Investment Rate and FDI – a Comparative Analysis of Return to Capital among China, US and Japan

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Abstract

This paper analyzes why unusual high investment ratio and increasing FDI emerge in China based on the return to capital among China, US and Japan. We also try to investigate into the future investment climate and the change of FDI in China. Over the last decade and a half, FDI-invested Chinese economy is growing at 19.97% a year and the investment rate in the country increases from 25.86% in 1990 to 42.74% in 2006, which are significantly higher than other major economies such as Japan and US. The surging level of FDI and the soaring investment rate in China imply that global capital is pouring into the world's third largest economy.

In this paper, five important findings are obtained: (1) the reason that China continues to top in the investment rate is because of the high return to capital in the country. During the period with high return to capital in US and Japan, their investment rates are significantly higher than today. The comparatively higher return to capital brings surging FDI into China. (2) The high investment rate and return to capital will sustain for at least 10 years. (3) The return to capital among the three countries doesn't converge during the last 30 years. This implies that FDI will continuously flows into China. (4) Although the return to capital is significantly affected by the economic cycle, it follows a decreasing trend in the long run. The experiences from Japan and the United States indicate that return to capital decreases in the long run and is likely to remain relatively stable after years of economic development. This implies that the return to capital in China will inevitably decrease in the future. However, it seems that the return to capital in China will continue to be high for a period of time as the

labor’s share and capital-output ratio in China are still very low, which means that the high investment rate in China is likely to last for a couple of years. (5) Currently FDI is mainly focusing on manufacturing industries and the ratio of technology-intensive investment rises remarkably in China. The technology-intensive FDI’s growth rate is significantly higher than foreign investment actually utilized after 2000. The major body of technology-intensive product exports is from foreign investment companies. These imply that the high return to capital is not only attractive for low-tech FDI but also for high-tech.

Keywords: Return to Capital; Investment Rate; FDI； High-Tech Industry

1. Introduction

Over the last decade and a half, China has been maintaining the highest investment rate compared with advanced economies such as Japan and the United States. The investment rate in China, which rises from 25.86% in 1990 to 42.75% in 2006, averages much higher than that of Japan which decreases from 32.32% in 1990 to 23.46% in 2006 and that of the United States which fluctuates around 26% during the period of 1990-2007. In the meantime, the FID-invested Chinese economy is growing at 19.97% a year, sharply rises from $3.5 billion in 1990 to $92.4 billion in 2008.

What has been making China increasingly attractive to investors? Is the high investment rate in China sustainable? How about the sustainability of the flood of FDI into China? To answer those questions that arise from China's high investment rate and the surging level of FDI in the country, a natural metric is to estimate the return to capital in China as well as those of other major countries such as Japan and the United States: If the return to capital in China continues to be high, the high investment rate in the country is likely to last for quite a couple of years; if the return to capital in China is significantly higher than those of other major countries, foreign capital will continue to flow into China. To reveal the sustainability of China's high investment rate and the surging level of FDI in the country, the most intuitive approach is to analyze key factors that affect return to capital and investigate into the changes of the factors.

Scholars and government officials have devoted lengthy and full discussions to the high investment rate[1] and the rapid growing foreign-invested economy in China[2], which conclude that 1) government investment, 2) investment from private sector, and 3) foreign direct investment are typical key factors that contribute to China's high investment rate; while 1) low cost of production factors, 2) huge market demand, and 3) economies of agglomeration are principal elements that attract FDI flows into China. Although many papers have reported estimates of return to capital in China

[1] For example, Development Research Center of the State Council (2005), Li (2006), Hu (2007), and Yu (2008)
[2] For example, Zhao and Lu (2007), Lu and Xu (2008), and Luo (2009)

and concluded that the return to capital is much higher than those of advanced economies and China's emerging peers[3], we are not aware of any study that uses the basic element of the market-oriented economy, the return to capital, to explain the high investment rate and the surging level of FDI. For these considerations, this paper estimates the return to capital in China, Japan and the United States, studies key factors that affect return to capital, and investigates into the changes of the factors, hoping to reveal the trend of return to capital and future investment climate in China, which, we have not noticed any earlier discussions.

Our study of return to capital differs from those earlier estimates in many ways, of which three principal ones are: Firstly, we update China's data reported by China's National Bureau of Statistics (NBS) after the 2007 census, update Japan's data reported by Japan's Statistics Bureau and the American data reported by the Bureau of Economic Analysis (BEA) after the 2008 census. Secondly, by estimating the return to capital in China, Japan and the United States, we investigate into key factors that affect return to capital and analyze the changes of the key factors. Last but not least, we explore the trend of return to capital and future investment climate in China.

Various evidences show that although significantly affected by the economic cycle, return to capital follows a decreasing trend in the long run, which is because return to capital is mainly affected by labor's share and capital-output ratio. At the early stage of economic booms, labor's share and capital-output ratio are always low, however, as the economic development labor's share and capital-output ratio increase, declining return to capital. The reasons that the return to capital in China is higher than that of Japan and that of the United States are precisely because China has a lower labor's share and a lower capital-output ratio. Although labor's share and capital-output ratio in China will inevitably increase as the development of economy, which will decline the return to capital in the country, however, it seems that the return to capital in China will continue to be high for a period of time, and even higher than that of Japan and that of the United States. This is because the labor's share and capital-output ratio

[3] For example, Bai, Hsieh, and Qian (2006), Song (2006)

in the country are still very low, and are not likely to experience remarkable increase in the near future, suggesting that China will be able to sustain the high investment rate and attract more FDI for quite a few years.

Chapter 2 begins this paper with a literature review. Chapter 3 estimates and makes a comparative analysis of the return to capital in China, Japan and the United States. Chapter 4 analyzes key factors that affect return to capital. Chapter 5 explores the trend of return to capital and future investment climate in China, in the meantime discusses the return to capital in high-tech industries. Chapter 6 concludes findings in this paper.

2. Literature review

There have been many discussions on China's high investment rate and the country's fast growing foreign-invested economy. Development Research Center of the State Council (2005) concludes that the industrialization, the high saving rate, the extensive economy, the low efficiency of investment and the low consumption rate lead to the high investment rate in China. Based upon these conclusions, Li (2006), Hu (2007), Yu (2008) and many other papers further discuss the high investment rate and the low consumption rate in China, while Fan (2009) discusses the same topic based on a comparison between the political system of China and the US, concluding that China's local governments always pay more attention to the capital's interests and relatively ignore the labor's interests, which result in high investment rate and low consumption rate. As for factors that attract FDI flows into China, Shen *et al.* (2002) finds that human capital stock significantly affects FDI's location choice and investment scale. Xu *et al.* (2002) concludes that FDI is mainly affected by market demand, capital stock, and exchange rate. Li (2004) analyzes that there is a positive correlation between foreign trade and FDI. Huang *et al.* (2006) points out that the transaction cost of foreign trade, technology spillover, and market demand significantly affect FDI's location choice. Luo (2009) studies the source countries and concludes that the source country market size and the bilateral trade influence on FDI inflow.

In this paper, we use the basic element of the market-oriented economy, the return to capital, to explain the high investment rate and the surging level of FDI, which, we are not aware of any earlier discussions. The earliest estimate of return to capital with large samples originates from Baumol *et al.* (1970), which regresses output on capital invested. Friend and Husic (1973), Brealey *et al*. (1976), and McFetridge (1978), however, challenges Baumol *et al.* (1970) that the regression model omits the scale effect and thus leads to biased estimates of the return to capital that all types of capital almost have the same return. One important thing to be noticed about those pioneer estimates is that all of them are based upon constant prices, rather than market prices. In the 1990s, estimates of the return to capital have developed into market price-based calculation. Mueller and Reardon (1993) serve as the pioneer of using market prices

to estimate the return to capital. The methodology is further applied by Mueller and Yurtoglu (2000) and Gugler *et al.* (2003, 2004).

Note that all of the above methodologies measure the return to capital in the capital market, which is a natural way to estimate the aggregate return to capital for a country with well-developed financial market; however, it is inappropriate for estimating the aggregate return to capital of a developing country like China. To estimate the aggregate return to capital in China, Bai, Hsieh, and Qian (2006) calculates the return to capital by using data on capital share, capital-output ratio, depreciation rate, growth rate of investment goods deflator and GDP deflator, considering a decision by a firm, a price-taker, at the margin to purchase a unit of capital. Bai, Hsieh, and Qian (2006) estimate the return to capital in China during the period of 1978-2005, considering different capital concepts and various depreciation rates. By making a comparative study of the regression method, the capital market approach, and the estimation with national account data, it's easy to see that the first one can only estimate the average return to capital during a certain period, however, cannot explain its change over time; the second one cannot be widely used because it's inappropriate for a developing country like China; while the third one, which uses macro data to calculate the aggregate return to capital, is more reasonable for estimating return to capital in different economies, particularly when the System of National Accounts 1993 has been widely used.

Many other papers have also reported estimates of investment efficiency in China[4]. however, we are not aware of any study that research into the trend of return to capital. For these considerations, this paper estimates the return to capital in China, Japan and the United States, studies key factors that affect return to capital, and investigates into the changes of key factors, hoping to reveal the trend of return to capital and future investment climate in China, which, we are not aware of any earlier studies.

[4] For example, Zhang (2005), Qin and Song (2003), Wang and Fan (2000)

3. Estimates of Return to Capital

3.1 Methodology

As discussed, methods that one could make use to estimate the aggregate return to capital include, firstly, using the return to capital in the capital market to estimate that of the aggregate economy[5], which, however, is only appropriate for a country that with a well-developed capital market and inappropriate for a developing country like China; secondly, regressing output on capital stock, which, however, might omit variables that affect capital stock and aggregate output and thus lead to biased estimates of the return to capital, more importantly, the return to capital estimated from this approach does not change over time.

A third method, which will be employed in this paper, uses the data on labor's share in total income, capital-output ratio where both capital and output are measured at market prices, depreciation rate, growth rate of investment goods deflator, and growth rate of GDP deflator to estimate the aggregate return to capital by considering a transaction by a firm, a price taker, at the margin to purchase a unit of capital[6]. The real return from this transaction is:

$$r(t) = \frac{P_Y(t) MPK_j(t)}{P_{K_j}(t)} - \delta_j - \hat{P}_Y(t) + \hat{P}_{K_j}(t) \quad \ldots\ldots \textbf{(1)}$$

Where,

$r(t)$: The real rate of return to capital;

$P_Y(t)$: The price of the output;

$P_{K_j}(t)$: The price of capital j;

$MPK_j(t)$: The marginal physical product of capital j;

δ_j: The depreciation rate of capital j;

$\hat{P}_Y(t)$: The growth rate of $P_Y(t)$;

[5] Xin, Lin, and Yang (2007) estimates the return to capital investment in China using data of listed companies

[6] This methodology originates from the Hall-Jorgenson rental price equation and has been used in Bai, Hsieh, and Qian (2006).

$\hat{P}_{K_j}(t)$: The growth rate of $P_{K_j}(t)$.

This methodology is simple and straightforward because it only bases upon one assumption that the firm takes the output price as given. More importantly, the methodology has nothing to do with the economic structure and thus can be used to estimate the return to capital in China, the emerging market economy; those of Japan and the United States, the advanced economic entities. However, it's not likely that one could observe the marginal physical product of capital, which, luckily, can be inferred from data on labor's share. Note that labor's share in total income equals to total wages over aggregate output, thus, the share of capital in total income is:

$$\alpha(t) = 1 - \frac{W(t)L(t)}{P_Y(t)Y(t)} \quad \ldots\ldots \textbf{(2)}$$

Where $W(t)$ is wage and $L(t)$ is employment.

Additionally, the share of payments of capital can be given by:

$$\alpha(t) = \frac{\sum_j P_Y(t)MPK_j(t)K_j(t)}{P_Y(t)Y(t)}$$
$$= \frac{\sum_j \frac{P_Y(t)MPK_j(t)}{P_{K_j}(t)} K_j(t)P_{K_j}(t)}{P_Y(t)Y(t)}$$

Substituting equation (1) into $\alpha(t)$ we get:

$$\alpha(t) = \frac{\sum_j \left(r(t) + \delta_j + \hat{P}_Y(t) - \hat{P}_{K_j}(t)\right) K_j(t)P_{K_j}(t)}{P_Y(t)Y(t)}$$

$$= \frac{\sum_j \left(r(t) + \hat{P}_Y(t)\right) K_j(t)P_{K_j}(t) + \sum_j \left(\delta_j - \hat{P}_{K_j}(t)\right) K_j(t)P_{K_j}(t)}{P_Y(t)Y(t)}$$

$$= \frac{\left(r(t) + \hat{P}_Y(t)\right) K(t)P_K(t) + K(t)P_K(t)\left(\frac{\sum_j \delta_j K_j(t)P_{K_j}(t)}{K(t)P_K(t)} - \frac{\sum_j \hat{P}_{K_j}(t)K_j(t)P_{K_j}(t)}{K(t)P_K(t)}\right)}{P_Y(t)Y(t)}$$

$$= \frac{K(t)P_K(t)\left(r(t)+\hat{P}_Y(t)+\delta(t)-\hat{P}_K(t)\right)}{P_Y(t)Y(t)} \quad \text{…… (3)}$$

Where,

$K(t)P_K(t)=\sum_j K_j(t)P_{K_j}(t)$: The aggregate produced assets;

$\hat{P}_K(t)=\sum_j \frac{K_j(t)P_{K_j}(t)}{K(t)P_K(t)}\hat{P}_{K_j}(t)$: The growth rate of the investment goods deflator;

$\delta(t)=\sum_j \frac{K_j(t)P_{K_j}(t)}{K(t)P_K(t)}\delta_j$: The depreciation rate;

From equation (3) we can get the real return to capital as:

$$r(t)=\frac{\alpha(t)}{K(t)P_K(t)/P_Y(t)Y(t)}+\left(\hat{P}_K(t)-\hat{P}_Y(t)\right)-\delta(t) \quad \text{…… (4)}$$

Substituting equation (2) into equation (4), we get:

$$r(t)=\frac{1-\frac{W(t)L(t)}{P_Y(t)Y(t)}}{K(t)P_K(t)/P_Y(t)Y(t)}+\left(\hat{P}_K(t)-\hat{P}_Y(t)\right)-\delta(t) \quad \text{….. (5)}$$

Equation (5) is the formula that we will make use to estimate the aggregate return to capital in China, Japan, and the United States. Note that we use the capital stock of produced assets, rather than the capital stock of fixed assets to calculate the capital-output ratio, and the reason is that produced assets, which include tangible fixed assets, inventories, and intangible fixed assets, seem to be better reflecting capital invested.

3.2 Data

3.2.1 China

For the GDP data in China, we get those for 1978-2006 from Chinese Statistical Yearbook 2007, and those for 1953-1977 from Chinese Statistical Collection

(1949-2004). For the investment goods deflator, China's NBS released price indices for investment in fixed assets since 1990, for those that before 1990, we simply get them from Bai, Hsieh, and Qian (2006)[7]. As for labor's share, theoretically, it should be measured by aggregate compensations to employees over total income. However, the NBS of China only provides data that reveal the basic conditions of China's labor economy in industrial sectors, which does not necessarily reflect the true condition of the aggregate economy; luckily, we can estimate it from the provincial annual data on labor's share, weighted by the share of provincial GDP in the aggregate GDP.

To generate the capital stock in China, we have to use the perpetual inventory method (PIM), of which the formula is:

$$K_t = \sum_{\tau=0}^{d-1} w_\tau * I_{t-\tau} \quad \text{..... (6)}$$

Where,

K_t is the capital stock at time t;

d is the service life of the investment goods;

$I_{t-\tau}$ is the constant value of the investment goods invested τ years before;

w_τ is the weight of the investment goods invested τ years before.

According to the formula, we can easily see that the application of PIM requires estimates and assumptions on three parameters: 1) service life of the investment goods, 2) depreciation method, and 3) constant price of capital invested. For the capital stock in China, we mainly have to consider two kinds of investment goods, including 1) construction and installation and 2) machinery and equipment. According to the estimates in Wang and Wu (2003), the useful life of construction and installation is 38 years and that of machinery and equipment is 12 years. As for depreciation method, this paper employs the declining-balance method of depreciation, which provides gradually decreasing depreciation charges in the service life of the asset and thus might provide a more realistic reflection of the actual depreciation. Therefore, the

[7] Bai, Hsieh, and Qian (2006) assumes that the price of structures from 1978-1989 equals to the deflator of value added in the construction industry, and that of machinery and equipment equals to the output price deflator of the domestic machinery and equipment industry; for that before 1978, Bai, Hsieh, and Qian (2006) assumes it as the growth rate of the aggregate price of fixed capital formation

depreciation rate of construction and installation is 8% and that of machinery and equipment is 24%[8].

In China, the series that being frequently used to measure the annual capital invested is the "investment in fixed assets", which is disaggregated into different types of investment[9]. However, Xu (2000), Bai, Hsieh, and Qian (2006) argue that the widely used statistics might not provide an accurate estimate of the aggregate investment in China because on the one hand, the series include value of purchased land and expenditure on used machinery and preexisting structures, which should not be regarded as part of reproducible capital stock and thus might lead to bias estimates of the change in China's capital stock; on the other hand, the statistics only count large investment projects, which will inevitably underestimate the aggregate investment.

To get around these problems, many researchers recommend another statistics, the "gross fixed capital formation" as an alternative to value the change of capital stock. The reasons are that on the one hand, the statistics has subtracted the value of land sales and the expenditure on preexisting machinery and equipments; on the other hand, the statistics has added expenditure on small-scale investment projects. The main limitation of "gross fixed capital formation" is that it is not disaggregated into different types of investment, to cover this shortage, we assume that the share of the two types of capital in gross fixed capital formation are the same as those for investment in fixed asset[10]. Note that we include inventories in the capital stock because inventories are also important parts of produced assets[11].

3.2.2 Japan

The Economic and Social Research Institute (ESRI), which is the producer of the Japanese national account in Japan Statistical Yearbook, publishes several estimates for gross domestic product. The national accounts of Japan Statistical Yearbook 2009

[8] In China, the residual value rate ranges from 3% to 5%, in this paper we use 4% as the residual value rate.
[9] Specifically, it is disaggregated into investment in construction and installation and purchase of equipment and instruments
[10] The data from 1953 to 1977 are from Hsieh and Li (1999), data from 1978 to 2004 are from Bai, Hsieh, and Qian (2006), data from 2005 to 2006 are from China Statistical Yearbook 2007
[11] We initialize the capital stock of 1952 as the ratio of investment in 1953 to the sum of the average growth rate of investment in 1953-1958 and the depreciation rate

provide data on aggregate output for calendar year of 1965-2006, whereas the national accounts of Historical Statistics of Japan provide data on gross domestic products for 1980-2003 under 1993 System of National Accounts (93SNA) and those for 1955-1998 under 1968 System of National Accounts (68SNA). In this paper, we use the data of aggregate output in Japan Statistical Yearbook 2009 for 1965-2006, and the data in Historical Statistics of Japan for 1955-1964. As for the compensation to employees, we use the estimates in the national accounts of Japan Statistical Yearbook 2009 for 2003-2006, the data in the national accounts that under 93SNA for 1980-2002, and those under 68SNA for 1955-1979.

One of the main estimates for capital stock in Japan Statistical Yearbook is net capital stock (NCS), which covers buildings, structures, transport equipment, machinery and etc. Another one is gross capital stock of private enterprises (GCSPE), which covers all fixed assets, excluding residential buildings owned by private corporations and unincorporated enterprises and fixed assets owned by private non-profit institutions. The main limitation with NCS is that it is only disaggregated into six categories for tangible asset, which consists of 1) dwellings, 2) other buildings, 3) other structures, 4) transport equipment, 5) other machinery and equipment, and 6) cultivated assets. As indicated by Erwin Diewert, the current asset classification is too aggregated to fully satisfy research needs as high and low depreciation assets are bundled together in some of the classifications. However, the GCSPE, which is frequently used as the main data source for analysis of production by industry, is not appropriate to be used as a measure of productive capacity because GCSPE does not have asset categories. Moreover, GCSPE only counts the capital stock for private enterprises, which does not provide an appropriate measure for the capital stock of the aggregate economy. Based upon the above analysis, we decide to use NCS as the capital stock of Japan in this paper, adding the inventories.

According to the ESRI, depreciation in NCS is based on geometric method for dwellings, transport equipment, etc. The residual value rate is 50% for cultivated asset and 10% for other assets. We can generate the corresponding depreciation rate as following and compute the aggregate depreciation rate as a weighted average of depreciation rates by types of assets, using the capital stock shares as the weights.

Table 1: Depreciation Rates Used in Japan Statistical Yearbook (by Types of Assets)

	Service Life	Depreciation rate
Dwellings	28.0	7.9
Other buildings	37.4	6
Other structures	33.7	6.6
Transportation equipment	7.6	26.2
Other machinery and equipment	10.6	12.1
Cultivated assets	5.4	9.9

Source: Koji Nomura and Tadao Futakami (2005)

3.2.2 The United States

In the US Economic Accounts, the US Bureau of Economic Analysis (BEA) provides data for current-dollar and "real" GDP starting from 1929 to 2008. BEA also provides series on compensation to employees for the same period, which includes wages and salary and supplement to wage and salary. The US BEA mainly disaggregates fixed assets into private equipment and software, private nonresidential structures, residential structures, durable goods owned by consumers, and government-owned fixed assets. Like China and Japan, the US used geometric depreciation patterns for most assets types. The US BEA determined the geometric rate for specific types of assets by dividing the appropriate declining-balance rate for each asset by the asset's assumed service life. The declining-balance rates used by BEA are primarily derived from estimates made by Hulten and Wykoff, who divided assets into three major types: Type A, assets that with extensive data for estimating geometric rates of depreciation; type B, assets that with limited studies or other relevant data to support estimates of the rate of declining balance; and type C, assets that with no data[12]. In this paper, we don't have to conduct in-depth research into the depreciation rates for different types of assets in the US as the US BEA has provided data series on capital stock as well as depreciation in the National Economic Accounts. To get the average depreciation rate, we simply have to divide the depreciation by the capital stock.

3.3 Return to Capital in China, Japan, and the United States

With the above-mentioned data in hand, we can estimate return to capital from

[12] This information is primarily extracted from "BEA Depreciation Estimates" at the BEA website

equation (5). In table 2 we provide our estimates of return to capital in China and list the variables that used to calculate the return to capital in the country, in table 3 we provide our estimates of return to capital in Japan and list the variables that used to calculate the return to capital in the country, and in table 4 we provide our estimates of return to capital in the United States and list the variables that used to calculate the return to capital in the country.

Table 2: Variables and Return to Capital in China (%)

Year	Labor's share	Capital output ratio	Depreciation Rate	Growth of Investment Deflator	Growth of GDP Deflator	Return to Capital
1978	49.67	1.39	12.10	0.93	1.92	23.17
1979	51.38	1.37	11.97	2.15	3.58	22.07
1980	51.15	1.35	11.82	4.95	3.78	25.41
1981	52.68	1.44	11.43	1.78	2.25	20.98
1982	53.57	1.45	11.06	2.34	-0.21	23.62
1983	53.54	1.43	10.82	3.76	1.04	24.44
1984	53.68	1.33	10.67	4.80	4.96	23.92
1985	52.90	1.24	10.69	8.62	10.24	25.77
1986	52.82	1.31	10.86	7.52	4.70	27.91
1987	52.53	1.33	10.81	6.98	5.17	26.60
1988	51.72	1.27	10.84	12.50	12.10	27.49
1989	51.51	1.41	10.88	9.55	8.55	24.58
1990	53.36	1.48	11.00	7.31	5.80	21.96
1991	50.03	1.44	10.91	9.05	6.87	26.09
1992	50.09	1.35	10.79	15.52	8.20	33.37
1993	50.37	1.31	10.72	29.35	15.16	41.47
1994	51.11	1.38	10.65	10.25	20.63	14.29
1995	52.56	1.37	10.74	4.97	13.71	15.25
1996	52.80	1.39	10.71	4.51	6.43	21.42
1997	52.89	1.47	10.61	2.12	1.52	22.01
1998	53.12	1.57	10.61	0.02	-0.89	20.23
1999	52.42	1.64	10.59	-0.15	-1.27	19.59
2000	51.48	1.63	10.59	1.60	2.03	18.75

2001	51.46	1.65	10.56	0.70	2.05	17.52
2002	50.92	1.67	10.55	0.37	0.60	18.62
2003	49.62	1.65	10.55	3.09	2.59	20.48
2004	45.51	1.63	10.54	6.86	6.93	22.83
2005	41.40	1.71	10.53	1.42	4.14	21.00
2006	40.61	1.72	10.65	1.20	3.24	21.82

Source: China Statistical Yearbook, various years, and author's calculation

Table 3: Variables and Return to Capital in Japan (%)

Year	Labor's share	Capital output ratio	Depreciation Rate	Growth of Investment Deflator	Growth of GDP Deflator	Return to Capital
1956	41.55	1.71	10.34	14.39	6.22	31.95
1957	40.81	1.54	10.00	11.59	7.16	32.79
1958	42.91	1.67	9.92	-5.64	-0.91	19.46
1959	42.47	1.56	9.92	1.57	5.50	23.15
1960	40.48	1.29	9.76	4.95	9.48	31.76
1961	39.53	1.17	9.83	7.96	10.21	39.43
1962	41.90	1.17	9.93	0.00	5.55	34.09
1963	42.34	1.24	10.10	0.00	7.18	29.03
1964	42.44	1.19	10.07	2.19	6.85	33.66
1965	44.12	1.22	10.04	-0.53	13.94	21.48
1966	43.96	1.21	10.00	3.76	5.34	34.86
1967	43.12	1.15	9.92	4.92	5.50	39.09
1968	42.43	1.12	9.94	2.22	5.83	37.74
1969	42.51	1.13	10.11	2.66	4.93	38.59
1970	43.49	1.11	10.18	4.47	6.87	38.28
1971	46.86	1.21	10.39	1.35	5.40	29.32
1972	47.65	1.31	10.52	3.56	5.60	27.44
1973	49.05	1.25	10.30	16.31	12.71	34.17
1974	52.15	1.31	10.17	24.72	20.81	30.38
1975	55.00	1.64	10.16	3.85	7.18	13.94
1976	55.24	1.83	9.99	4.84	8.01	11.30
1977	55.38	1.79	9.76	4.76	6.75	13.16

1978	54.34	1.86	9.60	2.85	4.60	13.23
1979	54.19	1.87	9.45	6.68	2.75	19.01
1980	53.84	1.88	9.27	8.51	-1.08	24.81
1981	54.13	2.04	9.35	1.74	4.52	10.33
1982	54.50	2.22	9.27	1.18	1.76	10.65
1983	55.10	2.24	9.24	0.11	1.71	9.16
1984	54.62	2.22	9.22	1.16	2.48	9.94
1985	53.11	2.11	9.26	0.73	3.01	10.65
1986	52.89	2.11	9.33	-0.83	1.66	10.51
1987	52.57	2.09	9.37	-0.73	-0.36	12.92
1988	51.72	1.99	9.34	0.32	1.00	14.19
1989	51.48	1.95	9.37	1.89	2.32	15.06
1990	51.68	1.92	9.38	2.89	2.99	15.62
1991	52.49	2.01	9.42	2.20	2.94	13.43
1992	52.82	2.14	9.42	1.27	1.63	12.26
1993	53.55	2.28	9.42	-0.19	0.53	10.27
1994	54.35	2.35	9.36	-1.55	3.09	5.40
1995	54.51	2.37	9.26	-1.48	-0.50	8.97
1996	54.22	2.36	9.25	-1.18	-0.57	9.52
1997	54.44	2.33	9.23	0.41	0.60	10.12
1998	55.01	2.46	9.27	-1.56	0.03	7.45
1999	54.88	2.57	9.27	-2.14	-1.29	7.44
2000	54.68	2.52	9.23	-1.23	-1.73	9.23
2001	54.93	2.54	9.18	-2.13	-1.23	7.67
2002	54.30	2.60	9.15	-2.05	-1.55	7.94
2003	52.74	2.57	9.08	-1.77	-1.60	9.12

2004	51.44	2.51	9.00	-0.21	-1.08	11.25
2005	51.51	2.49	9.02	-0.07	-1.23	11.58
2006	51.60	2.41	9.05	0.82	-0.94	12.79

Source: Japan Statistical Yearbook, various years, and author's calculation

Table 4: Variables and Return to Capital in the US (%)

Year	Labor's share	Capital output ratio	Depreciation Rate	Growth of Investment Deflator	Growth of GDP Deflator	Return to Capital
1930	51.43	3.37	4.82	1.99	-3.67	15.28
1931	52.03	3.47	4.63	0.56	-10.36	20.14
1932	52.98	4.16	4.53	-0.77	-11.80	17.81
1933	52.48	4.60	4.84	-1.19	-2.68	6.99
1934	51.97	4.02	4.75	-0.34	5.60	1.27
1935	51.02	3.67	4.79	0.37	1.98	6.94
1936	51.19	3.55	4.94	1.68	1.17	9.31
1937	52.23	3.41	4.91	1.89	4.31	6.68
1938	52.26	3.67	4.60	1.11	-2.97	12.50
1939	52.17	3.50	4.63	1.87	-0.91	11.81
1940	51.48	3.46	4.80	2.42	1.11	10.56
1941	51.14	3.16	5.57	3.88	6.69	7.10
1942	52.69	2.82	5.20	5.77	7.81	9.55
1943	55.19	2.56	5.57	5.79	5.38	12.37
1944	55.19	2.47	5.79	4.59	2.37	14.57
1945	55.27	2.63	6.46	1.84	2.65	9.76
1946	53.85	3.09	6.95	0.33	11.99	-3.69
1947	53.24	3.26	6.88	1.58	10.89	-1.82
1948	52.71	3.15	6.52	2.28	5.63	5.14
1949	53.05	3.22	5.83	2.76	-0.18	11.68
1950	52.83	3.28	6.11	3.90	1.09	11.08
1951	53.46	3.49	5.71	4.09	7.18	4.54
1952	54.76	3.45	5.49	3.95	1.71	9.87

1953	55.40	3.37	5.47	4.31	1.24	10.84
1954	54.99	3.49	5.63	3.70	0.95	10.03
1955	54.44	3.45	5.74	4.24	1.78	9.94
1956	55.91	3.54	5.87	3.65	3.46	6.77
1957	55.87	3.52	5.71	3.43	3.32	6.94
1958	55.57	3.58	5.77	2.65	2.30	6.99
1959	55.49	3.43	5.69	3.58	1.23	9.64
1960	56.34	3.40	5.72	3.22	1.40	8.93
1961	56.07	3.40	5.69	3.05	1.12	9.16
1962	55.87	3.30	5.69	3.54	1.36	9.86
1963	55.90	3.24	5.72	3.74	1.06	10.58
1964	55.86	3.20	5.80	4.08	1.53	10.56
1965	55.56	3.15	5.79	4.46	1.83	10.96
1966	56.18	3.12	5.88	4.53	2.85	9.83
1967	57.06	3.18	5.87	4.01	3.09	8.56
1968	57.62	3.19	5.99	4.10	4.27	7.14
1969	58.66	3.21	5.97	3.89	4.96	5.83
1970	59.43	3.30	5.95	3.17	5.29	4.22
1971	58.46	3.34	5.95	3.28	5.00	4.77
1972	58.56	3.34	5.86	3.73	4.34	5.92
1973	58.67	3.41	5.87	4.02	5.58	4.70
1974	59.35	3.72	5.92	3.10	9.03	-0.93
1975	57.94	3.67	5.71	2.32	9.43	-1.37
1976	58.04	3.59	5.79	2.75	5.78	2.87
1977	58.13	3.61	5.91	3.26	6.35	2.60
1978	58.23	3.62	5.96	3.67	7.03	2.20

1979	58.55	3.74	5.99	3.59	8.29	0.41
1980	59.22	3.90	5.91	2.69	9.07	-1.82
1981	58.37	3.81	5.83	2.54	9.39	-1.76
1982	59.17	3.84	5.71	1.91	6.10	0.71
1983	57.76	3.66	5.61	2.39	3.96	4.36
1984	57.35	3.49	5.74	3.29	3.75	6.03
1985	57.46	3.42	5.87	3.48	3.04	7.00
1986	57.63	3.43	5.99	3.39	2.20	7.54
1987	58.06	3.43	6.01	3.14	2.73	6.62
1988	58.15	3.39	6.06	3.02	3.41	5.87
1989	57.37	3.34	6.15	2.83	3.78	5.66
1990	57.56	3.31	6.12	2.52	3.86	5.37
1991	57.51	3.27	6.13	1.80	3.50	5.14
1992	57.41	3.23	6.22	1.91	2.30	6.59
1993	57.15	3.23	6.21	2.21	2.31	6.97
1994	56.58	3.23	6.30	2.41	2.13	7.45
1995	56.74	3.23	6.20	2.59	2.05	7.71
1996	56.22	3.20	6.19	2.88	1.90	8.46
1997	56.19	3.17	6.20	3.03	1.66	8.99
1998	57.44	3.17	6.21	3.32	1.11	9.42
1999	57.86	3.19	6.27	3.52	1.45	9.04
2000	58.95	3.20	6.33	3.52	2.18	7.83
2001	58.72	3.26	6.33	2.93	2.40	6.85
2002	58.23	3.30	6.13	2.62	1.75	7.39
2003	57.76	3.32	6.07	2.62	2.13	7.15
2004	57.01	3.42	6.14	2.69	2.87	6.26

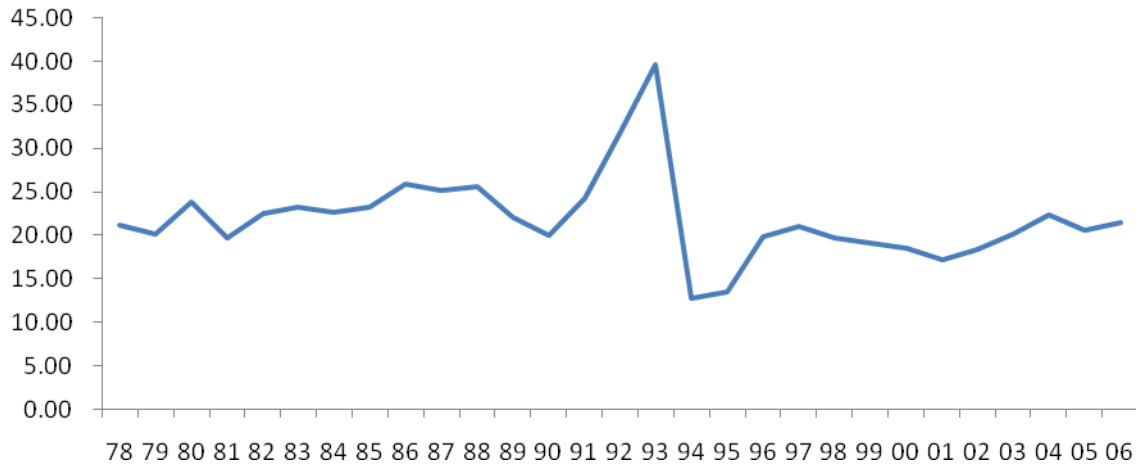
2005	56.65	3.52	6.17	2.57	3.26	5.45
2006	56.46	3.57	5.71	2.71	3.22	5.99
2007	56.63	3.38	5.58	2.37	2.69	6.94

Source: National Economic Accounts of the US Bureau of Economic Analysis, and author's calculation

3.3.1 The Return to Capital in China

As shown in Figure 1, the return to capital in China fluctuates from 23.17% in 1978 to 21.82% in 2006, averaging as high as more than 20% during the last three decades, however, there was a drastic fluctuation in the return to capital in China between 1992 and 1994, with a sharp increase in 1993 and a rapid decline in 1994. The reason for the sharp increase in the return to capital in China in 1993 is that there was a sharp increase in the growth rate of investment goods deflator in 1993, which rose from 15.52% in 1992 to 29.35% in 1993; and the reason for the rapid drawdown in the return to capital in China in 1994 is that there was a rapid decline in the growth rate of investment goods deflator in 1994, which decreased from 29.35% in 1993 to 10.25% in 1994. The return to capital remains relatively stable from 1978 to 2006 except the typical fluctuations during 1993 and 1994, and averages at a higher level during 1978-1991 than that of the period after 1994.

Figure 1: Return to Capital in China (%)

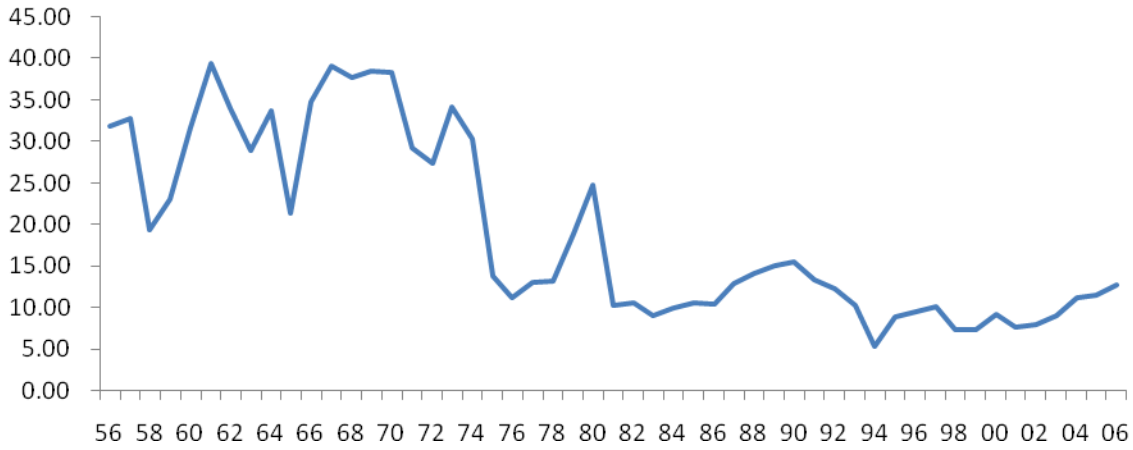


3.3.2 The Return to Capital in Japan

As shown in Figure 2, the return to capital in Japan was extremely volatile during the period of 1956 to 2006, with the highest return to capital at 39.43% in 1961 and the lowest return to capital at 5.4% in 1994. It's interesting to see that the return to capital in Japan has been significantly affected by the country's economic cycle: During the period of 1956 to 1974, which marks the rebuilding of Japan's lost industrial capacity and the country's economic booms; the return to capital in Japan was at the highest level, with an average return to capital above 31%. In the mid-1970s, Japan faced a severed economic challenge, the world oil crisis in 1973, which shocked the economy

that badly depended on foreign petroleum. During this period, the return to capital sharply decreased from 30.38% in 1974 to 13.94% in 1975. Throughout the last five years in the 1970s, the return to capital in Japan fluctuated around 14%; in the mid-1980s, the return to capital in Japan began a period of increase that continued until the country entered a recessionary period in 1992. After the 1990s, the return to capital in Japan remained relatively stable however it was very low, with an average of 9%.

Figure 2: Return to Capital in Japan (%)

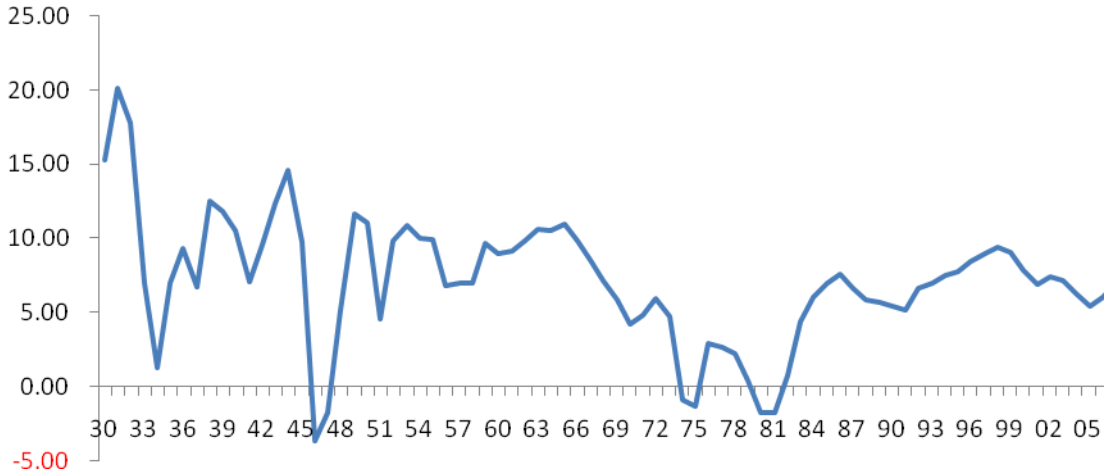


3.3.2 The Return to Capital in the United States

As shown in Figure 3, the return to capital in the United States fluctuates from around 15% after the Second World War to around 5% in the last decade. During late of the 1920s, the United States enjoyed a period of sustained prosperity, which was known as the roaring twenties, even in the first 3 years of the Wall Street Crash of 1929, the United States maintained the return to capital as high as about 15%, which, however, was mainly due to the negative growth rate of the GDP deflator. The Great Depression badly destroyed the economy of the United States and the return to capital in the country dropped to around 6% in the mid-1930s, however, the depression also led to the US government efforts to re-start the economy, and the return to capital during the period of 1935 to 1945 averaged around 10%. During the period of postwar prosperity, which started from 1945 to 1973, the return to capital in the US fluctuated from around 12% to around 4%, with an average around 8%. The oil crisis in 1973, which caused soaring inflation of the 1970s, badly hurt the US economy. The US government quickly response to the oil embargo but of limited effectiveness and the

return to capital in the US averaged below 1% for the decade starting from 1974 to 1983. To stimulate the American economy after a recession in the early 1980s, Reagan introduced expansionary fiscal policies, which led to an economic recovery starting from 1983. And the return to capital in the US averaged around 6% continued till the Clinton administration. The six years span of 1994 and 2000 witnessed the emergence of a technology-driven "new economy", and the return to capital in the US during this period averaged above 7%. The US return to capital after 2000 remained relatively stable and averaged around 6%.

Figure 3: Return to Capital in the US (%)

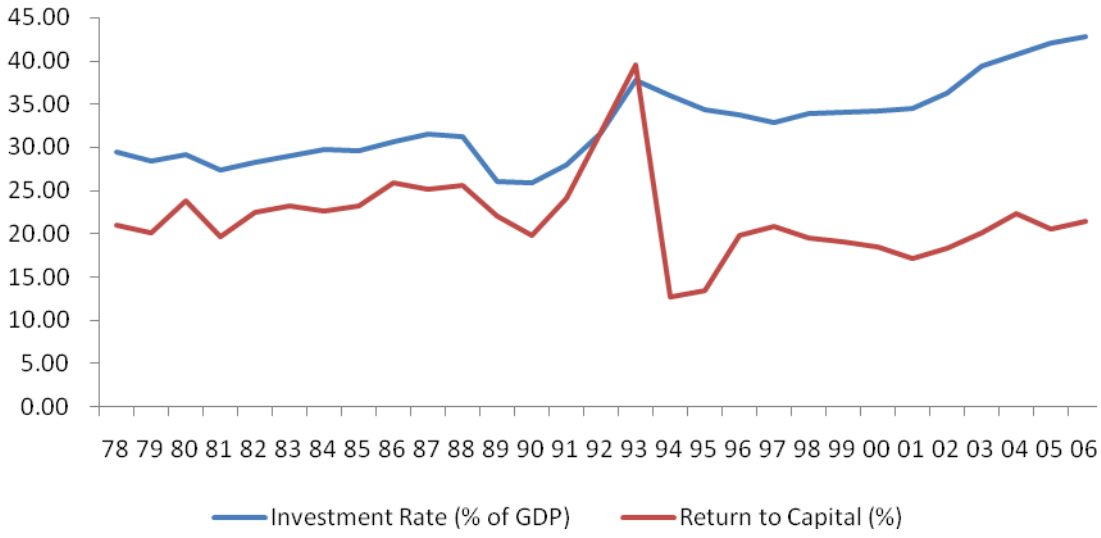


3.4 The Impacts of Return to Capital on Investment Rate

3.4.1 The Investment Rate in China

Figure 4 shows that investment rate in China increased from 29.46% in 1978 to 42.75% in 2006, in the meantime the return to capital in China fluctuated around as high as 22%. It is thus clear that the correlation between return to capital and investment rate is positive, and the reason that investment rate keep going up in China during the period of 1978 to 2006 is because the return to capital in China is at the highest level in the world, which spurs investors' willingness to invest in the country.

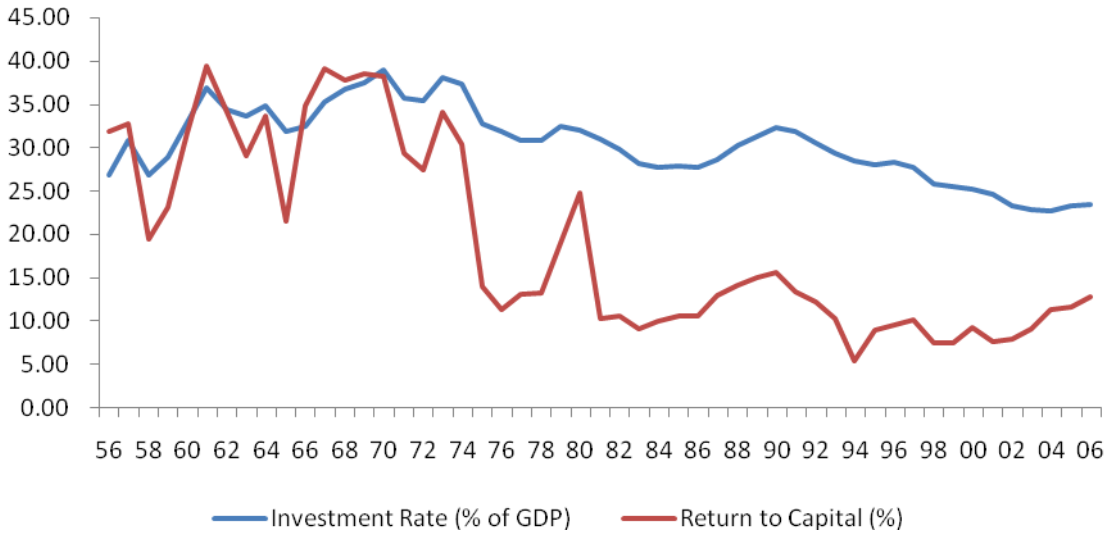
Figure 4: Investment Rate in China (%)



3.4.2 The Investment Rate in Japan

As show in Figure 5, investment rate in Japan increased from 26.80% in 1956 to 39.02% in 1970 and declined to 23.46% in 2006, with an average at 30.45% during the period of 1956 to 2006. During the period of 1956 to 1970, the return to capital in Japan increased from 31.95% in 1956 to 38.38% in 1970, averaged as high as 32.36%. After 1970, the return to capital in Japan dropped to 12.79% in 2006, averaged as low as 13.62%. The evidence from Japan indicates that investors are willing to invest more when the return to capital is high and invest less when the return to capital is low.

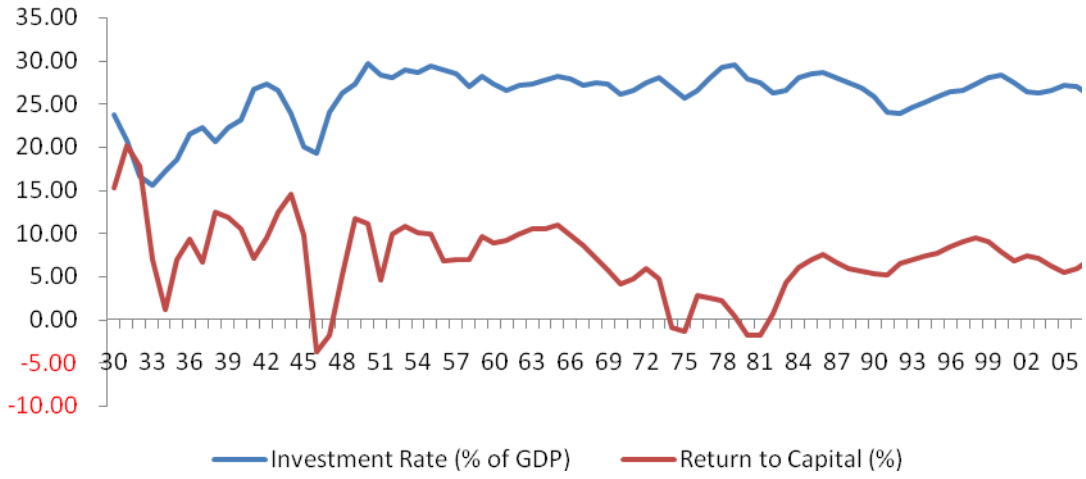
Figure 5: Investment Rate in Japan (%)



3.4.3 The Investment Rate in the United States

Figure 6 shows that investment rate in the United States experienced sharply decline in the early 1930s, the period that marked the Great Depression, and increased from 15.60% in 1933 to 29.68% in 1950, the year that marked the highest investment rate in the United States during the period of 1930 to 2007. After 1950, the investment rate in the US fluctuated between 24% and 30%, with an average around 27%. The return to capital in the United States, which also suffered a declined during the Great Depression period, increased from 1.27% in 1934 to 11.08% in 1950, with a drawdown in late 1940s just as the investment rate did. After 1950, the return to capital in the US remained relatively stable, however, it experienced a sharp decline in the 1970s because of the oil crisis, from when on it experienced slight increase and remained relatively stable again. It seems that the oil crisis, which badly declined the return to capital in the US, did not affect the investment rate in the country. The possible reason is that during the oil crisis, the government of the US brought many economic stimulus packages into effect, such as Deregulation and Reaganomics, which allowed and stimulated the private sector to invest in such sectors as energy, communications, transportation, and banking. The stimulus packages eventually helped stabilize the investment rate in the country despite the low level of aggregate return to capital.

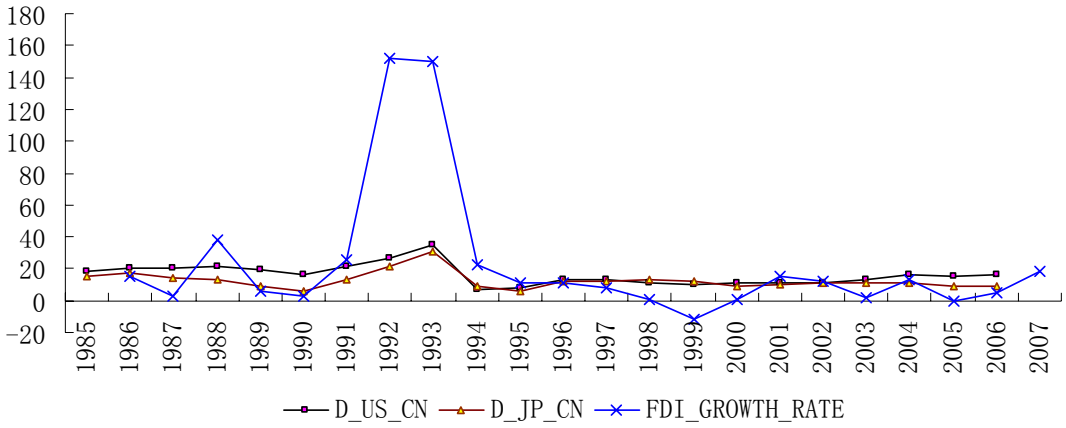
Figure 6: Investment Rate in the US (%)



3.5 The Impacts of Return to Capital on FDI

FDI plays an important role in the investment of the Chinese economy, and its surging level has contributed to the high investment rate in the country. It's undeniable that one important factor that affects cross boarder capital flow is the discrepancy of return to capital. Figure 7 shows the discrepancies of return to capital among China and the world's two largest capital export countries, Japan and the US, as well as the growth rate of FDI in China. We can see that the growth of FDI in China significantly increases when the discrepancies of return to capital among China, Japan and the US go up, which is especially evident during 1992 to 1993. The correlation coefficient between the growth rate of FDI and the discrepancy between the return to capital in China and Japan is as high as 0.83, much higher than that with the US.

Figure 7: Discrepancy of Return to Capital and Growth Rate of FDI in China



4. Factors that Affect Return to Capital

4.1 Marginal Return

4.1.1 Notation and Definition

Marginal Return (MR): The marginal return is the change in the aggregate return resulting from a marginal change in an individual factor. The marginal return of factor i, MR_i, equals,

$$MR_i = \frac{\partial r}{\partial f_i} \text{ ..... (7)}$$

Where,

MR_i, marginal return of factor i;

r, aggregate return;

f_i, factor i.

4.1.2 Estimates of Marginal Return

According to equation (5), we have:

$$r(t) = \frac{1 - \frac{W(t)L(t)}{P_Y(t)Y(t)}}{K(t)P_K(t) \big/ P_Y(t)Y(t)} + \left(\hat{P}_K(t) - \hat{P}_Y(t)\right) - \delta(t)$$

$$\Rightarrow r(t) = \frac{1-\beta(t)}{\varphi(t)} + \left(\hat{P}_K(t) - \hat{P}_Y(t)\right) - \delta(t) \text{ ..... (8)}$$

Where,

$\beta(t) = \frac{W(t)L(t)}{P_Y(t)Y(t)}$, is labor's share

$\varphi(t) = K(t)P_K(t) \big/ P_Y(t)Y(t)$, is capital-output ratio.

By taking partial derivative on return to capital with respect to each of the five factors, we have:

$$dr(t) = \frac{\partial r(t)}{\partial \beta(t)} d\beta(t) + \frac{\partial r(t)}{\partial \varphi(t)} d\varphi(t) + \frac{\partial r(t)}{\partial \hat{P}_K(t)} d\hat{P}_K(t) + \frac{\partial r(t)}{\partial \hat{P}_Y(t)} d\hat{P}_Y(t) + \frac{\partial r(t)}{\partial \delta(t)} d\delta(t) \text{ .. (8)}$$

Where,

$\frac{\partial r(t)}{\partial \beta(t)} = -\frac{1}{\varphi(t)}$, the marginal return of labor's share;

$\frac{\partial r(t)}{\partial \varphi(t)} = -\frac{1-\beta(t)}{\left(\varphi(t)\right)^2}$, the marginal return of capital-output ratio;

$\frac{\partial r(t)}{\partial \hat{P}_K(t)} = 1$, the marginal return of investment goods deflator;

$\frac{\partial r(t)}{\partial \hat{P}_Y(t)} = -1$, the marginal return of GDP deflator;

$\frac{\partial r(t)}{\partial \delta(t)} = -1$, the marginal return of depreciation rate.

$$\Rightarrow dr(t) = -\frac{1}{\varphi(t)} d\beta(t) - \frac{1-\beta(t)}{\left(\varphi(t)\right)^2} d\varphi(t) + d\hat{P}_K(t) - d\hat{P}_Y(t) - d\delta(t) \ldots\ldots \textbf{(9)}$$

From equation 9, we can see that we only have to estimate marginal returns of labor's share and capital-output ratio in China, Japan, and the US as marginal returns of other factors are constant (1 for investment goods deflator, -1 for GDP deflator and depreciation rate).

As shown in Figure 8, the marginal return of labor's share in Japan decreased from -0.58 in 1956 to -0.9 in 1970, the reason is that the capital-output ratio in Japan during this period declined from 1.71 in 1956 to 1.11 in 1970. During the 1970s and early 1980s, the capital-output ratio in Japan increased from 1.21 in 1970 to 2.24 in 1983, which caused the marginal return of labor's share increased from -0.82 to -0.45. Afterwards, the marginal return of labor's share in Japan fluctuated around -0.44 and remained relatively stable. Compared with Japan, the US enjoyed relatively more stable marginal returns of labor's share during the period of 1930 to 2007. Figure 8 also shows that the marginal return of labor's share in the US averaged at -0.30, and that of Japan averaged at -0.58, while that of China averaged at -0.66.

Figure 8: Marginal Return of Labor's Share

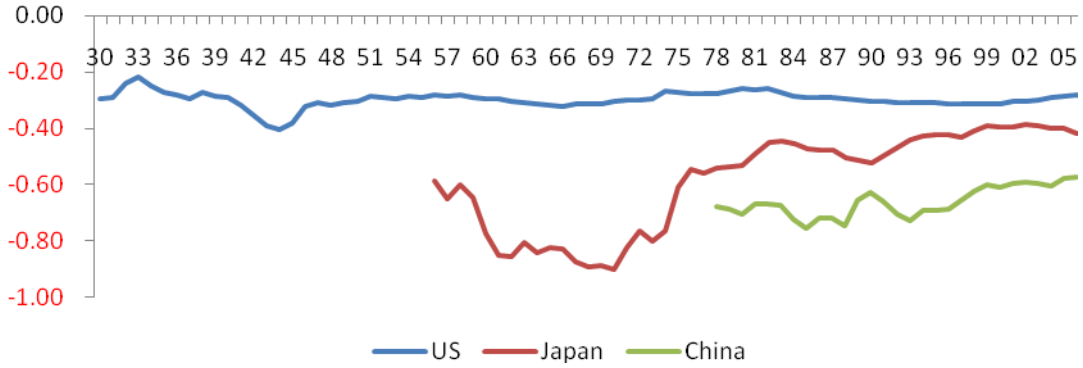


Figure 9 shows that the marginal return of capital-output ratio of Japan had a high volatility during the period of 1958 to the early 1980s, and remained relatively stable after mid-1980s. Compared with that of Japan, the marginal return of capital-output ratio in China and the United States remained relatively stable, however, that of China averaged at -0.22, lower than that of Japan which averaged at -0.19 and that of the United States which averaged at -0.04.

Figure 9: Marginal Return of Capital-Output Ratio

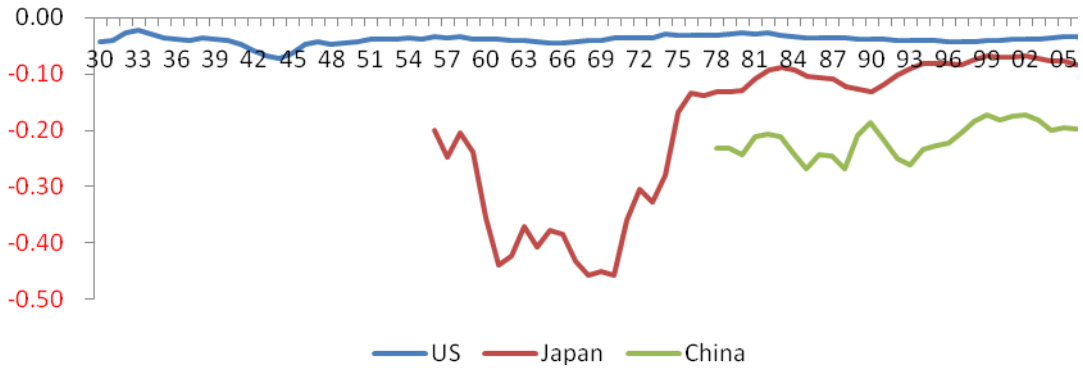


Figure 8 and Figure 9 together show that the marginal returns of labor's share and capital-output ratio are always negative, suggesting that the increase in labor's share and capital-output ratio will lead to a decrease in return to capital. In the long run, however, the marginal returns of labor's share and capital-output ratio on return to capital seem to converge to zero. The return to capital changes significantly when it is at a high level, and changes little when it is at a relatively lower level, this is why return to capital is able to remain stable after a sharp decline. In the short run, the change of marginal return originates from the change of labor's share and

capital-output ratio, in the following section we will discuss how these factors change over time and how do they affect return to capital.

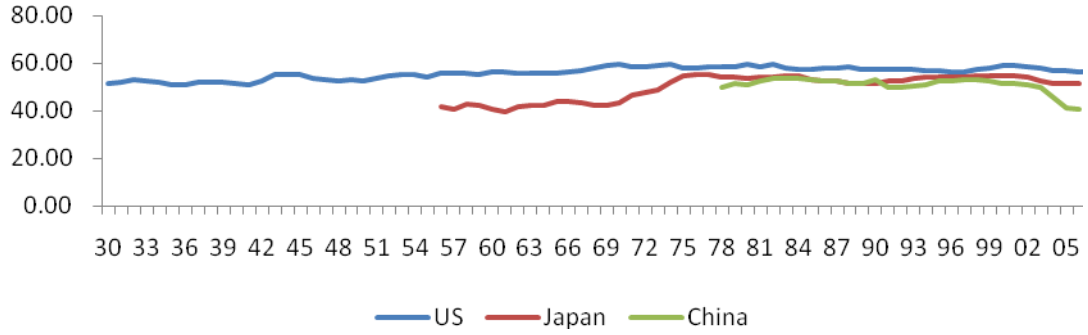
4.2 The Changes of Key Factors

4.2.1 The Change of Labor's Share

As shown in equation 10, the marginal return of labor's share is always negative, which means that return to capital decreases as labor's share increases. Figure 10 shows that the labor's share in Japan increased from 41.44% in 1956 to 51.6% in 2006, and that of the United States increased from 51.43% in 1930 to 56.63% in 2007, however, the labor's share in China decreased from 49.67% in 1978 to 40.61 in 2006. The labor's share in China is much lower than that of Japan and that of the United States, which is why the country's return to capital is higher than that of Japan and that of the United States. This is very intuitive, when labors get less compensation, capital will get more, which leads to a high return to capital.

The reason that China has a lower labor's share is because China is the manufacturing center, of which the labors get less pay compared with those that work in the service industry. Thanks to the abundant rural migrant workers who provide a steady flow of work force for the world's manufacturing hub, the labor's share in China decreased during the last two decades. In the future the workers in China will inevitably ask for more compensation, which will lead to an increase in labor's share in the country just as Japan and the Unites States did. The increase of labor's share will ultimately decrease the return to capital in the future. However, it seems that the labor's share in China will remain at a lower level for a couple of years compared with Japan and the United States because on the one hand, China is still a manufacturing economy where compensation to employees is naturally low, on the other hand, the bulks of rural migrant workers in the country will continue to provide a steady flow of work force.

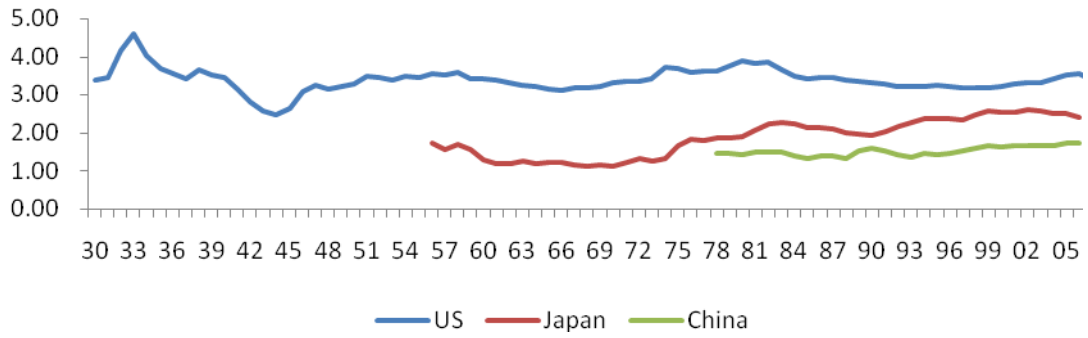
Figure 10: Labor's Share in China, Japan, and the US (%)



4.2.2 The Change of Capital-Output Ratio

Equation 9 shows that the marginal return of capital-output ratio is always negative, which means that return to capital decreases as capital-output ratio increases. As shown in Figure 11, the United States has the highest capital-output ratio compared with China and Japan, while China has the lowest capital-output ratio among the three countries. The capital-output ratio in the United States, which averaged around 3.4 during the period of 1930 to 2007, is much higher than that of Japan, which averaged around 1.86 during the period of 1956 to 2006. The capital-output ratio in China, which averaged as low as 1.52 during the period of 1978 to 2006, contributes to a relatively higher return to capital in the country compared with that of Japan and that of the United States.

Figure 11: Capital-output Ratio in China, Japan, and the US (%)



What is the economic meaning of a high capital-output ratio? Does it mean a low GDP, or imply a high capital stock? In the case of Japan and the United States, which are the two largest economic entities in the world, the answer should be a high capital stock. It's natural that Japan and the United States have attracted major investments

during the 20th century, which leads to a high capital stock in the two countries. Figure 11 also shows that capital-output ratio in Japan increased from 1.71 in 1956 to 2.41 in 2006, while that of China just experienced a slight increase from 1.47 in 1978 to 1.74 in 2006. Although the capital-output ratio in the United States did not experience any remarkable change during the period of 1930 to 2007, it remained at a level as high as 3.4, which is much higher than that of China and that of Japan.

From the experience of Japan and the United States we can see that the capital stock in China will inevitably increase in the future, which might lead to an increase in capital-output ratio. The reason is that the high return to capital in China is likely to attract more investment, which will increase the capital stock in the country and lead to a high capital-output ratio. However, it seems that the capital-output ratio in China is not likely to experience significant increase in a short period of time because China has the world's third largest GDP and a fast growing economy. The relatively lower capital-output ratio in China compared with that of Japan and that of the United States will be likely to contribute to the highest return to capital in China among the three countries in the years ahead.

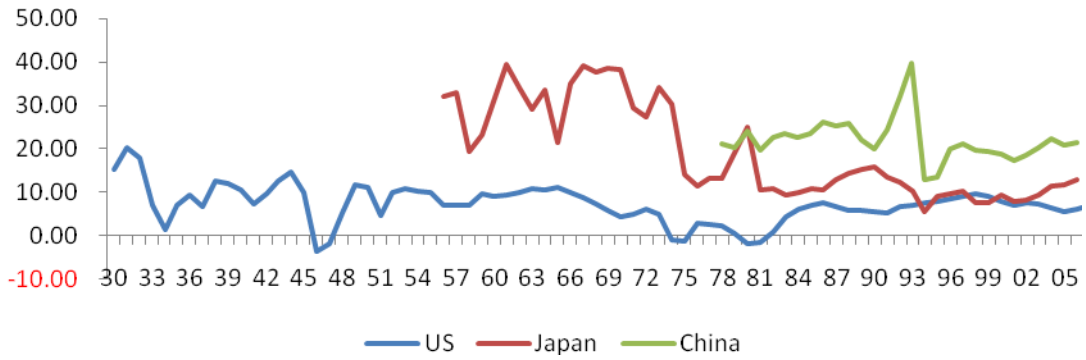
5. The Change of Return to Capital and Future Investment Climate in China

5.1 The Change of Return to Capital

5.1.1 Return to Capital Seems to Decline as the Development of Economy

As shown in Figure 12, the return to capital in Japan decreased from 31.95% in 1956 to 12.79% in 2006, while that of the United States decreased from 15.28% in 1930 to 6.94% in 2007, indicating that return to capital seems to decline from a higher level to a lower level in the long run. The reasons are that labor's share and capital-output ratio seem to increase as the development of economy, which lead to a decline in return to capital. The evidences from Japan and the United States indicate that the return to capital remains at a high level at the early stage of the economic booms, as the economic development, it experiences remarkable declines. This is why during 1965 to 1980, the period that marked the economic booms of Japan, the return to capital in Japan averaged above 28%. It is also why during the period of 1978 to 2006, the period that marked China's opening and reforming, the return to capital in China averaged as high as 21.9%.

Figure 12: Return to Capital in China, Japan, and the US (%)



5.1.2 The Return to Capital in China will remain higher than that of Japan and that of the United States in Years Ahead

The experiences from major developed countries show that the return to capital in China will inevitably decrease in the future because of the increase of labor's share

and capital-output ratio. However, it seems that the return to capital in China will remain higher than that of Japan and that of the United States in years ahead because labor's share and capital-output ratio are still very low and are not likely to experience significant increase in the near future. Considering the experience from Japan, of which the return to capital becomes in line with that of the US after more than 40 years economic development, we can roughly conclude that China will still be able to enjoy a high return to capital for at least 10 years, or even much longer considering scale effect.

5.2 The Future Investment Climate in China

Although the return to capital in China averaged as high as 21.9% during the period of 1978-2006, it seems continue to be high for a couple of years because of the low labor's share and capital-output ratio in the country, indicating that the high investment rate in the country is likely to last for quite a few years. In the future, the return to capital in China will inevitably decrease because of the increase of labor's share and capital-output ratio, however, it seems continue to be higher than that of Japan and United States in years ahead because of the relatively lower labor's share and capital-output ratio. As the return to capital in China is significantly higher than those of other major countries, foreign capital will continue to flow into China, especially when China increasingly opens more sectors to foreign investors as part of its commitments to the WTO entry.

To analyze the dynamic relationship between investment rate and return to capital, a natural metric is to use the Vector Auto-Regression model (VAR). However, by using the VAR we found that return to capital goes up with right-handed screw, which does not coincide with the long term fact. A possible reason is that the labor market in China is not in equilibrium, which leads to the fact that when return to capital goes up, investment rate increases. Thus, this paper does not use VAR to study the impact of return to capital on investment rate. Instead, we infer the impacts from the experiences in Japan and the US.

5.3 FDI and Return to Capital in High-Tech Industries

The above discussions show that the remarkable discrepancy among return to capital in China, Japan and the United States contributes to the surging level of FDI in China. FDI not only flows into low-tech sectors, but also increasingly pours into high-tech industries, which include Computer & Communication, Life Sciences, Computer Integrated Manufacturing, and etc. According to the Report on Foreign Direct Investment in China (2003-2007), FDI in China increases by 13.3%, -0.5%, and 4.46% respectively in 2004, 2005, and 2006, while FDI in high-tech industries increases by 4.09%, 22.8%, and 32.64% respectively. FDI in high-tech industries accounted for 15% of the total FDI in China in 2003, increases to 21.6% in 2006. In terms of export, the high-tech products exported by foreign invested companies account for 77% of the total high-tech products export in 2003, increases to 88% in 2006, in the meantime, the high-tech products exported by foreign invested companies increase by 64.8%, 57.6%, 32.8%, and 29.1% respectively during 2003 to 2006, while that of total high-tech products export increase by 76%, 38.9%, 31.8%, and 28.9%. From these figures we can easily see that the structure of FDI in China has experienced significant change during 2003-2006, and FDI in high-tech industries also experiences significant increase.

In this paper we also estimate the return to capital of different industries based upon the firm-level data of the industrial enterprises released by NBS. Interestingly, the return to capital in all of the sectors seems to converge during the period of 2003 to 2007, with an average of 20% in 2007. A FDI flow into high-tech industries implies that foreign capitals are more competitive in these sectors.

6. Summary and Conclusion

By estimating the aggregate return to capital in China, Japan, and the United States, this paper attempts to study the impacts of return to capital on investment rate, hoping to reveal the unusual high investment rate and surging level of FDI in China. Our findings show that the return to capital in China has maintained at a level as high as 21.9% during the last three decades, even higher than that of Japan and that of the US above 10%. In the meantime, the investment rate in China increases from 29.46% in 1978 to 42.75% in 2006, much higher than that of Japan and that of the US. We also find that investment rate is always high when return to capital is high and low when return to capital is low, indicating that investment rate is significantly affected by return to capital. The reason that China has a higher investment rate during the last thirty years is precisely because China has a higher return to capital.

Our analysis also shows that return to capital remarkably affected by the economic cycle, however, it follows a decreasing trend in the long run because it is affected by labor's share and capital-output ratio. At the early stage of economic booms, labor's share and capital-output ratio are always low, as the development of economy, labor's share and capital-output ratio will increase, leading to a decline in return to capital. The reasons that China has a higher return to capital than that of Japan and that of the United States are because China has a lower labor's share and capital-output ratio. In the long run, the increase of labor's share and capital-output ratio will inevitably decline the return to capital in China, however, our analysis shows that China will continue to top in return to capital because labor's share and capital-output ratio in China are still very low, and are not likely to experience significant increase in the near future. The experiences from developed countries also show that depreciation rate will also decline as the economic development, which will contribute to a higher return to capital.

Through analyzing the return to capital in China, Japan and the United States we find that return to capital doesn't converge during the last 30 years, which implies that the

discrepancies among return to capital in China, Japan and the United States will continue to last for a couple of years, indicating that FDI will continuously flows into China, the country that has a higher return to capital.

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