 1978-2005

$ln(Y/L) = lnA + gt + b_K ln(K/L) + (b_K + b_L - 1)lnL$					
	lnA	g	b_K	$(b_K + b_L - 1)$	
$ln(Y/L)$	3.554	0.050 ***(3.091)	0.485 **(2.715)	-0.488 **(-2.244)	Adj-R^2 = 0.997
$ln(Y/L) = lnA + gt + b_K ln(K/L) + b_M ln(M/Y)$					
	lnA	g	b_K	b_M	
$ln(Y/L)$	-1.907	0.013 **(2.338)	1.019 ***(9.843)	-0.419 ** (-3.108)	Adj-R^2 = 0.997
$G_N = a + b_N G_M$					
	a	b_N			
G_N	5.877	0.219 **(2.348)			Adj-R^2 = 0.149
$(G_M - G_{L'}) = a + b_M G_M$					
	a	b_M			
$(G_M - G_{L'})$	0.391	0.771 ***(4.575)			Adj-R^2 = 0.434
$(G_N - G_{L''}) = a + b_{N'} G_M$					
	a	$b_{N'}$			
$(G_N - G_{L''})$	0.037	0.508 ***(3.158)			Adj-R^2 = 0.257

Sources: China National Statistical Bureau, *China Statistical Yearbook* and *China Statistical Abstract*, various years. Capital data are authors' estimates.

Note: Data analyzed are Chinese dat of 1978-2005. Figures in parenthese are t-ratios; ***, ** and * indicate statistical significance at 1%, 5% and 10% confidence levels, respectively.i

Figure 2. Incremental Capital-Output Ratio (5-Year Moving Averages), 1982-2003



Sources: China State Statistical Bureau, *China Statistical Abstract 2006*.

Notes: Incremental Capital-Output Ratio = dK/dY, where dK = total fixed-asset investment, dY = GDP of current year minus GDP of last year..

Table 3. The Structural and Institutional Characteristics of China's Economic Growth, 1978-2005

	α	β	A	b	c	Adjusted-R^2	
						Equation (6)	Equation (7)
Industry	0.391	0.771^{***} (4.575)	-0.087	0.184 (1.415)	0.821^{***} (7.894)	0.434	0.716
Non-Industry	-5.369	1.342^{***} (5.277)	-0.027	1.091^{***} (5.288)	1.096^{***} (3.898)	0.508	0.620
SOEs	1.723	1.064^{***} (7.672)	0.276	0.234^{*} (1.931)	0.789^{***} (8.706)	0.465	0.750
Non-SOEs	-0.880	0.765^{***} (9.341)	-0.029	0.486^{**} (2.550)	0.763^{***} (12.953)	0.768	0.882

Sources: China National Statistical Bureau, *China Statistical Yearbook* and *China Statistical Abstract*, various years.

Note: Data analyzed are Chinese dat of 1978-2005. Figures in parenthese are t-ratios; ***, ** and * indicate statistical significance at 1%, 5% and 10% confidence levels, respectively.

Appendix 1. Unit-root and Cointegration Tests

Time series data are known to be vulnerable to the problem of nonstationarity which might result in spurious regression. Hence, it is a common practice in applied econometric analysis to perform unit root tests and, if nonstationarity is found to be present, to further test the existence or otherwise of cointegration between the data series. In this appendix, we follow the standard procedure of testing the (non)stationarity of the data series by means of the augmented Dickey-Fuller (ADF) test which takes the following form

$$\Delta Z_t = \phi + \gamma Z_{t-1} + \delta \Delta Z_{t-1} + u_t \qquad \text{(A.1)}$$

In this formulation, the null hypothesis to be tested is $\gamma = 0$ which implies that X_t is integrated of order one, or *I(1)*; and the alternative hypothesis is $\gamma < 0$ which implies that X_t is *I(0)*. Readers are referred to Gujarati (1995, ch.21) for a detailed discussion of the test.

Equation (A.1) is applied on the principal data series used in this paper, i.e., the real growth rates of labour productivity $\dot{\hat{x}}_t$ and output $\dot{Q}_t$, for the four "sectors" of industry, non-industry, SOEs and non-SOEs. The results for industry and non-industry are presented in Table A.1, while those for SOEs and Non-SOEs are presented in Table A.2. It can be seen that, both in the cases of non-industry and non-SOEs, the null hypothesis that a unit root exists for any of the two time series is rejected at 5% level of confidence. The data series are thus regarded as free of the problem of nonstationarity; they are both I(0) for non-industry and non-SOEs.

Meanwhile, in the case of industry, the two series are found to be both I(1). For SOEs, the productivity growth series is I(1) while the output growth series is I(0). It is thus necessary to further test the cointegration between the data series both in the cases of industry and SOEs. We use the Engle-Granger test of the following form

$$Z_t = \alpha_1 + \beta_1 Z_t^* + u_t \qquad \text{(A.2)}$$

If Z_t and Z_t^* are cointegrated, then the residuals from (A.2), i.e., u_t, must be *I(0)*. To check this property, we apply the ADF test on the residuals obtained from applying (A.2) on productivity growth and output growth. The results, as can be seen from Table A.1 and Table A.2, indicate that for both industry and SOEs, there does exist a long-term relationship

between the two time series. Finally, to test the long-term relationship between the two data series, as well as the short- term adjustment, for all the four “sectors”, the error-correction model of the form given in equation (7) in the text is adopted.

Table A.1. Unit-root and Cointegration Tests: Industry and Non-Industry, 1978-2005

	variable	ADF (without trend)
Industry	$\dot{\hat{x}}_t$	-2.374
	$\dot{\hat{Q}}_t$	-2.958
	$\Delta\dot{\hat{x}}_t$	-5.422***
	$\Delta\dot{\hat{Q}}_t$	-5.284**
	EG1	-2.101**
Non-industry	$\dot{\hat{x}}_t$	-3.370**
	$\dot{\hat{Q}}_t$	-3.596**

Sources: China National Statistical Bureau, *China Statistical Yearbook* and *China Statistical Abstract*, various years.

Note: Data analyzed are Chinese dat of 1978-2005. Figures in parenthese are t-ratios; ***, ** and * indicate statistical significance at 1%, 5% and 10% confidence levels, respectively. EG denotes the ADF of the residuals from the cointegration test of the two variables in question.

Table A.2. Unit-root and Cointegration Tests: SOEs and Non-SOEs, 1978-2005

	variable	ADF (without trend)
SOEs	$\dot{\hat{x}}_t$	-2.334
	$\dot{\hat{Q}}_t$	-5.652***
	$\Delta\dot{\hat{x}}_t$	-5.586***
	EG1	-1.995**
Non-SOEs	$\dot{\hat{x}}_t$	-4.054***
	$\dot{\hat{Q}}_t$	-4.171***

Sources: China National Statistical Bureau, *China Statistical Yearbook* and *China Statistical Abstract*, various years.

Note: Data analyzed are Chinese dat of 1978-2005. Figures in parenthese are t-ratios; ***, ** and * indicate statistical significance at 1%, 5% and 10% confidence levels, respectively. EG denotes the ADF of the residuals from the cointegration test of the two variables in question.