EF 9000: Research Paper



# ECONOMIC GROWTH IN CHINA: SOURCES AND PROSPECTS

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The Research Paper is submitted In partial fulfillment of the requirements for the Master of Arts degree in International Economics and Finance Ryerson University Toronto, Ontario, Canada

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#### [ECONOMIC GROWTH IN CHINA: SOURCES AND PROSPECTS]

# A Research Paper presented to Ryerson University in partial fulfillment of the requirement for the degree of Master of Arts in International Economics and Finance

# By [GUANG YANG]

## ABSTRACT

[The performance of China's economy in the last thirty years is an ongoing debate. After the economic reforms in 1978, China has emerged as the fastest-growing major economy with an average annual GDP growth rate of 9.83%. Capital formation is the major driver to cause China's rapid growth and contributes 54.28% in total GDP growth in 2008. TFP growth plays the second important role to boost China's economic growth. Because of highly investment-driven economy pattern, China needs to faces three major challenges like structural imbalance, environment stains and income inequality. However, addressing the structural imbalance will be the key word in government economic growth plan. Traditional pattern of economic growth needs to be replaced if China wants to keep an efficiency growth in the future. ]

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#### 1. Introduction

For the past 30 years, China has experienced a rapid economic growth and achieved tremendous economic progress. China's economy has changed from a rigid central planning system to an increasingly market-oriented open economy that has a rapidly growing private sector. After the economic reforms in 1978, China has emerged as the fastest-growing major economy with an average annual GDP (Gross Domestic Product) growth rate of 9.83% (according to the data retrieved from World Bank, see Appendix TABLE 1). According to the report of IMF (International Monetary Fund), the country's GDP by PPP (purchasing power parity) is \$8.77 trillion in 2009, which means the economy of China is the world's second largest national economy after that of the U.S.. China is also the second largest trading nation and largest exporter of manufactured products and the second largest importer of goods in the world. Without doubt, China's phenomenal performance has astounded the whole world. Is China's rapid economic growth sustainable? Is the growth speeding off the rails? Such of these issues has captured the attention of economists and researchers, and the response range varies widely from outright pessimism to think highly of china's future economic growth. This paper will try to address this ongoing debate and asses China's economy growth in different stages.

Some of economists and researchers claim China's economic growth rate has been already overheated and the growth pattern has been unbalanced. For example, Zheng, Bigsten and Hu (2007) state that China's economy growth rapidly in the short-run, but the growth rate will be delayed in the long-run process. Tyers, Golley, Xiang and Bain (2006) indicate China's economy will face a trend toward depreciation in the long-run. Henderson (1999) stresses the large economic, environmental, and social problems and sees China as on the "brink". Shane and Gale (2004) conclude that China's economy faces a "serious structure imbalance" and "potentially

unsustainable pressure". Krugman (1994) has the same opinion and describe china's growth as unsustainable.

On the other hand, some economists and researchers believe there is a bright future for China. Holz(2005) predicts China will become the world's largest economy by 2025, China's GDP will surpass U.S. by 2015 in terms of purchasing power parity. Wong (2004) believes China can as a powerful force and new engine to integrate and increase the East Asian economy in the long-run. Hu (2004) expects china's will sustain a high level of growth and make a meaningful progress in the next several years. Murray (1998) describes "China is steadily emerging as a 'superpower' for the next century." Also, Chow and Li (2002) conclude that with the high expected rate of capital formation and high capital elasticity, China's economy will be grow at a substantial rate of at least 7% in the next decade. Bosworth and Collins (2008) are optimistic about China's economy future as well, they believe China's economy growth rate will be 10% in the future.

However, China's rapid economic growth over the past 30 years since 1978 is undeniable. This paper describes China's miracle economic growth in the past and prospect China's economy in the future. Whatever the growth statistic are reliable or not, China's economic growth has been phenomenal. Capital formation and TFP growth are two major factors toward economic growth in China. Capital formation contributes more than 40% in GDP growth and TFP contribution to GDP growth is around 30%. As huge investment result a serious problem which include structural imbalance, environment pollution and income inequality. In order to achieve sustainable economic growth, these three problems need to be direct to the right position. In the future, GDP growth will be slower in order to achieve a soft-landing in the next two decades.

The remainder of the paper is as follows. Section 2 discusses China's economic growth statistics and review China's extraordinary performance in the last 30 years. Section 3 identifies the major driving sources of China's economic growth. Section 4 and section 5 analyze the changelings and prospects for China's economy. The final section offers conclusions.

|      |                       | rate, ODI and ODI   | per eupine (1700 2000)        |
|------|-----------------------|---------------------|-------------------------------|
| Year | GDP Growth (annual %) | GDP ( current US\$) | GDP per capita (current US\$) |
| 1960 | -                     | 61377930682         | 92.0112292                    |
| 1961 | -27.1018818           | 50100934916         | 75.8725712                    |
| 1962 | -6.1053387            | 46464003927         | 69.7898733                    |
| 1963 | 10.3420125            | 50280424169         | 73.688766                     |
| 1964 | 15.8369578            | 58613239133         | 83.9304353                    |
| 1965 | 16.3635408            | 69709152023         | 97.470098                     |
| 1966 | 10.7                  | 75879433528         | 103.1811715                   |
| 1967 | -5.7                  | 72057026116         | 95.4966883                    |
| 1968 | -4.1                  | 69993499400         | 90.3713308                    |
| 1969 | 16.9                  | 78718820946         | 98.8898853                    |
| 1970 | 19.4                  | 91506213646         | 111.8227255                   |
| 1971 | 7                     | 98562021764         | 117.1815906                   |
| 1972 | 3.8                   | 1.1216E+11          | 130.1112674                   |
| 1973 | 7.9                   | 1.3677E+11          | 155.078442                    |
| 1974 | 2.3                   | 1.42255E+11         | 157.9993781                   |
| 1975 | 8.7                   | 1.61162E+11         | 175.865754                    |
| 1976 | -1.6                  | 1.51628E+11         | 162.9205149                   |
| 1977 | 7.6                   | 1.72349E+11         | 182.678568                    |
| 1978 | 11.7                  | 1.48179E+11         | 154.9720597                   |
| 1979 | 7.6                   | 1.76635E+11         | 182.2847006                   |
| 1980 | 7.8                   | 1.894E+11           | 193.0220513                   |
| 1981 | 5.2                   | 1.94111E+11         | 195.3054051                   |
| 1982 | 9.1                   | 2.03183E+11         | 201.4447468                   |
| 1983 | 10.9                  | 2.28456E+11         | 223.251945                    |
| 1984 | 15.2                  | 2.57432E+11         | 248.2889082                   |
| 1985 | 13.5                  | 3.06667E+11         | 291.7744907                   |
| 1986 | 8.8                   | 2.97832E+11         | 279.1851067                   |
| 1987 | 11.6                  | 2.70372E+11         | 249.4127911                   |
| 1988 | 11.3                  | 3.09523E+11         | 280.9678615                   |
| 1989 | 4.1                   | 3.43974E+11         | 307.4899926                   |
| 1990 | 3.8                   | 3.56937E+11         | 314.4306005                   |
| 1991 | 9.2                   | 3.79469E+11         | 329.7490887                   |
| 1992 | 14.2                  | 4.22661E+11         | 362.808414                    |
| 1993 | 14                    | 4.40501E+11         | 373.8000229                   |
| 1994 | 13.1                  | - 5.59225E+11       | 469.2131942                   |
| 1995 | 10.9                  | 7.28007E+11         | 604.2280606                   |
| 1996 | 10                    | 8.56085E+11         | 703.1207994                   |
| 1997 | 93                    | 9.52653E+11         | 774 467161                    |

|  | T/ | ABL | E 1: | : China | 's GDP | growth rate. | GDP and | GDP | per captia ( | (1960-2008 |
|--|----|-----|------|---------|--------|--------------|---------|-----|--------------|------------|
|--|----|-----|------|---------|--------|--------------|---------|-----|--------------|------------|

| 1998                    | 7.8         | 1.01946E+12 | 820.8630768 |
|-------------------------|-------------|-------------|-------------|
| 1999                    | 7.6         | 1.08328E+12 | 864.7303144 |
| 2000                    | 8.4         | 1.19848E+12 | 949.1823289 |
| 2001                    | 8.3         | 1.3248E+12  | 1041.63608  |
| 2002                    | 9.1         | 1.45383E+12 | 1135.448053 |
| 2003                    | 10          | 1.64096E+12 | 1273.641155 |
| 2004                    | 10.1        | 1.93164E+12 | 1490.376905 |
| 2005                    | 10.4        | 2.23591E+12 | 1715.026224 |
| 2006                    | 11.6        | 2.65788E+12 | 2027.338412 |
| 2007                    | 13          | 3.38226E+12 | 2566.432004 |
| 2008                    | 9           | 4.327E+12   | 3266.508198 |
| Average (1960-<br>1978) | 5.218627256 | 97250826329 | 117.3332815 |
| Average (1979-<br>2008) | 9.83        | 9.90954E+11 | 791.1809364 |
| Total Average           | 8.100735221 | 6.44416E+11 | 529.8930702 |

Sources: World Bank Data Sources. All Average rates are based on own calculations.

#### 2. China's economic growth statistics

#### How fast was the growth rate?

Since China launched the economic reform in 1978, China's economy has grown substantially and been the world's fastest growing economy. According to the World Bank data resources, China's average annual economy growth rate since 1960 is 8.1% (see TABLE 1). From 1960 to 1978, the average annual growth rate was estimated at 5.22%. After 1979 to present, the average annual growth rate was increased to 9.83%. In 1978, China's gross domestic product (GDP) was 14.81 billion U.S. dollars. After 20 years, GDP grew to 432.7 billion U.S. dollars (see TABLE 1), which means by 2008 China's GDP was 29.2 times larger than the beginning period of economy reform in 1978. As TABLE 1 shows, GDP per capita also increased rapidly from 3266.51 U.S. dollars in 2008 to 154.97 U.S. dollars in 1978. Although the GDP growth rate was decreased to 4.1% and 3.8% in 1989 and 1990, the rate was recovered to 9.2% in 1992, to 14% in 1993, to 13.1% in 1994. With the development of economy reform, China's economy becoming more and more stable and mature. GDP growth rate was 11.6% in 2006, grew by 13% in 2007 and little bit slow down to 9% in 2008.

| <u></u> |                    |                        |  |  |
|---------|--------------------|------------------------|--|--|
|         |                    | Gross domestic         |  |  |
|         |                    | product 2008 (millions |  |  |
| Ranking | Country            | of US dollars)         |  |  |
| 1       | United States      | 14,093,310             |  |  |
| 2       | Japan              | 4,910,840              |  |  |
| 3       | China              | 4,326,996              |  |  |
| 4       | Germany            | 3,649,494              |  |  |
| 5       | France             | 2,856,556              |  |  |
| 6       | United Kingdom     | 2,674,057              |  |  |
| 7       | Italy              | 2,303,079              |  |  |
| 8       | Russian Federation | 1,679,484              |  |  |
| 9       | Spain              | 1,604,235              |  |  |
| 10      | Brazil             | 1,575,151              |  |  |
|         |                    | _                      |  |  |

TABLE 2: Gross GDP (2008) - World Ranking

Source: World Bank Data Sources

Compare with other countries, China's GDP was 433 billion U.S. dollars and ranked as the third largest economy in the world right after United States and Japan (see TABLE 2). TABLE 3 compares China's economy growth rate in 1980s, 1990s and 2000s with select countries. The comparison shows that China's GDP annual growth rate was far above other countries' GDP average in any period since 1981. Either compare with large developing countries like India and Indonesia or compare with neighboring newly industrialized economy countries, Singapore and Korea, China was still in the leading position. Even compare with developed countries as Japan and United States, China's average annual GDP growth rate was significantly higher than theirs.

| 1980-1998 (in percentage) |           |           |           |          |  |
|---------------------------|-----------|-----------|-----------|----------|--|
| Country                   | 1981-1990 | 1991-2000 | 2001-2008 | Average  |  |
| China                     | 9.35      | 10.45     | 10.19     | 9.996667 |  |
| India                     | 5.57      | 5.47      | 7.47      | 6.17     |  |
| Indonesia                 | 6.4       | 4.43      | 5.19      | 5.34     |  |
| Singapore                 | 7.49      | 7.63      | 4.92      | 6.68     |  |
| Korea                     | 8.74      | 6.19      | 4.38      | 6.436667 |  |
| Japan                     | 3.95      | 1.26      | 1.28      | 2.163333 |  |
| United States             | 3.26      | 3.31      | 2.09      | 2.886667 |  |

TABLE 3: GDP growth rate: China & select countries,

Sources: World Bank Data Sources. All Average rates are based on own calculations.

#### How reliable was the statistics?

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Actually, there are different versions of China's GDP statistics. The data used in this paper is the World Bank data sources, which is has a downward bias compare with the official statistics for china's economic growth rate. When facing different version of GDP data, which version is more accurate? And how reliable are these statistics? Many economists and researchers have different opinion on how to calculate China's GDP. Table 4 compares the different GDP growth number by different estimate methodologies. The comparison shows that although the official growth rate was overstated, especially for the pre 1978 period, the rapid economic growth after China's economic reform in 1978 still cannot denied.

| official and alternative estimates (% per year) |                      |             |          |  |  |
|---|----------------------|-------------|----------|--|--|
| Sources   | Period               | Alternative | Official |  |  |
| Maddison (1990 prices)                          | 1952-87              | 4.3         | 6.1      |  |  |
|   | 1978-92              | 7.6         | 9.4      |  |  |
| Wu (1980 prices)                                | 1952-78              | 4.9         | 6.1      |  |  |
|   | 1978-91              | 8.6         | 9        |  |  |
| Li et al.                                       | 1952-78              | 5.6         | 6.1      |  |  |
|   | 1978-90              | 8.4         | 9        |  |  |
| Chow( 1980 prices)                              | 1952-80              | 3.9         | 6.2      |  |  |
| World Bank                                      | 1978-95              | 8.2         | 9.9      |  |  |
|   | 1978-86 <sup>-</sup> | 8.8         | 9.7      |  |  |
|   | 1986-95              | 7.9         | 10       |  |  |
| Ren (1985 prices)                               | 1985-94              | 6           | 9.8      |  |  |
| Yeh (1990 prices)                               | 1990-95              | 8.7         | 12       |  |  |
| 0   | 11 1 (20)            | 20)         |          |  |  |

TABLE 4: China's GDP growth, official and alternative estimates (% per year

Source: Yeh (2000)

On the other side, many statistics prefer to measure the GDP growth by Purchasing Power Parity (PPP) conversion factor. Because PPP rates shows the amount of a certain basket of basic goods and services which can be bought in a domestic market as one dollar would buy in the other country. PPP conversion factor can provide a standard measure allowing comparison of real price levels between countries rather than exchange rates. In the other word, GDP growth rate in terms of PPP measure measures more than just change rate of total value of goods and services, it also measures relative price level between two countries. Feng and Wu (2006) calculate economic growth rate using PPP-adjusted GDP for different countries as shown in TABLE 5. The finding shows by 2004, China's economy is still astonishing even we use the PPP measurement method.

| Country        | 1981-2004 | 1981-1994 | 1995-2004 |
|----------------|-----------|-----------|-----------|
| United States  | 6.17      | 6.98      | 5.04      |
| Japan          | 5.33      | 7.01      | 3.02      |
| Germany        | 5.02      | 6.2       | 3.39      |
| united Kingdom | 5.39      | 5.99      | 4.55      |
| France         | 5.28      | 6.04      | 4.24      |
| China          | 13.03     | 14.36     | 11.2      |
| Korea          | 10.01     | 12.3      | 6.89      |
| Brazil         | 5.14      | 5.61      | 4.49      |
| Indonesia      | 8.25      | 10.64     | 5         |
| Thailand       | 9.17      | 12.12     | 5.16      |
| Argentina      | 4.49      | 5.22      | 3.47      |
| Malaysia       | 9.4       | 11.04     | 7.13      |
| Singapore      | 9.8       | 11.43     | 7.56      |
| India          | 8.91      | 9.51      | 8.06      |

TABLE 5: GDP growth rate in terms of PPP (1981-2004)

#### 3. Causes of China's economic growth

Most of economists and researchers address the causes of China's rapid economic growth by combination of large scale capital investment and increased productivity growth. Yeh (2000) shows the sources of economic growth in selected countries in TABLE 6. The comparison shows China's GDP growth not only depends heavily on the growth of capital but also on total factor productivity (TFP). From 1960 to 2000, capital growth contributed 46.8% to the economic growth rate. Only 13.3% can be attributed to increases in labors and the remaining 39.8% came from increased TFP. Zheng, Bigsten and Hu (2007) also support Yeh's result. Hu and Khan (1996) believe the contribution of capital formation is high and will keep rising in the next

Source: Feng and Wu (2006)

decades. As shown on TABLE 7, either period 1978-1993 or 1993-2005, China's economic growth heavily reliance on capital and productivity growth (TPF). Compare these two periods, China's growth during 1993-2005 was more dependent on growth of capital than period 1978-1993.

| Country   |          | GDP growth rate | contributions<br>from Capital | contributions from Labour | contributions<br>from TFP |
|-----------|----------|-----------------|-------------------------------|---------------------------|---------------------------|
| China     |          | 9.4             | 4.4                           | 1.3                       | 3.7                       |
|           | % in GDP |                 | 46.8                          | 13.3                      | 39.8                      |
| Singapore |          | 8.5             | 6.2                           | 2.7                       | -0.4                      |
|           | % in GDP |                 | 73.1                          | 31.6                      | -4.7                      |
| Korea     |          | 10.3            | 4.8                           | 4.4 ·                     | 1.2                       |
|           | % in GDP |                 | 44.2                          | 42.4                      | 11.6                      |
| Taiwan    |          | 9.1             | 3.7                           | 3.6                       | 1.8                       |
|           | % in GDP |                 | 40.5                          | 39.8                      | 19.8                      |
| Japan     |          | 6.8             | 3.9                           | 1                         | 2                         |
|           | % in GDP |                 | 56.9                          | 14.3                      | 28.8                      |
| United    |          |                 |                               |                           |                           |
| States    |          | 3.1             | 1.4                           | 1.3                       | 0.4                       |
|           | % in GDP |                 | 45.2                          | 41.5                      | 13.2                      |

 TABLE 6: Source of GDP growth (selected countries, 1960-2000, in percentage)

Source: Yeh (2000)

# TABLE 7: China: growth accounting, 1978-1993 and 1993-2005

|                            |          | 1978-1993 | 1993-2005 |
|----------------------------|----------|-----------|-----------|
| Average Growth             |          |           |           |
| GDP                        |          | 9.9       | 9.91      |
| Factors                    |          |           |           |
|                            | Capital. | 8.76      | 12.34     |
|                            | Labour   | 2.51      | 1.06      |
| TFP                        |          | 4.27      | 4.34      |
|                            |          |           | -         |
|                            |          |           |           |
| Contribution to GDP growth |          |           |           |
| Total GDP                  |          | 9.9       | 9.91      |
| Factors                    |          | 5.64      | 6.7       |
|                            | Capital  | 4.38      | 6.17      |
|                            | Labour   | 1.26      | 0.53      |
| TFP                        |          | 4.27      | 3.21      |

Source: Zheng, Gibson and Hu (2007)

#### Capital Formation

Capital formation is a process of transfer savings from household and government to business sector to result an increasing output and expansion of economy. Since China's open market economy strategy in 1978, china has consistently allocated a large share of GDP to capital formation. Since the beginning of 1980s, China's capital formation share of GDP has trend up; the average share of capital formation in GDP during 1978-2008 was 38.53% (TABLE 8). In 1993, the capital share reached 44.48% but the share fell down to 37.94% in 1997. Since 2004, the average share of capital formation in GDP was quite stable and almost constantly floating around 44%. Shane and Gale (2004) indicate high Gross Capital Formation percentage in GDP plays major role to increase the GDP growth rate. For example, Singapore had a continual growth economy period from 1971 to 1985 when its gross capital formation share of GDP was more than 40%. Malaysia has the same situation in the mid-1990s. As a result, higher gross capital formation shares to GDP contribute to higher GDP growth rate.

|      |             |            | Q · ·       |                |                   |
|------|-------------|------------|-------------|----------------|-------------------|
|      |             | Gross      |             | ×              |                   |
|      | Agriculture | capital    | Gross       | Industry value | Service etc value |
| Year | value added | formation  | savings     | added          | added             |
| 1978 | 28.1877538  | 37.8003942 |             | 47.8766576     | 23.9355886        |
| 1979 | 31.2656919  | 36.4027962 | -           | 47.1003785     | 21.6339296        |
| 1980 | 30.1742344  | 35.1922739 | -           | 48.222456      | 21.6033096        |
| 1981 | 31.8811841  | 33.3265189 | -           | 46.1096557     | 22.0091602        |
| 1982 | 33.388436   | 33.5161739 | 36.0815582  | 44.7646249     | 21.8469391        |
| 1983 | 33.1795999  | 34.195918  | 35.9153936  | 44.3792241     | 22.4411761        |
| 1984 | 32.1319072  | 34.8926902 | 35.6042325  | 43.0862491     | 24.7818437        |
| 1985 | 28.4427684  | 38.3484916 | 34.5925715  | 42.8859814     | 28.6712502        |
| 1986 | 27.1401043  | 38.3632435 | 35.6286231  | 43.7237221     | 29.1361736        |
| 1987 | 26.8107409  | 37.0026371 | 36.9756256  | 43.5506601     | 29.6385991        |
| 1988 | 25.696014   | 37.8932114 | 36.5984954  | 43.789722      | 30.5142639        |
| 1989 | 25.1049005  | 37.2680567 | 36.4269249  | 42.8311659     | 32.0639336        |
| 1990 | 27.1162108  | 36.1424485 | 39.9980887  | 41.3407048     | 31.5430844        |
| 1991 | 24.5263182  | 36.1223975 | 40.1388378  | 41.7886739     | 33.6850079        |
| 1992 | 21 7898862  | 37 /628113 | 239 5567315 | 43 4546022     | 34 7555116        |

 TABLE 8: Percentage of GDP

| 1993    | 19.7085518  | 44.4833432 | 42.3845777  | 46.5683098  | 33.7231384  |
|---------|-------------|------------|-------------|-------------|-------------|
| 1994    | 19.8612388  | 42.203291  | 43.8960961  | 46.5692489  | 33.5695124  |
| 1995    | 19.9622658  | 41.895953  | 42.6861439  | 47.1751185  | 32.8626157  |
| 1996    | 19.6910221  | 40.4415215 | 41.2875821  | 47.5366904  | 32.7722875  |
| 1997    | 18.2871361  | 37.9471465 | 41.8271544  | 47.5390323  | 34.1738316  |
| 1998    | 17.5559821  | 37.1012535 | 40.1883186  | 46.2121751  | 36.2318429  |
| 1999    | 16.4702209  | 36.7446502 | 38.3704565  | 45.7575521  | 37.772227   |
| 2000    | 15.0629441  | 35.1184801 | 36.830586   | 45.9164441  | 39.0206118  |
| 2001    | 14.3917742  | 36.2677489 | 37.5812828  | 45.1525238  | 40.455702   |
| 2002    | 13.7427316  | 37.8658503 | 40.3023129  | 44.7898202  | 41.4674482  |
| 2003    | 12.7973359  | 41.2029497 | 43.9985591  | 45.9689389  | 41.2337251  |
| 2004    | 13.3931498  | 43.2632382 | 46.817687   | 46.2252468  | 40.3816035  |
| 2005    | 12.2368224  | 44.0167015 | 51.2092084  | 47.6835455  | 40.0796321  |
| 2006    | 11.343716   | 44.5453194 | 54.074272   | 48.6788865  | 39.9773975  |
| 2007    | 11.1256809  | 43.1080396 | 54.1016438  | 48.5022479  | 40.3720712  |
| 2008    | 11.3080786  | 44.4381881 | 54.2858269  | 48.6190841  | 40.0728373  |
| Average | 21.73465812 | 38.5346367 | 41.38365893 | 45.60643043 | 32.65891146 |

Sources: World Bank Data Sources. All Average rates are based on own calculations

In China, capital growth mainly depends on investment. And there are two major sources to keep a high and stable investment: high savings and foreign direct investment. TABLE 8 shows China has a historically steadily risen percentage of GDP to gross saving rate. China's gross saving as a percentage of GDP stood at 36.08% in 1982 and reached 54.28% in 2008; and the overall average share of GDP was 41.38% from 1982 to 2008. The Gross Saving in percentage of GDP rose sharply from 40% in 2002 to 44% in 2003. The accession to the World Trade Organization in late 2002 and the preparation to host 2008 Olympic Games are the major reasons of this jump. As see in TABLE 9, the saving rate was increased from 30% in the pre-reform period to 37.4% in the period 1978-1998. But in the same time period, the investment rate highly jumped from 18.5% to 26.8%. Relative low increment in saving but higher expand in investment means saving were efficiently invested.

| TABLE 9. Rates of saving investment, | , and capital II | nonnation (7 |
|--------------------------------------|------------------|--------------|
|                                      | 1961-1977        | 1978-1998    |
| Saving Rate(GDP=100)                 | 30               | 37.4         |
| Investment Rate (GDP=100)            | 18.5             | 26.8         |
| Rate of Capital Formation (GDP=100)  | 12.6             | 22.2         |
| Efficiency of Capital Formation      |                  |              |
| (saving=1000)                        | 42.1             | 59.4         |

TABLE 9: Rates of saving investment, and capital information (%)

Note: investment rate is defined as the ratio of investment in fixed assets to GDP. Source: Wang (1999)

Foreign direct investment has played another crucial role in the capital formation. Foreign direct investment has several positive effects on economic growth. Firstly, FDI enhance capital formation directly. Secondly, FDI will increase the demand of employment market. Thirdly, FDI can incentive the trading market, either import or export. Also, foreign direct investment brings more new technology, process and management skills that can lead China's economy growth to higher efficiency. Foreign direct investment in China increased rapidly since 1992 (TABLE 10). In 2008, FDI increased to 14.78 billon U.S. dollars which is 13 times to FDI in 1992. Zhang (2006) uses provincial data over the period of 1992-2004 to test the relationship of FDI and GDP growth in China. The result of regression test suggests the direct impact and spillover of FDI on economy growth are significantly positive. Dondeti and Mohanty (2007) confirm FDI can promote China's GDP growth and estimate "one dollar of FDI adds about 3.27 dollars to the GDP".

|      | B  |
|------|--|
|      | Foreign direct investment net inflows ( in US\$) |
| 1992 | 11156000000                                      |
| 1993 | 27515000000                                      |
| 1994 | 33787000000                                      |
| 1995 | 35849200000                                      |
| 1996 | 4018000000                                       |
| 1997 | 44237000000                                      |
| 1998 | 43751000000                                      |
| 1999 | 38753000000                                      |
| 2000 | 38399300000                                      |
| 2001 | 44241000000                                      |
| 2002 | 49307976629                                      |
| 2003 | 47076719000                                      |
| 2004 | 54936483255                                      |
| 2005 | 79126731413                                      |
| 2006 | 78094665751                                      |
| 2007 | 1.38413E+11                                      |
| 2008 | 1.47791E+11                                      |

TABLE 10: Foreign direct investment in China

Source: World Bank Data Sources.

#### Labor Contribution

As TABLE 6 shows, China's labor contributed only 13.3% of the GDP growth over the period 1960 -2000. By comparison, U.S. and Korea's labor contribution are relatively higher, at approximately 42% over this period. However, labor contribution has to be low in China to maintained China's comparative advantage in global markets. Relative low wages also help China highly competitive in labor-intensive industries. Yeh (2000) points out there are two reasons to lower estimated China's labor contribution. First is lack of information, labor input is measured in number of employment rather than working hours. Second, "there is the likelihood that the labor share in GDP used in estimation sources of growth has been too low". In any event, the contribution of labor growth still goes far below the contribution of capital input and productivity growth.

#### Productivity (TFP) Growth

Productivity growth is another major factor to boost China's economy growth and played a significant role to contribute to growth and welfare. China' TFP growth can be distinguished into three sources: resources allocation efficiency, technology renovation and improved quality of labor force. Since China's economic reform, resource structure has changed from low productivity resources to high productivity resources. For example, the employment shit from agriculture section to industry and service section. Obviously, output per worker in industry and service is higher than output per worker in agriculture and result the more efficiency resource allocation. Technology changes also contribute a lot to GDP growth. Zachariadis (2004) estimates about 80% of growth in TFP was contributed by domestic Research and Development (R&D). Aghion and Howitt (1998) also agree with result, and they believe there is a stongly positive relationship between TFP growth and domestic R&D. Higher education level is the major evidence of improvement of workers skills. TABLE 11 shows the difference of composition of labor force by education between 1982 and 1997. In 1982, college and above labor force is only 0.9% but this number sharply increased to 3.5% in 1998. Illiterate or semiilliterate percentage level dropped from 28.2% in 1982 to 11.6% in 1998. China's GDP increase rapidly as the quality of labor force improved.

| citemage | 2   |
|----------|---|
| 1982     | 1997  |
| 100      | 100   |
| 0.9      | 3.5   |
| 10.5     | 12.1  |
| 26       | 37.9  |
| 34.4     | 34.8  |
| 28.2     | 11.6  |
|          | <u>1982</u><br><u>100</u><br><u>0.9</u><br><u>10.5</u><br><u>26</u><br><u>34.4</u><br><u>28.2</u> |

| TABLE | 11: Composition | of the | workforce   | by | education | level, |
|-------|-----------------|--------|-------------|----|-----------|--------|
|       | 1007 8-1        | 007 (  | n naraantaa | 10 |           |        |

Many researchers use empirical study to prove that TFP make a significant contribution to GDP growth. Chow and Li (2003) found that TFP plays a major role to boost China's economy growth and accounting for 32% of growth during the period of 1978-1998. Sharma (2007) use Cobb-Douglas function to estimate the contribution of TFP to GDP growth is 28% from 1978 to 1998. They both agree that although TFP made the relative lower contribution to GDP growth than capital formation, TFP is an important factor to maintain the substantial growth in China's GDP. Therefore, China's GDP growth basically driven by capital formation, labor input and TFP increase, but only increasing capital formation and efficient TFP can mostly explain the acceleration of economic growth.

## 4. Challenges facing the Chinese economy

During thirty years economy reform, China has accomplished an extraordinary successful in economic growth. Economists and researchers believe China's rapid economy growth mainly depend on huge capital investment rather than capital efficiency. Therefore, there exist some serious problems if China wants to achieve a sustainable growth. In the current growth pattern, China's economic growth heavily relies on manufacturing industry and investment. Unbalance of GDP structural not only means the capital inefficiency but also lead to economic and social instability. Furthermore, high environment cost is created by the reliance on manufacturing especially on heavy industry. Finally, rising income inequity is also associated with China's rapidly investment-driven economic growth.

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## Structural Imbalance

Since economic reform in 1978, investment played the major role to drive China's GDP growth and this investment-driven situation results the structural imbalance problem in the economy. Larry (2006) compares China's gross investment share of economy with Japan and Korea. The result shows China has the highest share of investment among three countries which is 35% in 2000 and the number increase to 45% of GDP in2006. He and Kuijs (2007) conclude that high level of saving and investment lead China to a capital-intensive not labor-intensive industry. Hofman and Kuijs (2007) shows, China's investment-driven level is almost 4 times higher than that of advanced countries. Moreover, most of the investment is done by enterprise and enterprise savings mainly financed by household savings. This means household put lots of money into the investment market and result the decline of domestic consumption share. Domestic market and virtual economy development are ignored under the investment-heavy economic pattern. Also, increasing capital -intensive economy creates a higher urban unemployment rate than labor-intensive economy.

### **Environmental Strains**

Increasing environmental strains is created during China's industry-driven economic growth process. The use of natural resources and energy significantly increased over the past 30 years. Hofman and Kuijs (2007) compare China's energy use per unit of output with advanced countries. The result shows China's energy intensity is three to five times higher than that of advanced countries. According World Bank report in 2007, health cost of air pollution is up to 3.8% of GDP per year and one third China's landmass will experience acid rain almost every year which will cause the damage of 13 billion U.S. dollars. China also needs pay attention to water pollution and scarce problems. China's usage of recycled water is only 50% of that in advanced countries (Hofman and Kuijs, 2007). As the increase of environment damage, China needs a stronger monitoring, inspection and prevention policy to make a more environmentally sustainable growth.

# Income Inequality

Income inequality increased significantly as China's economy growth rapidly. Chen and Ravallion (2008) calculate the Gini coefficient of China's income inequality increased from 0.3 in 1981 to 0.45 in 2005 which means higher inequality level than United States and Russia. Firstly, China's low- interest rate monetary policy makes the economy market more capital intensive. More capital intensive means fewer job position and higher income inequality. Secondly, the heavy reliance on investment will lower the agricultural income per capita and widen the income gap between urban and rural. Also, China's coastal development strategy result the higher interprovincial inequalities between east and west in China. As a result, current investment-driven growth pattern has contributed to increasing inequality and lagged the income per capita both urban-rural and east-west.

In sum, despite China's remarkable achievement in the past 30 years, there is still a long way to go to maintain a sustainable economic growth. Structural problem subsequently emerged in China's economy along with the rapidly economic growth. Addressing the structural imbalance will be the key word in government economic growth plan. Traditional pattern of economic growth needs to be replaced if China wants to keep an efficiency growth in the future.

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# 5. Prospects of China's economic growth

Many researchers believe China can repeat the extraordinary economic performance in the future. Based on the past economy growth, Woo (1998) predicted China's future economic growth rate will be at least 8% per year. Malkiel (2009) believes China will keep growth rapidly, because he has a strong confidence with Chinese government. He convinced the government policy maker will firmly follow the development conditions and make the right decision on critical situation. He has the strong confidence that China will rank as the first largest economy in the world within twenty years. On the contrary, some researchers indicate China's economic growth will be slowdown in the following years. In TABLE 12, both World Bank and Li believe GDP growth will fall down and below the current level. In the next 20 years, investment rate will fall slightly, and labor growth contribute to GDP will drop sharply. World Bank also expects a sharp drop on TFP growth, but Li believes TFP growth will maintain the same level until 2010. However, this paper focuses to explore the future of capital formation, labor and TFP.

|            |  |   | 0-1   |
|------------|--|---|---|
| GDP Growth | Investment Rate  | Labor Growth  | TFP growth  |
|            | £  |   |   |
| 8.2        | 37   | 2.4   | 3.5   |
| 6.6        | 35   | 0.8   | 1.5   |
| 6.9        | -  | -   | -   |
| 5.5        | -  |   | -   |
|            |  |   |   |
| 9.4        | 37   | 2 <u>.1</u>   | 3.7   |
| 8.1        | 33   | 1   | 3.4   |
| 6          | 30   | 0.3   | -   |
| 4.5        | -  | -0.2  | -   |
|            |  |   |   |
| 8.2        | -  | 2.2   | 3.7   |
| 6.4        | -  | 1.4   | 2.5   |
|            | GDP Growth<br>8.2<br>6.6<br>6.9<br>5.5<br>9.4<br>8.1<br>6<br>4.5<br>8.2<br>6.4 | GDP Growth         Investment Rate           8.2         37           6.6         35           6.9         -           5.5         -           9.4         37           8.1         33           6         30           4.5         -           8.2         -           6.4         - | GDP Growth         Investment Rate         Labor Growth           8.2         37         2.4           6.6         35         0.8           6.9         -         -           5.5         -         -           9.4         37         2.1           8.1         33         1           6         30         0.3           4.5         -         -0.2           8.2         -         2.2           6.4         -         1.4 |

| IABLE 12: GDP protections, 1995-2050 (1 | n percentage) |
|---|---------------|
|---|---------------|

Source: Yeh (2000)

In general, China has the potential to sustain rapid growth in the future and there is long way to reach mature status to get a steady economic growth rate. Chinese economy maybe overheated in recent years due to over invest on infrastructure and other capitals, but investment rate will be maintained in the next few years because government wants to keep GDP growth sustainable. In the following years, Chinese government will release serious policies to slow down GDP and achieve a soft-landing. Thus, GDP growth will decline and investment rate maybe can maintain the same level as before or little bit lower than before. If soft-landing happens, income per capita will increase at a slower rate. The Contribution to GDP growth of labor input will decrease because age structure changed (rate of aging population increased) and relative low population growth rate in 1980s (one child policy). Technological change is a continuous and on-going factor in economic growth process. Therefore, TFP and human capital will continue to growth. Human capital directly linked with technology changes, new technology requires well educated and vocational trained labor.

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## 6. Conclusion

China's economy has changed from a rigid central planning system to an increasingly marketoriented open economy that has a rapidly growing private sector. Since China launched the economic reform in 1978, China's economy has grown substantially and ranked as the world fastest growing economy. Capital formation and TFP contribute most to the shares of GDP growth. On the other hand, China's GDP growth mainly depends on investment in domestic market. Therefore, a serious structural imbalance problem has been emerged and counteracts China's long-term sustainable economic growth. However, structural imbalance makes China's economy facing many other potentially unsustainable burdens, like environment stains and income inequality, and increased unemployment. In sum, despite China's remarkable achievement in the past 30 years, there is still a long way to go to maintain a sustainable economic growth. Structural problem subsequently emerged in China's economy along with the rapidly economic growth. Addressing the structural imbalance will be the key word in government economic growth plan. Traditional pattern of economic growth needs to be replaced if China wants to keep an efficiency growth in the future.

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