Why China's economy can sustain high performance: an analysis of its sources of growth

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Summary

The Chinese economy has experienced phenomenal growth since it embarked on economic reform in 1978. Despite the recent Asian financial crisis and the current global downturn, China's growth remains very much unaffected. China's spectacular growth has been the recent subject of much heated debate, with many sceptics questioning the validity of China's official growth numbers. However, China's high GDP growth is not a myth, and to date, China's growth remains basically domestic-demand driven, almost the exact opposite of the highly open economies of Hong Kong and Singapore. This paper examines the sources of growth in China, and employs the multiple regression analysis to estimate the growth elasticity of the various income components, namely, consumption, investment and exports. From the study, it is found that domestic consumption will remain the major driving force of China's economic growth while domestic investment provides the extra push for additional growth. The contribution of external demand to China's growth is marginal but its importance is clearly on the rise and it is set to play a more important supporting role for China's future growth, particularly when domestic demand falters. This is crucial given that China cannot continue its proactive fiscal policy for long, without running into unacceptable levels of fiscal or budget deficits.

1. Persistent High Growth Not a Myth

The Chinese economy has experienced spectacular growth, averaging 9.5% a year since 1978. The 1997 Asian financial crisis brought down many Asian economies but China's economy was hardly affected, and it continued to grow at 8.8% in 1997 and 7.8% in 1998.

More recently, while economic growth in most of Asia has been plummeting to low or negative growth as the world economy at large is creeping into recession, China's economy alone is still steaming ahead with strong growth. In 2002, China's economy expanded by a robust 8%, amidst the general gloom and doom in market sentiment in the region (Figures 1A and 1B). China is expected to maintain its economic growth for the whole of 2003.

A number of Western journalists and scholars have taken issue with Chinese official statistics for their gross inaccuracy which greatly exaggerated China's economic performance.[1] The controversy was rekindled by a recent study by American scholar Thomas Rawski (2001), who observed that official growth figures for China's GDP and industrial production do not

reconcile with lower growth rates for other indicators such as energy use. Rawski noted that increases in China's GDP and industrial production since 1998 were negatively correlated with a decline in energy consumption. China's actual GDP growth could range from negative growth in 1998 and 1999, to 2-3 percent in 2000 – a far cry from the official growth figures of 7-8 percent.[2] Rawski's argument was soon widely picked up by Western media due to its sensational nature.

A number of Chinese scholars and statisticians have since refuted Rawski's argument for being "groundless". They cogently argue that with the growth of the service sector in China and the shift of its industrial structure from smoke-stacked heavy industries to light and high-tech industries, it would be unrealistic for Rawski to expect any close correlation between growth in industrial production and growth in energy consumption. In most industrial countries, economic growth is actually accompanied by a decline in energy consumption. In China, its new growth industries in recent years are the light and high-tech industries such as electronics and electrical machinery which are not energy intensive. There should therefore be no permanent casual relationship between GDP growth and energy consumption.[3]

Some scholars have also refuted Rawski's claim that Chinese official growth statistics are highly questionable. Economics Nobel Laureate Lawrence Klein (2002) and his associate, employing a more comprehensive test of the relations between China's GDP and other 15 major indicators (not just energy but also electricity, grain, steel, freight, civil aviation, long-distance phone and so on) for the whole period of 1980-2000, confirm that the movements of these major economic components "are consistent with the movements of real GDP as officially estimated". Klein has qualified that their study has not "proved" that Chinese official GDP measure is correct; as no one knows the "correct estimate".[4]

Another noted American economist Nicholas Lardy (2002) pointed to a few indicators that supported Chinese official growth data. First, China's import growth of 70% between 1997 and 2001 does not support the contention that the economy is contracting nor sharply decelerating. The most plausible explanation for the high import growth figures, consistent with export data in trading partner countries, is an expansion of GDP. Modest tariff reductions

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[1] Brian Palmer, "China by the Numbers", *Fortune*, 6 Dec 1999; "Beijing has HK$54 billion chasm in key data", *South China Morning Post,* 24 July 2000; and "Why China Cooks the Books?", *Newsweek*, 1 Apr 2002.

[2] Thomas G. Rawski, "What is Happening to China's GDP Statistics?", *China Economic Review*, Vol. 12, 2001.

[3] Shi Liangping, "China's GDP Statistics Are Credible", *Beijing Review*, July 4, 2002.

[4] L.R. Klein and S. Ozmucur, "The Estimation of China's Economic Growth Rate", seminar paper presented at the Singapore Management University, May 2002.

are unlikely to explain more than a fifth of the growth of imports.[5] Second, family incomes and household savings have been steadily rising, which is a sign of a growing, not faltering economy.

The authenticity of China's official figures is further verified by senior China scholars who have all along emphasised that there is no evidence of Beijing having deliberately fabricated statistical information. Official mendacity is simply impossible because it is technically and politically difficult for any government of a large country to systematically manufacture false economic and social statistics on a large scale and year after year (for consistency). Deliberate falsification of official statistics would also entail the mammoth administrative complications of keeping two or more separate sets of books all the way from the central down to the local levels; and many economic data such as wages and prices cannot be faked as they can be easily checked out by people based on their own personal experience. Afterall, an authoritative government, instead of falsifying numbers to lie, could have simply withheld unfavourable information.[6]

In fact, seen in the historical context of many high-performance East Asian economies, China's high economic growth for the past two decades as reflected in its official GDP statistics, though very impressive, is actually not exceptional. China's growth rates are comparable to the phenomenal growth rates of Japan and the other East Asian countries. Japan experienced near double-digit rates of growth in the 1950s, 1960s and most of the 1970s, while the newly-industrialised economies of South Korea, Taiwan, Hong Kong and Singapore, experienced growth for more than three decades from the 1960s to the 1980s. Several ASEAN countries like Malaysia, Indonesia and Thailand also experienced similar high growth performance in the 1970s and 1980s.

China is a much larger country than its East Asian neighbours. China have much more internal dynamics to sustain an even longer period of high growth, as it has virtually a whole continent to develop and it will take many decades before China exhaust its total development potential. Empirically speaking, the sceptical views of China's economy are just not consistent with the historical experiences of the East Asian economies.

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[5] "China Will Keep On Growing", *Asian Wall Street Journal*, 14 June 2002.
[6] Dwight H. Perkins, *Market Control and Planning in Communist China*, Cambridge, Mass., Harvard University Press, 1966; and Nai-Ruenn Chen, "An Assessment of Chinese Economic Data: Availability, Reliability and Usability: In Joint Economic Committee of US Congress, *China: A Reassessment of the Economy,* US Govt. Printing Office, 1985.

2. Domestic Demand as Major Driving Force

How do we explain China's dynamic economic growth? For a huge continental economy like China, domestic demand naturally constitutes the mainstay of its economic growth. As shown in Figure 2, domestic demand was responsible for over 90% of China's total demand in the early and mid-1980s. In recent years, as China's exports continued to surge, domestic demand still stood at about 80%. This proportion is about the exact opposite of that for the highly open Singapore and Hong Kong economies, with their growth depending predominantly on external demand. In fact, China's 7.9% growth in the first three quarters of 2002 was basically fuelled by domestic investment, which actually increased 21.8% over the same period. This explains why China's economy can continue to grow at high rates quite independent of the ebbs and flows of the international economy.[7]

From a demand perspective, China's high growth stems from its high levels of domestic investment, being matched by equally high levels of domestic savings which were over 30% of GDP in the 1980s and above 40% in the 1990s. Accordingly, the Chinese government was able to mobilise such huge pool of savings for infrastructural investment, and this easily translates into high GDP growth.

Such simple analysis, however, cannot explain China's growth fluctuations as seen from Figure 3: Why was it that in some years growth could reach double-digit whereas in others, it dived. To better understand the pattern of growth and fluctuation, one needs to look closely into the sources of growth: i.e., to analyse the two key macroeconomic components of "domestic demand" (DD) and "external demand" (ED) that together constitute "aggregate demand" (AD), as manifested in the simple macroeconomic identity: $Y = C + I + G + (X-M)$. (See Box 1)

From simple economic theory, China's economic growth (increases of Y or GDP by the expenditure approach) occurs when its AD increases. AD rises because its domestic demand (comprising personal and household consumption C, domestic investment I, and government spending G) and external demand (exports net of imports) rises. Figure 4 shows how domestic demand and external demand interact to generate the process of growth and fluctuations. Changes in these key macroeconomic variables will not affect growth but also causes

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[7] Why do Chinese exports seem immune to the global recession? China's primary products accounted for only a modest share of total exports, which explains why China has not experienced the vagaries of volatile commodity prices. A wide variety of labour-intensive commodities produced by China are also globally cost competitive, with some necessity-type products like clothes or footwear which are income-inelastic. As such, China is not so adversely affected by changes in the global economy.

fluctuation. Variation of the individual components of domestic demand (i.e., *C, I, G*), particularly for fixed investment *I*, has actually been the major source of China's growth fluctuations over the past two decades. Figure 5 shows how China's past economic growth process tended to "swing" with the ups and downs of consumption and investment, giving rise to a number of "reform cycles".[8]

The last upswing occurred in 1992 when Deng Xiaoping's *Nanxun* (tour of South China) touched off an explosion of domestic investment (over 50% increases) and subsequently, serious economic overheating. Premier Zhu Rongji undertook strenuous efforts to cool down the economy by squeezing hard on fixed investment, and eventually achieved a soft landing in 1996. In recent years, fixed investment was again used by Zhu Rongji as an instrument of expansionary fiscal policy in order to boost growth when domestic deflation (i.e., a slump in domestic consumption) set in.

How have domestic consumption *C* and domestic investment *I* actually contributed to growth over the past two decades? Table 1 gives a break-down of China's sources of growth for the whole period. It can be seen that household and government consumption has been the major source of growth for most years except for the boom years of 1985 and 1993, when domestic investment took over as the main driver of growth. This means the economy got overheated when China was over-investing. At the same time, the proportions of exports, whilst fluctuating widely, made only a marginal contribution to growth except for two or three years.

A regression analysis brings out the growth elasticity of various components of the aggregate demand for 1980-2001 as follows: 0.66 for *C*; 0.33 for *I*; and 0.02 for *NX* (or net exports). This means that on average, every 1% increase in domestic consumption brings about 0.66% increase in GDP; every 1% increase in investment brings about 0.33% increase in GDP; but every 1% increase in net exports brings about a meagre 0.02% increase in GDP (See Box 2). Not surprisingly, the Chinese economy has continued to experience high rates of growth even though much of the global economy remains sluggish.

3. Exports Rising, but still of Marginal Importance

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[8] This happened in the half-reformed Chinese economy of the 1980s and early 1990s, which lacked a built-in self-adjusting macroeconomic mechanism. Thus, when too much investment ran into bottleneck of energy, transport and industrial raw materials, the government was forced to apply a severe credit crunch by bringing expansion into an abrupt halt.

Is the contribution of external demand to China's economic growth of only marginal significance? What has happened to China's open-door policy? By conventional measure (as shown in Table 2), the Chinese economy today is quite "open" as reflected by its trade-GDP ratio which rose from 15% in 1982 to 48% in 2000. In fact, on the basis of export-GDP ratio, China can be ranked economically more open than USA and Japan! (Figure 6). This is because China's nominal GDP tends to be downward-biased on account of its old socialist pricing structures whereas exports are denominated in US dollar terms.

Consequently, it is more realistic to express GDP in PPP (purchasing power parity) terms, and the ensuing export-GDP ratio results in a lower ranking for China. It makes sense to say that China is economically less open than Japan and USA, and very much so compared to the four East Asian NIEs and ASEAN-4, as shown in Figure 7. A large economy, be it Japan, USA or China, tends to be more self-sufficient and therefore less dependent on trade. Naturally, China's per-capita trade turnover is also much smaller than that of the other economies.

It may be stressed that though China's exports (at US$266 billion in 2001) may be nominally very large in absolute terms, making it the world's sixth largest exporting nation, the net value-added of its export trade remains relatively low. First, almost 50% of China's exports are generated by foreign enterprises. Second and more importantly, China's exports are heavily dependent on the import of intermediate products, estimated to be as high as 50%. As the domestic content of China's exports is low, its domestic value-added or contribution to GDP will necessarily remain low. Hence the small contribution of external demand to China's GDP growth.

4. External Demand's Supporting Role

Viewed from a different angle, however, China's exports are economically not all that unimportant, even if we take into account its relatively low domestic content. It is commonly acknowledged that China's export sector is the single most vibrant segment of the whole economy because of its better management and better technology. As such, it must have exerted a strong catalytic effect on the rest of the economy, creating a much greater total linkage effect than what is shown in our foregoing analysis. In other words, our limited exercise here has probably failed to capture all the "spread effects" of the export sector. A proper approach would need to trace all the multiplier effects of the foreign trade sector through a detailed input-output table.

Of even greater importance, our analysis has shown that even though the share of export's contribution to GDP is still very small, it is clearly rising. The rising trend is unmistakable when we break up the time series into two sub-periods of 1980-1992 and 1992-2001: with the export elasticity of the latter period being substantially higher than the former (refer to Appendix).[9] China's WTO membership will certainly accelerate this rising trend.

To conclude, China as a large continental sized economy will continue to depend primarily on its internal dynamics for its long-term growth. The contribution of external demand to growth will nominally remain small. But external demand is clearly rising, and it is set to play a more important supporting role for China's future economic growth, particularly when domestic demand falters. Since the 1997 Asian financial crisis, the Chinese government has come to rely on increasing fixed investment to pump prime growth. Beijing cannot continue with this proactive fiscal policy for long without running into unacceptable levels of fiscal deficits.[10] External demand will have to come in to play an increasingly crucial role in supporting China's future economic growth.

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[9] The elasticity coefficient for net exports in the post-*Nanxun* period is *0.02* as compared to 0.01 for the 1980-1992 period.

[10] In 2001, China's fiscal deficit/GDP ratio is only just within the "safety limit" of 3%. China cannot afford to continue playing around with such proactive expansionary policy year after year.

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Note: *2002 growth forecast estimated by World Bank in its half-yearly report on East Asia. China's official growth rate for 2002 is estimated to be 8%. Singapore's official growth forecast for 2002 is 2.2 percent.
Source: World Bank , *East Asia Regional Update: Making Progress in Uncertain Times*, **6 November**

FIGURE 1A   ECONOMIC PERFORMANCE OF CHINA
VIS-A-VIS 4 ASIAN NIEs, 1996-2002*
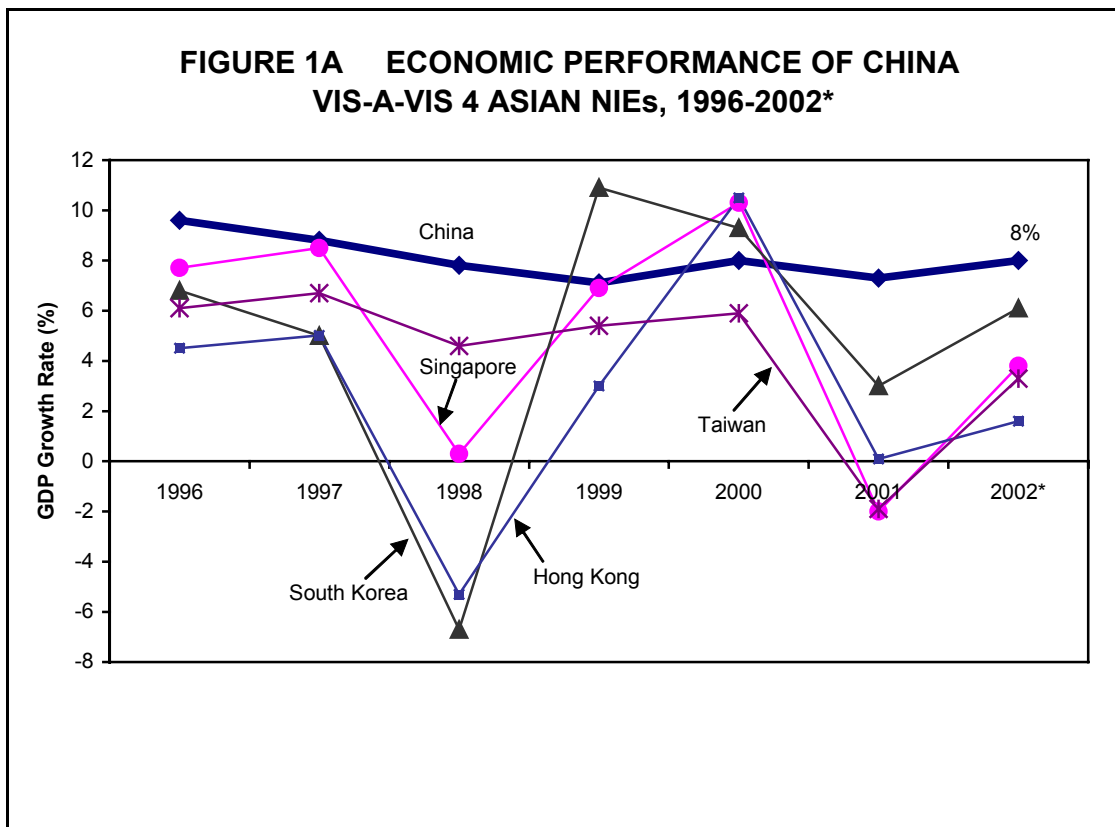
**Note: *2002 growth forecast estimated by World Bank in its half-yearly report on East Asia.
Source: World Bank , *East Asia Regional Update: Making Progress in Uncertain Times*, 6 November
2002; *Asian Development Outlook 2002*.**

FIGURE 1B   ECONOMIC PERFORMANCE OF CHINA AND THE ASEAN-4, 1996-2002*
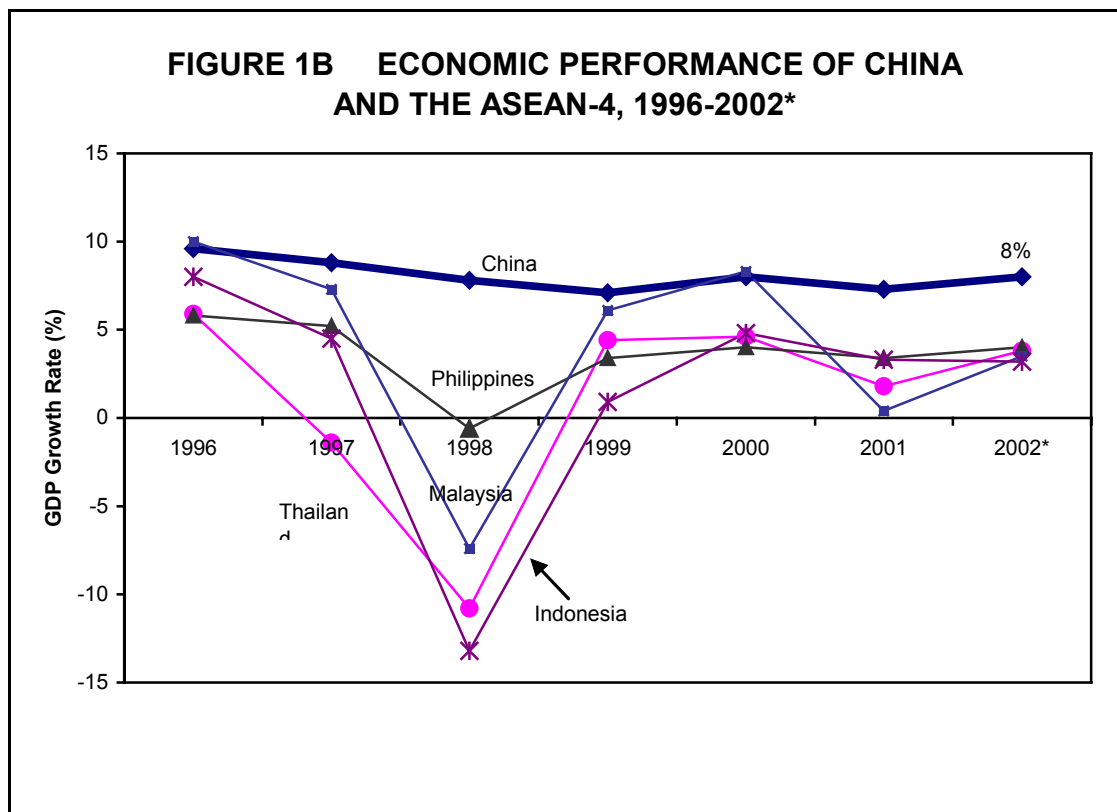
Note: Total demand comprises domestic demand (i.e., consumption and investment of both private and public sectors, plus changes in inventories) and external demand (i.e., exports). Sources: Computed from data in *China Statistical Yearboo*k (relevant years); *EIU*.

FIGURE 2 CHINA'S SOURCES OF ECONOMIC GROWTH, 1980-2001
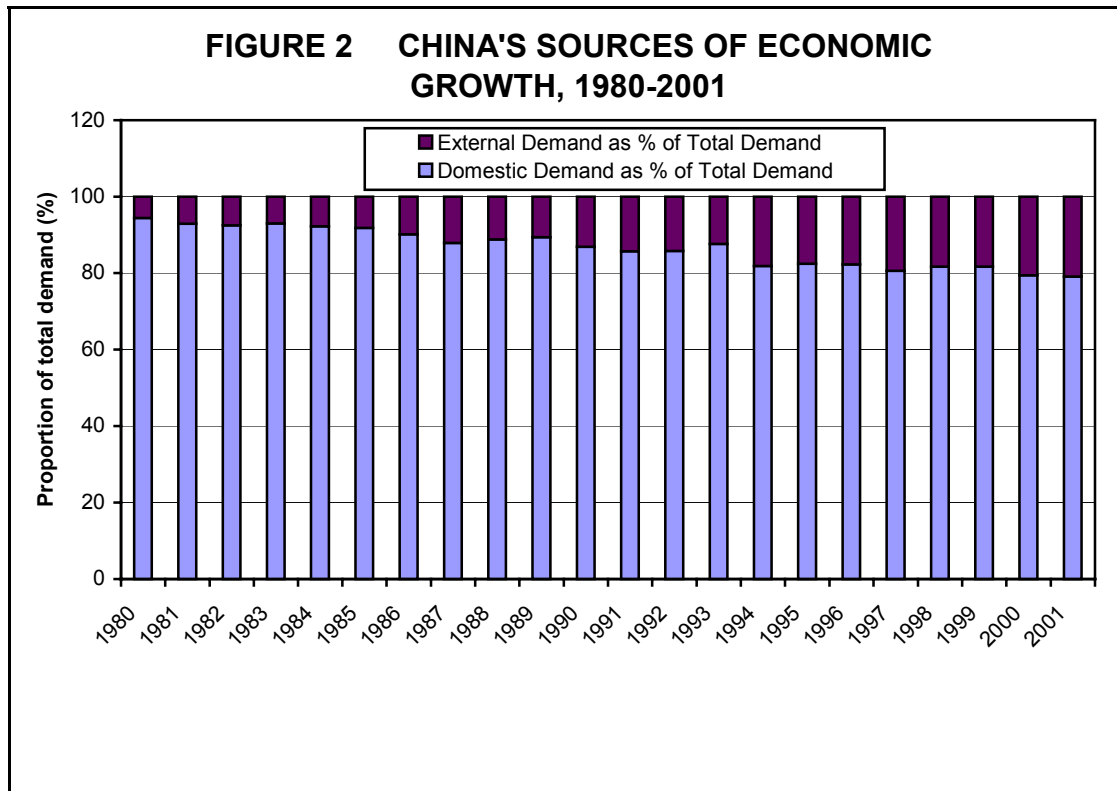
Source: China Statistical *Yearbook (various issues).*

FIGURE 3   FLUCTUATIONS IN CHINA'S ECONOMIC GROWTH, 1978-2002
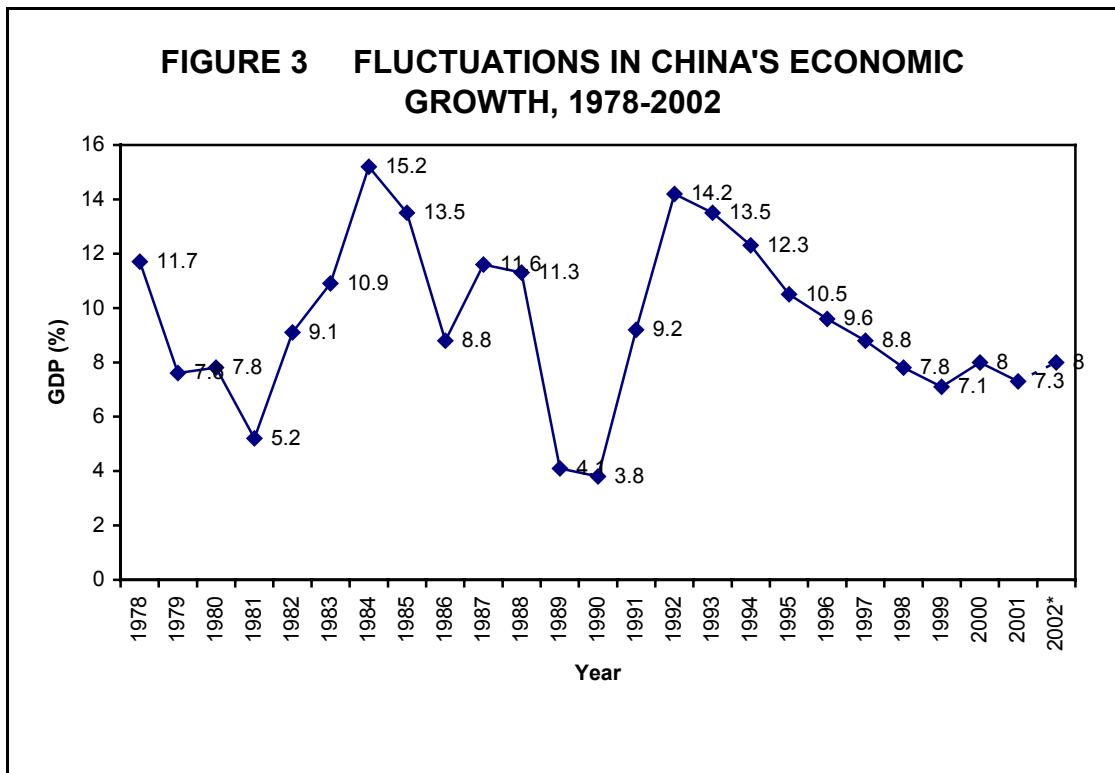
Sources: *China Statistical Yearbook*, relevant years.
For 2002 GDP growth forecast, *China Daily* (November 11, 2002).

**FIGURE 4   CHANGES IN TOTAL DEMAND AT 1990
MARKET PRICES, 1981-2001**
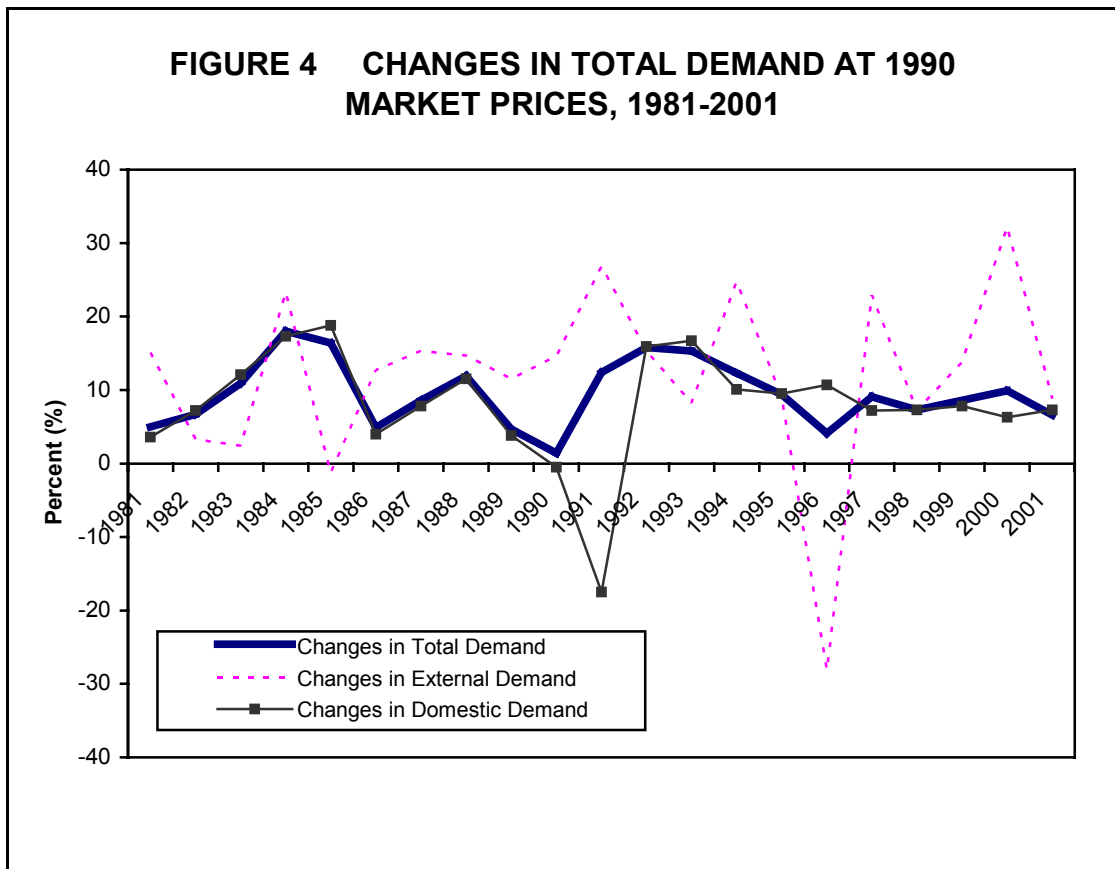
Source: Computed from data in China Statistical Abstract 2002 and *EIU*.

FIGURE 5   CHINA'S DOMESTIC DEMAND AND
ECONOMIC GROWTH PERFORMANCE, 1980-2001
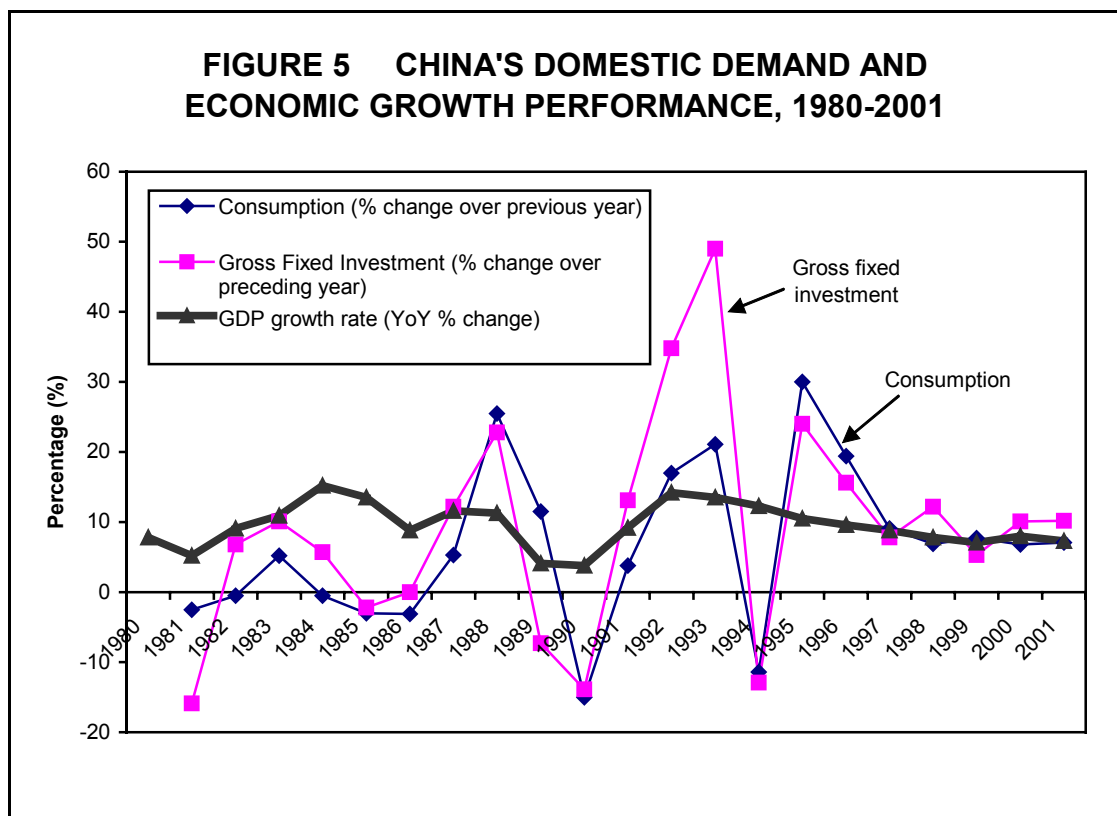
Source: Export-GDP ratios calculated from data provided by *EIU*.

FIGURE 6   OPENNESS OF THE CHINESE ECONOMY: EXPORT-GDP (NOMINAL) RATIOS
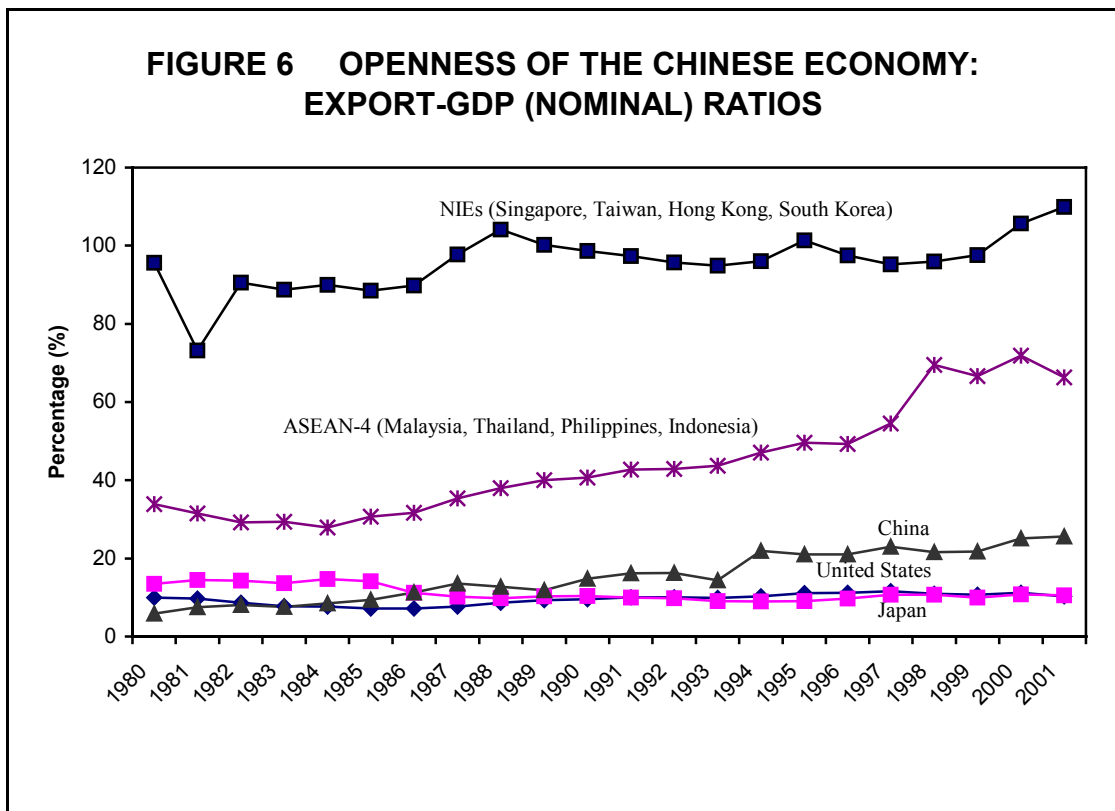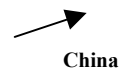
China

Source: Export-GDP (PPP) ratios calculated from data provided by *EIU*.

FIGURE 7   REAL OPENNESS OF THE CHINESE ECONOMY: EXPORT-GDP (PPP) RATIOS

TABLE 1   SOURCES OF AGGREGATE DEMAND IN CHINA, 1981-2000

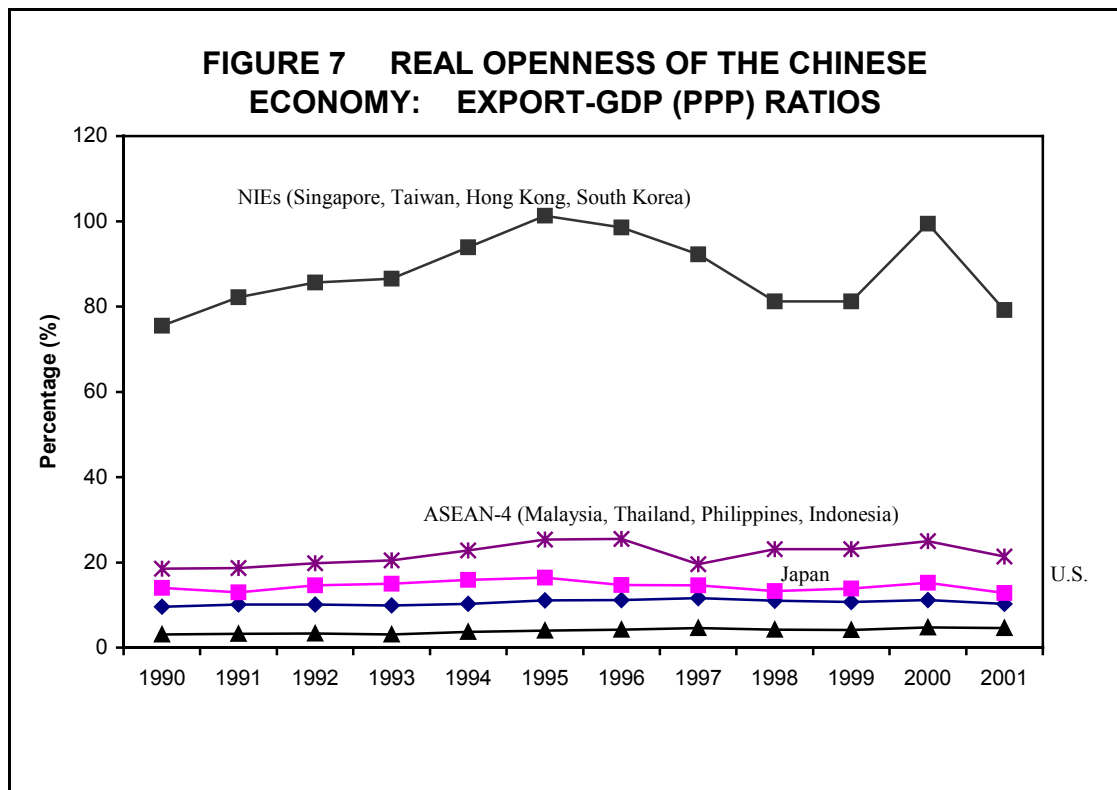| Percentage Point Contribution to GDP Growth by Each Expenditure Category			
Year	GDP Growth Rate(%)	Consumption (%)	Gross Fixed Investment (%)	Net Exports (%)
1981	5.3	5.7	-1.0	0.6
1982	12.1	6.8	3.7	1.6
1983	9.6	6.2	4.1	-0.7
1984	12.4	7.5	5.7	-0.8
1985	11.3	7.6	8.4	-4.7
1986	10.2	5.5	3.3	1.4
1987	10.6	5.4	2.6	2.6
1988	11.3	7.6	4.9	-1.2
1989	2.9	2.3	0.7	-0.1
1990	5.2	1.2	0.03	4.0
1991	8.9	5.2	3.3	0.4
1992	12.7	7.7	6.7	-1.7
1993	16.5	6.4	13.4	-3.3
1994	13.9	7.3	3.1	3.5
1995	9.7	5.3	3.9	0.5
1996	10.2	7.1	2.5	0.6
1997	8.7	4.7	2.0	2
1998	8.0	5.3	2.4	0.3
1999	6.7	5.6	2.1	-1.0
2000	8.6	5.7	3.1	-0.2

Notes: (1) Consumption refers to personal or household consumption plus government consumption. Investment refers to investment by both the private and public sectors.

(2) Computed from data in *China Statistical Yearbook*, using 1978 as the base year (1978 = 100). GDP growth rates (listed in the table) differ from the official figures due to statistical discrepancies using the GDP by expenditure approach.

Source: Lin Yifu, "Export and Economic Growth in China: A demand-oriented analysis", China Center for Economic Research, Peking University, Paper No. C2002002, 23 May 2002.

**TABLE 2   SOME INDICATORS ON THE OPENNESS OF
THE CHINESE ECONOMY**

Year	Export of Goods & Services as % of GDP	Trade in Goods as % of GDP	Trade in Services as % of GDP	Trade in both Goods & Services as % of GDP	FDI Inflows as % of Gross Fixed Capital Formation
1982	7.9	13.1	1.6	14.5	0.5
1983	7.5	12.8	1.5	14.3	0.7
1984	8.4	15.5	1.8	17.2	1.4
1985	9.4	21.2	1.9	23.4	1.8
1986	11.3	20.7	2.1	26.3	2.1
1987	13.9	22.4	2.2	27.4	2.3
1988	12.9	22.1	2.1	26.8	2.6
1989	12.4	21.1	1.9	25.6	3.0
1990	14.9	24.5	2.7	27.2	3.5
1991	16.5	27.3	2.8	30.0	3.9
1992	16.8	28.6	4.0	32.6	7.4
1993	14.5	27.0	3.9	30.9	12.3
1994	22.0	36.5	6.1	42.6	17.2
1995	21.0	34.0	6.3	40.2	14.8
1996	21.0	34.4	5.3	39.7	14.3
1997	22.7	35.1	5.8	41.1	14.6
1998	21.8	33.6	5.3	39.8	12.9
1999	22.0	35.3	5.8	41.2	10.8
2000	25.3	42.9	6.1	47.8	9.2

Note: (1) Nominal GDP at current market prices.
         (2) Data for years 1980 and 1981 unavailable.

Data calculated from official figures in *China Statistical Yearbook*, *EIU database*, *IMF International Financial Statistics Yearbook 2001*.

BOX 1

The national income accounting identity is as follows:

$$Y = C + I + G + (X - M) \qquad \text{---------- Equation (1)}$$

Y is GDP calculated using the expenditure approach, whereby *Y = national income, C = consumption, I = investment, (X-M) = net exports or NX*. It refers to total expenditure on final consumption, total capital formation (fixed assets acquired plus changes in inventory) and net export of goods and services by residents of a country in a certain period of time.

Economic growth is increases in GDP or *Y* over time, i.e., dY/dt. Hence, differentiating Equation (1) with respect to time will give

$$\dot{Y} = \dot{C} + \dot{I} + \dot{G} + (\dot{X} - \dot{M}) \qquad \text{---------- Equation (2)}$$

where $\dot{Y}$ = dY/dt

$\dot{C}$ = dC/dt (change in *C* over time)

$\dot{I}$ = dI/dt (change in *I* over time)

$\dot{G}$ = dG/dt (change in *G* over time)

$\dot{NX}$ = d(X-M)/dt (change in *NX* over time)

From Equation 2, we can derive

$$\frac{\dot{Y}}{Y} = \frac{\dot{C}}{Y} + \frac{\dot{I}}{Y} + \frac{\dot{G}}{Y} + \frac{\dot{NX}}{Y} \qquad \text{---------- Equation (3)}$$

where economic growth rate is $\frac{\dot{Y}}{Y}$ while $\frac{\dot{C}}{Y}$, $\frac{\dot{I}}{Y}$, $\frac{\dot{G}}{Y}$, $\frac{\dot{NX}}{Y}$ are the respective contribution rate of *C, I, G, NX* to $\frac{\dot{Y}}{Y}$ (i.e., rate of growth of Y). Technically, $\frac{\dot{C}}{Y}$, $\frac{\dot{I}}{Y}$, $\frac{\dot{G}}{Y}$, $\frac{\dot{NX}}{Y}$ are also the respective weighted growth rate of *C, I, G, NX* as seen from the following equation:

$$\frac{\dot{Y}}{Y} = \frac{\dot{C}}{C}\frac{C}{Y} + \frac{\dot{I}}{I}\frac{I}{Y} + \frac{\dot{G}}{G}\frac{G}{Y} + \frac{\dot{NX}}{NX}\frac{NX}{Y} \qquad \text{---------- Equation (4)}$$

where $\frac{C}{Y}$, $\frac{I}{Y}$, $\frac{G}{Y}$, $\frac{NX}{Y}$ are the respective shares of *C, I, G, NX* in *Y* while $\frac{\dot{C}}{C}$, $\frac{\dot{I}}{I}$, $\frac{\dot{G}}{G}$, $\frac{\dot{NX}}{NX}$ are the respective growth rate of *C, I, G* and *NX*.

BOX 2

Based on the data set which contains annual figures over the period 1980-2001, a multiple regression analysis is run to find out how much China's GDP or income will change given a unit change in the GDP components, namely consumption, investment and net exports.

Year	GDP (US$ Billion)	Consumption* (US$ Billion)	Gross Fixed Capital Investment (US$ Billion)	Net Exports (US$ Billion)
1980	304	199	106	-1
1981	288	194	93	0
1982	290	193	93	4
1983	308	203	102	2
1984	309	202	107	-1
1985	299	196	115	-14
1986	293	190	112	-11
1987	317	200	117	1
1988	395	251	147	-4
1989	437	280	162	-4
1990	383	238	135	10
1991	400	247	142	12
1992	469	289	178	5
1993	599	350	260	-11
1994	542	310	224	7
1995	701	403	286	12
1996	825	481	327	18
1997	902	525	341	34
1998	961	561	363	36
1999	1005	604	371	30
2000	1080	645	405	30
2001	1159	691	444	25

Notes: (1) Consumption refers to both private and government consumption.
(2) GFCI includes stock-building.
(3) Net Exports = Total Exports minus imports

Source: *EIU*

Based on the data above, the log-linear regression model is generated as follows. Assuming Y = GDP, C = consumption, GFCI = Gross Fixed Investment, NX = Net Exports,

$$\ln Y_t = 0.650041 + 0.663873 \ln C_t + 0.332125 \ln GFCI_t + 0.015076 \ln NX_t$$
$$t = (9.284)^* \quad (19.534)^* \quad (12.701)^* \quad (5.0695)^*$$

$$(R^2 = 0.99961)$$

The significance of each variable in determining the GDP growth is shown in parenthesis. The t-statistics show that all variables are statistically significant at $\alpha = 0.05$ (5% significance), which indicates that the model is stable over the data set period.

In the log-linear model, both the slope and the elasticity coefficients are the same. The elasticity values as found from the regression results are as follows:

Income elasticity of Y in relation to variables		
C	*GFCI*	*NX*
0.66	*0.33*	*0.02*

The results indicate that net exports over the past two decades play a very meagre role in increasing China's GDP. For every 1% increase in net exports, GDP on average is estimated to rise by 0.02%. For every 1% increase in consumption, holding other variables constant, China's GDP is estimated to rise by approximately 0.7%. Likewise for investment, every 1% increase in GFCI will result in an increase of GDP by 0.3%.

Note: More results of the multiple regression can be found in the Appendix.

APPENDIX

Further to the results shown in Box 2, another multiple regression analysis is run to find out how much GDP or income will change given a unit change in consumption, investment and total (or gross) exports.

Year	GDP (US$ Billion)	Consumption* (US$ Billion)	Gross Fixed Capital Investment (US$ Billion)	Total Exports (US$ Billion)
1980	304	199	106	18
1981	288	194	93	22
1982	290	193	93	23
1983	308	203	102	23
1984	309	202	107	26
1985	299	196	115	28
1986	293	190	112	33
1987	317	200	117	44
1988	395	251	147	51
1989	437	280	162	54
1990	383	238	135	57
1991	400	247	142	66
1992	469	289	178	79
1993	599	350	260	87
1994	542	310	224	119
1995	701	403	286	147
1996	825	481	327	172
1997	902	525	341	201
1998	961	561	363	210
1999	1005	604	371	245
2000	1080	645	405	298
2001	1159	691	444	296

Notes: (1) Consumption refers to both private and government consumption.
      (2) GFCI includes stock-building.

Source: *EIU*

Based on the data above, the log-linear regression model is generated as follows. Assuming Y = GDP, C = consumption, GFCI = Gross Fixed Investment, X = Total Exports,

$$\ln Y_t = 0.661083 + 0.79880 \ln C_t + 0.151919 \ln GFCI_t + 0.047944 \ln X_t$$
$$t = (5.056)^* \quad (14.089)^* \quad (3.0484)^* \quad (2.9578)^*$$

$$(R^2 = 0.99869)$$

* denotes that all variables are statistically significant at $\alpha = 0.05$ (5% significance), which indicates that the model is stable over the data set period (1980-2001). The elasticity values as found from the regression results are contained in the table below:

Income elasticity of Y in relation to variables		
C	*GFCI*	*X*
0.79	*0.15*	*0.05*

It can be deduced from the results that for every 1 per cent increase in consumption, China's GDP on average is estimated to increase by approximately 0.8%. For every 1% increase in investment, GDP is estimated to increase by 0.2%. And for every 1% increase in total or gross exports, GDP is estimated to rise by nearly 0.05%.

Breaking the data into two different periods and performing a regression analysis on the two separate time periods yield different results. Using data on GDP, consumption, investment and net exports,

Period 1980-1992:

Equation (1): $\ln Y_t = 0.35426 + 0.81491 \ln C_t + 0.2239 \ln GFCI_t + 0.01401 \ln NX_t$
          $t = (2.0689)^* \ (11.918)^* \qquad (4.693)^* \qquad (3.732)^*$

          $(R^2 = 0.99718)$

Income elasticity of Y in relation to variables		
C	*GFCI*	*NX*
0.81	*0.22*	*0.01*

Period 1992-2001:

Equation (2): $\ln Y_t = 0.80938 + 0.654818 \ln C_t + 0.314286 \ln GFCI_t + 0.01572 \ln NX_t$
          $t = (11.992)^* \ (10.1202)^* \quad (4.1333)^* \qquad (6.1274)^*$

          $(R^2 = 0.99984)$

The t-statistics denoted by asterisk show that all independent variables are statistically significant at 0.05 significance level.

Income elasticity of Y in relation to variables		
C	*GFCI*	*NX*
0.65	*0.31*	*0.02*

From the results, it is found that in the early reform period of 1980-1992, China's GDP is estimated to increase by 0.01% given a 1 per cent increase in net exports. In the post-*Nanxun* period (1992-2001) however, China's GDP is estimated to rise by 0.02% given a 1 per cent rise in net exports.